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R00001 THIS LGC PROGRAM IS INTENDED FOR USE IN THE LM DURING THE MANNED LUNAR LANDING MISSION OR ANY SUBSET THEREOF.
R00002 THE DETAILS OF IMPLEMENTATION ARE SPECIFIED IN REPORT R-567, AS AMENDED.

R000025 GUIDANCE SYSTEM OPERATIONS PLAN
R00003 FOR MANNED LM EARTH ORBITAL AND LUNAR MISSIONS
R000035 USING PROGRAM LUMINARY

R00004 THIS PROGRAM AND R-567 HAVE BEEN PREPARED BY THE INSTRUMENTATION LABORATORY, MASSACHUSETTS INSTITUTE OF
R00005 TECHNOLOGY 75 CAMBRIDGE PARKWAY, CAMBRIDGE, MASSACHUSETTS UNDER PROJECT 55-238-70, SPONSORED BY THE MANNED
R00006 SPACECRAFT CENTER OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, CONTRACT NAS 9-4065.

R00007 THIS PROGRAM IS REFERRED TO AS LUMINARY 1A

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PO113 VERB LIST FOR LUMINARY

RO114 REGULAR VERBS

RO115 00 NOT IN USE
RO116 01 DISPLAY OCTAL COMP 1 IN R1
RO117 02 DISPLAY OCTAL COMP 2 IN R1
RO118 03 DISPLAY OCTAL COMP 3 IN R1
RO119 04 DISPLAY OCTAL COMP 1,2 IN R1,R2
RO120 05 DISPLAY OCTAL COMP 1,2,3 IN R1,R2,R3
RO121 06 DISPLAY DECIMAL IN R1 OR R1,R2 OR R1,R2,R3
RO122 07 DISPLAY DP DECIMAL IN R1,R2 (TEST ONLY)
RO123 08
RO124 09
RO125 10
RO126 11 MONITOR OCTAL COMP 1 IN R1
RO127 12 MONITOR OCTAL COMP 2 IN R1
RO128 13 MONITOR OCTAL COMP 3 IN R1
RO129 14 MONITOR OCTAL COMP 1,2 IN R1,R2
RO130 15 MONITOR OCTAL COMP 1,2,3 IN R1,R2,R3
RO131 16 MONITOR DECIMAL IN R1 OR R1,R2 OR R1,R2,R3
RO132 17 MONITOR DP DECIMAL IN R1,R2 (TEST ONLY)
RO133 18
RO134 19
RO135 20
RO136 21 LOAD COMPONENT 1 INTO R1
RO137 22 LOAD COMPONENT 2 INTO R2
RO138 23 LOAD COMPONENT 3 INTO R3
RO139 24 LOAD COMPONENT 1,2 INTO R1,R2
RO140 25 LOAD COMPONENT 1,2,3 INTO R1,R2,R3
RO141 26
RO142 27 DISPLAY FIXED MEMORY
RO143 28
RO144 29
RO145 30 REQUEST EXECUTIVE
RO146 31 REQUEST WAITLIST
RO147 32 RECYCLE PROGRAM
RO148 33 PROCEED WITHOUT DSKY INPUTS
RO149 34 TERMINATE FUNCTION
RO150 35 TEST LIGHTS
RO151 36 REQUEST FRESH START
RO152 37 CHANGE PROGRAM (MAJOR MODE)
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P0155 EXTENDED VERBS

R0156 40 ZERO CDU-S
R0157 41 COARSE ALIGN CDU-S
R0158 42 FINE ALIGN IMU
R0159 43 LOAD IMU ATT ERROR METERS
R0160 44 TERMINATE RR CONTINUOUS DESIGNATE (V4IN72 OPTION 2)
R0161 45
R0162 46
R0163 47 INITIALIZE AGS (R47)
R0164 48 REQUEST DAP DATA LOAD ROUTINE (R03)
R0165 49 REQUEST CREW DEFINED MANEUVER ROUTINE (R62)
R0166 50 PLEASE PERFORM
R0167 51
R0168 52 MARK X-RETICLE
R0169 53 MARK Y-RETICLE
R0170 54 MARK X OR Y-RETICLE
R0171 55 INCREMENT AGC TIME (DECIMAL)
R0172 56 TERMINATE TRACKING (P20 + P25)
R0173 57 PERMIT LANDING RADAR UPDATES
R0174 58 INHIBIT LANDING RADAR UPDATES
R0175 59
R0176 60 COMMAND LR TO POSITION 2.
R0177 61 DISPLAY DAP FOLLOWING ATTITUDE ERRORS.
R0178 62 DISPLAY TOTAL ATTITUDE ERRORS WITH RESPECT TO NOUN 22.
R0179 63 SAMPLE RADAR ONCE PER SECOND (R04).
R0180 64 REQUEST S-BAND ANTENNA ROUTINE (R05)
R0181 65 DISABLE U AND V JET FIRINGS DURING DPS BURNS.
R0182 66 VEHICLES ARE ATTACHED. MOVE THIS VEHICLE STATE TO OTHER VEHICLE.
R0183 67 DISPLAY W MATRIX
R0184 68
R0185 69 CAUSE RESTART
R0186 70 UPDATE LIFTOFF TIME
R0187 71 UNIVERSAL UPDATE-BLOCK ADR
R0188 72 UNIVERSAL UPDATE-SINGLE ADR
R0189 73 UPDATE AGC TIME (OCTAL)
R0190 74 INITIALIZE ERASABLE DUMP VIA DOWNLINK
R0191 75 ENABLE U AND V JET FIRINGS DURING DPS BURNS.
R0192 76 MINIMUM IMPULSE COMMAND MODE
R0193 77 RATE COMMAND AND ATTITUDE HOLD MODE
R0194 78 LR SPURIOUS RETURN TEST START (R77)
R0195 79 LR SPURIOUS RETURN TEST STOP
R0196 80 UPDATE LEM STATE VECTOR
R0197 81 UPDATE CSM STATE VECTOR
R0198 82 REQUEST ORBIT PARAM DISPLAY (R30)
R0199 83 REQUEST REND PARAM DISPLAY (R31)
R0200 84
R0201 85 DISPLAY RR LOS AZ AND ELEV
R0202 86
R0203 87

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R0204 88
R0205 89 REQUEST RENDEZVOUS FINAL ATTITUDE ROUTINE (R63)
R0206 90 REQUEST RENDEZVOUS OUT OF PLANE DISPLAY ROUTINE (R36)
R0207 91 DISPLAY BANK SUM
R0208 92 OPERATE IMU PERFORMANCE TEST (P07)
R0209 93 ENABLE W MATRIX INITIALIZATION
R0210 94
R0211 95 NO UPDATE OF EITHER STATE VECTOR (P20 OR P22)
R0212 96 INTERRUPT INTEGRATION AND GO TO P00
R0213 97 PERFORM ENGINE FAIL PROCEDURE
R0214 98
R0215 99 PLEASE ENABLE ENGINE

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R0216 IN THE FOLLOWING NOUN LIST THE :NO LOAD: RESTRICTION MEANS THE NOUN
 R0217 CONTAINS AT LEAST ONE COMPONENT WHICH CANNOT BE LOADED. I.E. OF
 R0218 SCALE TYPE L (MIN/SEC), PP (2 INTEGERS) OR TT (LANDING RADAR POSITION).
 R0219 IN THIS CASE VERBS 24 AND 25 ARE NOT ALLOWED. BUT VERBS 21, 22 OR 23
 R0220 MAY BE USED TO LOAD ANY OF THE NOUN'S COMPONENTS WHICH ARE NOT OF THE
 R0221 ABOVE SCALE TYPES.
 R0222 THE :DEC ONLY: RESTRICTION MEANS ONLY DECIMAL OPERATION IS ALLOWED ON
 R0223 EVERY COMPONENT IN THE NOUN. (NOTE THAT :NO LOAD: IMPLIES :DEC ONLY:.)

R0224	NORMAL NOUNS	COMPONENTS	SCALE AND DECIMAL POINT	RESTRICTIONS
R0226	00 NOT IN USE			
R0227	01 SPECIFY MACHINE ADDRESS (FRACTIONAL)	3COMP	.XXXXX FOR EACH	
R0228	02 SPECIFY MACHINE ADDRESS (WHOLE)	3COMP	XXXXX. FOR EACH	
R0229	03 SPECIFY MACHINE ADDRESS (DEGREES)	3COMP	XXX.XX DEG FOR EACH	
R0230	04 ANGULAR ERROR/DIFFERENCE	1COMP	XXX.XX DEG	
R0231	05 ANGULAR ERROR/DIFFERENCE	1COMP	XXX.XX DEG	
R0232	06 OPTION CODE	3COMP	OCTAL ONLY FOR EACH	
R0233	LOADING NOUN 07 WILL SET OR RESET SELECTED BITS IN ANY ERASABLE REGISTER			
R0234	07 ECADR OF WORD TO BE MODIFIED	3COMP	OCTAL ONLY FOR EACH	
R0235	ONES FOR BITS TO BE MODIFIED			
R0236	1 TO SET OR 0 TO RESET SELECTED BITS			
R0237	08 ALARM DATA	3COMP	OCTAL ONLY FOR EACH	
R0238	09 ALARM CODES	3COMP	OCTAL ONLY FOR EACH	
R0239	10 CHANNEL TO BE SPECIFIED	1COMP	OCTAL ONLY	
R0240	11 TIG OF CSI	3COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC	DEC ONLY MUST LOAD 3 COMPS
R0242				
R0244				
R0245	12 OPTION CODE	2COMP	OCTAL ONLY FOR EACH	
R0246	(USED BY EXTENDED VERBS ONLY)			
R0247	13 TIG OF CDH	3COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC	DEC ONLY MUST LOAD 3 COMPS
R0249				
R0251				
R0252	14 CHECKLIST	3COMP	XXXXX. FOR EACH	
R0253	(USED BY EXTENDED VERBS ONLY)			
R0254	(NOUN 25 IS PASTED AFTER DISPLAY)			
R0255	15 INCREMENT MACHINE ADDRESS	1COMP	OCTAL ONLY	
R0256	16 TIME OF EVENT	3COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC	DEC ONLY MUST LOAD 3 COMPS
R0258	(USED BY EXTENDED VERBS ONLY)			
R0260				
R0261	17 SPARE			
R0262	18 AUTO MANEUVER BALL ANGLES	3COMP	XXX.XX DEG FOR EACH	
R0263	19 SPARE			
R0264	20 ICDU ANGLES	3COMP	XXX.XX DEG FOR EACH	
R0265	21 PIPAS	3COMP	XXXXX. PULSES FOR EACH	
R0267	22 NEW ICDU ANGLES	3COMP	XXX.XX DEG FOR EACH	
R0268	23 SPARE			
R0269	24 DELTA TIME FOR AGC CLOCK	3COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC	DEC ONLY MUST LOAD 3 COMPS
R0271				
R0273				

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R0274	25	CHECKLIST	3COMP	XXXXX. FOR EACH	
R0275		(USED WITH PLEASE PERFORM ONLY)			
R0276	26	PRIORITY/DELAY, ADRES, BBCON	3COMP	OCTAL ONLY FOR EACH	
R0277	27	SELF TEST ON/OFF SWITCH	1COMP	XXXXX.	
R0278	28	SPARE			
R0279	29	SPARE			
R0280	30	SPARE			
R0281	31	SPARE			
R0282	32	TIME FROM PERIGEE	3COMP	00XXX. HRS	DEC ONLY
R0284				000XX. MIN	MUST LOAD 3 COMPS
R0286				0XX.XX SEC	
R0287	33	TIME OF IGNITION	3COMP	00XXX. HRS	DEC ONLY
R0289				000XX. MIN	MUST LOAD 3 COMPS
R0291				0XX.XX SEC	
R0292	34	TIME OF EVENT	3COMP	00XXX. HRS	DEC ONLY
R0294				000XX. MIN	MUST LOAD 3 COMPS
R0296				0XX.XX SEC	
R0297	35	TIME FROM EVENT	3COMP	00XXX. HRS	DEC ONLY
R0299				000XX. MIN	MUST LOAD 3 COMPS
R0301				0XX.XX SEC	
R0302	36	TIME OF AGC CLOCK	3COMP	00XXX. HRS	DEC ONLY
R0304				000XX. MIN	MUST LOAD 3 COMPS
R0306				0XX.XX SEC	
R0307	37	TIG OF TPI	3COMP	00XXX. HRS	DEC ONLY
R0309				000XX. MIN	MUST LOAD 3 COMPS
R0311				0XX.XX SEC	
R0312	38	TIME OF STATE BEING INTEGRATED	3COMP	00XXX. HRS	DEC ONLY
R0314				000XX. MIN	MUST LOAD 3 COMPS
R0316				0XX.XX SEC	
R0317	39	SPARE			

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PO310	MIXED NOUNS	COMPONENTS	SCALE AND DECIMAL POINT	RESTRICTIONS
R0320	40 TIME FROM IGNITION/CUTOFF	3COMP	XXBXX MIN/SEC	NO LOAD, DEC ONLY
R0322	VG,		XXXX.X FT/SEC	
R0323	DELTA V (ACCUMULATED)		XXXX.X FT/SEC	
R0324	41 TARGET AZIMUTH,	2COMP	XXX.XX DEG	(FOR SYSTEM TEST)
R0326	ELEVATION		XX.XXX DEG	
R0327	42 APOGEE,	3COMP	XXXX.X NAUT MI	DEC ONLY
R0329	PERIGEE,		XXXX.X NAUT MI	
R0330	DELTA V (REQUIRED)		XXXX.X FT/SEC	
R0331	43 LATITUDE,	3COMP	XXX.XX DEG	DEC ONLY
R0333	LONGITUDE,		XXX.XX DEG	
R0334	ALTITUDE		XXXX.X NAUT MI	
R0335	44 APDCEE,	3COMP	XXXX.X NAUT MI	NO LOAD, DEC ONLY
R0337	PERIGEE,		XXXX.X NAUT MI	
R0338	TFF		XXBXX MIN/SEC	
R0339	45 MARKS,	3COMP	XXXXX.	NO LOAD, DEC ONLY
R0341	TFI OF NEXT BURN		XXBXX MIN/SEC	
R0342	MGA		XXX.XX DEG	
R0343	46 AUTOPILOT CONFIGURATION	1COMP	OCTAL ONLY	
R0344	47 LEM WEIGHT,	2COMP	XXXXX. LBS	DEC ONLY
R0346	CSM WEIGHT		XXXXX. LBS	
R0347	48 GIMBAL PITCH TRIM,	2COMP	XXX.XX DEG	DEC ONLY
R0349	GIMBAL ROLL TRIM		XXX.XX DEG	
R0350	49 DELTA R,	3COMP	XXXX.X NAUT MI	DEC ONLY
R0352	DELTA V,		XXXX.X FT/SEC	
R03521	RADAR DATA SOURCE CODE		XXXXX.	
R0353	50 SPARE			
R0354	51 S-BAND ANTENNA ANGLES PITCH	2COMP	XXX.XX DEG	DEC ONLY
R0356	YAW		XXX.XX DEG	
R0357	52 CENTRAL ANGLE OF ACTIVE VEHICLE	1COMP	XXX.XX DEG	
R0358	53 SPARE			
R0359	54 RANGE,	3COMP	XXX.XX NAUT MI	DEC ONLY
R0361	RANGE RATE,		XXXX.X FT/SEC	
R0362	THETA		XXX.XX DEG	
R0363	55 NO. OF APSIDAL CROSSINGS	3COMP	XXXXX.	DEC ONLY
R0365	ELEVATION ANGLE		XXX.XX DEG	
R0366	CENTRAL ANGLE OF PASSIVE VEHICLE		XXX.XX DEG	
R0367	56 RR LOS AZIMUTH	2COMP	XXX.XX DEG	
R0368	ELEVATION		XXX.XX DEG	
R0369	57 DELTA R	1COMP	XXXX.X NAUT MI	DEC ONLY
R0371	58 PERIGEE ALT (POST TPI)	3COMP	XXXX.X NAUT MI	DEC ONLY
R0373	DELTA V TPI		XXXX.X FT/SEC	
R0374	DELTA V TPF		XXXX.X FT/SEC	
R0375	59 DELTA VELOCITY LOS	3COMP	XXXX.X FT/SEC FOR EA.	DEC ONLY
R0377	60 HORIZONTAL VELOCITY	3COMP	XXXX.X FT/SEC	DEC ONLY
R0379	ALTITUDE RATE		XXXX.X FT/SEC	
R0380	COMPUTED ALTITUDE		XXXXX. FEET	
R0381	61 TIME TO GO IN BRAKING PHASE	3COMP	XXBXX MIN/SEC	NO LOAD, DEC ONLY
R0383	TIME FROM IGNITION		XXBXX MIN/SEC	

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R0384		CROSS RANGE DISTANCE		XXXX.X NAUT MI	
R0385	62	ABSOLUTE VALUE OF VELOCITY	3COMP	XXXX.X FT/SEC	NO LOAD, DEC ONLY
R0387		TIME FROM IGNITION		XXBXX MIN/SEC	
R0388		DELTA-V (ACCUMULATED)		XXXX.X FT/SEC	
R0389	63	ABSOLUTE VALUE OF VELOCITY	3COMP	XXXX.X FT/SEC	DEC ONLY
R0391		ALTITUDE RATE		XXXX.X FT/SEC	
R0392		COMPUTED ALTITUDE		XXXXX. FEET	
R0393	64	TIME LEFT FOR REDESIGNATION- LPD ANGLE	3COMP	XXBXX	NO LOAD, DEC ONLY
R0395		ALTITUDE RATE		XXXX.X FT/SEC	
R0396		COMPUTED ALTITUDE		XXXXX. FEET	
R0397	65	SAMPLED AGC TIME	3COMP	00XXX. HRS	DEC ONLY
R0399		(FETCHED IN INTERRUPT)		000XX. MIN	MUST LOAD 3 COMPS
R0401				0XX.XX SEC	
R0402	66	LR RANGE	2COMP	XXXXX. FEET	NO LOAD, DEC ONLY
R0404		POSITION		+0000X	
R0405	67	LRVX	3COMP	XXXXX. FT/SEC	
R0406		LRVY		XXXXX. FT/SEC	
R0407		LRVZ		XXXXX. FT/SEC	
R0408	68	SLANT RANGE TO LANDING SITE	3COMP	XXXX.X NAUT MI	NO LOAD, DEC ONLY
R0410		TIME TO GO IN BRAKING PHASE		XXBXX MIN/SEC	
R0411		LR ALTITUDE - COMPUTED ALTITUDE		XXXXX. FEET	
R0412	69	SPARE			
R0413	70	AOT DETENT CODE/STAR CODE	3COMP	0CTAL ONLY FOR EACH	
R0414	71	AOT DETENT CODE/STAR CODE	3COMP	0CTAL ONLY FOR EACH	
R0415	72	RR 360 - TRUNNION ANGLE	2COMP	XXX.XX DEG	
R0416		SHAFT ANGLE		XXX.XX DEG	
R0417	73	NEW RR 360 - TRUNNION ANGLE	2COMP	XXX.XX DEG	
R0418		SHAFT ANGLE		XXX.XX DEG	
R0419	74	TIME FROM IGNITION	3COMP	XXBXX MIN/SEC	NO LOAD, DEC ONLY
R0421		YAW AFTER VEHICLE RISE		XXX.XX DEG	
R0422		PITCH AFTER VEHICLE RISE		XXX.XX DEG	
R0423	75	DELTA ALTITUDE CDH	3COMP	XXXX.X NAUT MI	NO LOAD, DEC ONLY
R0425		DELTA TIME (CDH-CSI OR TPI-CDH)		XXBXX MIN/SEC	
R0426		DELTA TIME (TPI-CDH OR TPI-NDMTPI)		XXBXX MIN/SEC	
R0427	76	DESIRED HORIZONTAL VELOCITY	3COMP	XXXX.X FT/SEC	DEC ONLY
R0429		DESIRED RADIAL VELOCITY		XXXX.X FT/SEC	
R04291		CROSS-RANGE DISTANCE		XXXX.X NAUT MI	
R0430	77	TIME TO ENGINE CUTOFF	2COMP	XXBXX MIN/SEC	NO LOAD, DEC ONLY
R0432		VELOCITY NORMAL TO CSM PLANE		XXXX.X FT/SEC	
R0433	78	RR RANGE	2COMP	XXX.XX NAUT MI	
R0434		RANGE RATE		XXXXX. FT/SEC	
R0435	79	CURSOR ANGLE	3COMP	XXX.XX DEG	DEC ONLY
R0437		SPIRAL ANGLE		XXX.XX DEG	
R0438		POSITION CODE		XXXXX.	
R0439	80	DATA INDICATOR.	2COMP	XXXXX.	
R0440		OMEGA		XXX.XX DEG	
R0441	81	DELTA-V (LV)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY

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R0443	82	DELTA V (LV)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0445	83	DELTA V (BODY)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0447	84	DELTA V (OTHER VEHICLE)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0449	85	VG (BODY)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0451	86	VG (LV)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0453	87	BACKUP OPTICS LOS AZIMUTH	2COMP	XXX.XX DEG	
R0454		ELEVATION		XXX.XX DEG	
R0455	88	HALF UNIT SUN OR PLANET VECTOR	3COMP	.XXXXX FOR EACH	DEC ONLY
R0457	89	LANDMARK LATITUDE	3COMP	XX.XXX DEG	DEC ONLY
R0459		LONGITUDE/2		XX.XXX DEG	
R0460		ALTITUDE		XXX.XX NAUT MI	
R0461	90	Y	3COMP	XXX.XX NM	DEC ONLY
R0463		Y-DOT		XXXX.X FPS	
R0464		PSI		XXX.XX DEG	
R0465	91	ALTITUDE	3COMP	XXXXXB. NAUT MI	
R04651		VELOCITY		XXXXX. FT/SEC	
R04652		FLIGHT-PATH ANGLE		XXX.XX DEG	
R0466	92	SPARE			
R0467	93	DELTA-GYRD ANGLES	3COMP	XX.XXX DEG FOR EACH	
R0468	94	SPARE			
R0469	95	SPARE			
R0470	96	SPARE			
R0471	97	SYSTEM TEST INPUTS	3COMP	XXXXX. FOR EACH	
R0472	98	SYSTEM TEST RESULTS AND INPUTS	3COMP	XXXXX.	
R0473				.XXXXX	
R0474				XXXXX.	
R0475	99	RMS IN POSITION	3COMP	XXXXX. FT	DEC ONLY
R0477		RMS IN VELOCITY		XXXX.X FT/SEC	
R04771		RMS IN BIAS		XX.XXX RADIAN	

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R0478 REGISTERS AND SCALING FOR NORMAL NOUNS

R0479	NOUN	REGISTER	SCALE TYPE
R0480	00	NOT IN USE	
R0481	01	SPECIFY ADDRESS	B
R0482	02	SPECIFY ADDRESS	C
R0483	03	SPECIFY ADDRESS	D
R0484	04	DSPTM1	H
R0485	05	DSPTM1	H
R0486	06	OPTION1	A
R0487	07	XREG	A
R0488	08	ALMCADR	A
R0489	09	FAILREG	A
R0490	10	SPECIFY CHANNEL	A
R0491	11	TCSI	K
R0492	12	OPTIONX	A
R0493	13	TCDH	K
R0494	14	DSPTMX	C
R0495	15	INCREMENT ADDRESS	A
R0496	16	DSPTMX	C
R0497	17	SPARE	
R0498	18	FDAIX	D
R0499	19	SPARE	
R0500	20	CDUX	D
R0501	21	PIPAX	C
R0502	22	THETAD	D
R0503	23	SPARE	
R0504	24	DSPTM2 +1	K
R0505	25	DSPTM1	C
R0506	26	DSPTM1	A
R0507	27	SMDDE	C
R0508	28	SPARE	
R0509	29	SPARE	
R0510	30	SPARE	
R0511	31	SPARE	
R0512	32	-TPER	K
R0513	33	TIG	K
R0514	34	DSPTM1	K
R0515	35	TTOGO	K
R0516	36	TIME2	K
R0517	37	TTP1	K
R0518	38	TET	K
R0519	39	SPARE	

L ASSEMBLY AND OPERATION INFORMATION

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R0520 REGISTERS AND SCALING FOR MIXED NOUNS

R0521	NOUN	COMP	REGISTER	SCALE TYPE
R0522	40	1	TTOGO	L
R0523		2	VGDISP	S
R0524		3	DVTOTAL	S
R0525	41	1	DSPTM1	D
R0526		2	DSPTM1 +1	E
R0527	42	1	HAPO	Q
R0528		2	HPER	Q
R0529		3	VGDISP	S
R0530	43	1	LAT	H
R0531		2	LONG	H
R0532		3	ALT	Q
R0533	44	1	HAPOX	Q
R0534		2	HPERX	Q
R0535		3	TFF	L
R0536	45	1	TRKMKCNT	C
R0537		2	TTOGO	L
R0538		3	+HGA	H
R0539	46	1	DAPDATR1	A
R0540	47	1	LEMMASS	KK
R0541		2	CSMMASS	KK
R0542	48	1	PITTIME	NN
R0543		2	ROLLTIME	NN
R0544	49	1	R22DISP	Q
R0545		2	P22DISP +2	S
R05451		3	WHCHREAD	C
R0546	50		SPARE	
R0547	51	1	ALPHASB	H
R0548		2	BETASB	H
R0549	52	1	ACTCENT	H
R0550	53		SPARE	
R0551	54	1	RANGE	JJ
R0552		2	PRATE	S
R0553		3	RTHETA	H
R0554	55	1	NN	C
R0555		2	ELEV	H
R0556		3	CENTANG	H
R0557	56	1	RR-AZ	H
R0558		2	RR-ELEV	H
R0559	57	1	DELTAR	Q
R0560	58	1	POSTTPI	Q
R0561		2	DELVTPI	S
R0562		3	DELVTPI	S
R0563	59	1	DVLOS	S
R0564		2	DVLOS +2	S
R0565		3	DVLOS +4	S
R0566	60	1	VHORIZ	S

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R0567		2	HDDTDISP	S
R0568		3	HCALC	RR
R0569	61	1	TTFDISP	L
R0570		2	TTOGO	L
R0571		3	GUTOFPLN	QQ
R0572	62	1	ABVEL	S
R0573		2	TTOGO	L
R0574		3	DVTOTAL	S
R0575	63	1	ABVEL	S
R0576		2	HDDTDISP	S
R0577		3	HCALC1	RR
R0578	64	1	FUNNYDSP	PP
R0579		2	HDDTDISP	S
R0580		3	HCALC	RR
R0581	65	1	SAMPTIME	K
R0582		2	SAMPTIME	K
R0583		3	SAMPTIME	K
R0584	66	1	RSTACK +6	W
R0585		2	CHANNEL 33	TT
R0586	67	1	RSTACK	X
R0587		2	RSTACK +2	Y
R0588		3	RSTACK +4	Z
R0589	68	1	RANGEDSP	QQ
R0590		2	TTFDISP	L
R0591		3	DELTAH	RR
R0592	69	SPARF		
R0593	70	1	AOTCODE	A
R0594		2	AOTCODE +1	A
R0595		3	AOTCODE +2	A
R0596	71	1	AOTCODE	A
R0597		2	AOTCODE +1	A
R0598		3	AOTCODE +2	A
R0599	72	1	CDUT	WW
R0600		2	CDUS	D
R0601	73	1	TANG	WW
R0602		2	TANG +1	D
R0603	74	1	TTOGO	L
R0604		2	YAW	H
R0605		3	PITCH	H
R0606	75	1	DIFFALT	O
R0607		2	T1TOT2	L
R0608		3	T2TOT3	L
R0609	76	1	ZDOTD	S
R0610		2	RDOTD	S
R06101		3	XRANGE	O
R0611	77	1	TTOGO	L
R0612		2	YDOT	S
R0613	78	1	RSTACK	U
R0614		2	RSTACK +2	V
R0615	79	1	CURSOR	D

L ASSEMBLY AND OPERATION INFORMATION

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R0616		2	SPIRAL	D
R0617		3	PUSCODE	C
R0618	80	1	DATACORD	C
R0619		2	OMEGAD	H
R0620	81	1	DELVLVC	S
R0621		2	DELVLVC +2	S
R0622		3	DELVLVC +4	S
R0623	82	1	DELVLVC	S
R0624		2	DELVLVC +2	S
R0625		3	DELVLVC +4	S
R0626	83	1	DELVIMU	S
R0627		2	DELVIMU +2	S
R0628		3	DELVIMU +4	S
R0629	84	1	DELVOV	S
R0630		2	DELVOV +2	S
R0631		3	DELVOV +4	S
R0632	85	1	VGBODY	S
R0633		2	VGBODY +2	S
R0634		3	VGBODY +4	S
R0635	86	1	DELVLVC	S
R0636		2	DELVLVC +2	S
R0637		3	DELVLVC +4	S
R0638	87	1	AZ	D
R0639		2	EL	D
R0640	88	1	STARAD	B
R0641		2	STARAD +2	B
R0642		3	STARAD +4	B
R0643	89	1	LANDLAT	G
R0644		2	LANDLONG	G
R0645		3	LANDALT	JJ
R0646	90	1	RANGE	JJ
R0647		2	RRATE	S
R0648		3	RTHETA	H
R0649	91	1	P21ALT	Q (MEMORY/100 TO DISPLAY TENS N.M.)
R06491		2	P21VEL	P
R06492		3	P21GAM	H
R0650	92	SPARE		
R0651	93	1	DGC	G
R0652		2	DGC +2	C
R0653		3	DGC +4	G
R0654	94	SPARE		
R0655	95	SPARE		
R0656	96	SPARE		
R0657	97	1	DSPTM1	C
R0658		2	DSPTM1 +1	C
R0659		3	DSPTM1 +2	C
R0660	98	1	DSPTM2	C
R0661		2	DSPTM2 +1	C
R0662		3	DSPTM2 +2	C
R0663	99	1	HWPOS	XX

ASSEMBLY AND OPERATION INFORMATION

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R0664	2	WWVEL	YY
R06641	3	WWBIAS	AAA

L ASSEMBLY AND OPERATION INFORMATION

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P0665 NOUN SCALES AND FORMATS

R0666	-SCALE TYPE-	PRECISION	
R0667	UNITS	DECIMAL FORMAT	-- AGC FORMAT
R0668	-----	-----	-----
R0669	-A-		
R0670	OCTAL	XXXXX	SP OCTAL
R0671	-B-		
R0672	FRACTIONAL	.XXXXX	SP BIT 1 = 2 ⁻¹⁴ UNITS
R0673		(MAX .99996)	
R0674	-C-		
R0675	WHOLE	XXXXX.	SP BIT 1 = 1 UNIT
R0676		(MAX 16383.)	
R0677	-D-		
R0678	CDU DEGREES	XXX.XX DEGREES	SP BIT 1 = 360/2 ¹⁵ DEGREES
R0679		(MAX 359.99)	(USES 15 BITS FOR MAGNI-
R0680			TUDE AND 2-5 COMP.)
R0681	-E-		
R0682	ELEVATION DEGREES	XX.XXX DEGREES	SP BIT 1 = 90/2 ¹⁴ DEGREES
R0683		(MAX 89.999)	
R0684	-F-		
R0685	DEGREES (180)	XXX.XX DEGREES	SP BIT 1 = 180/2 ¹⁴ DEGREES
R0686		(MAX 179.99)	
R0687	-G-		
R0688	DP DEGREES (90)	XX.XXX DEGREES	DP BIT 1 OF LOW REGISTER =
R0689			28
R0690			360/2 DEGREES
R0691	-H-		
R0692	DP DEGREES (360)	XXX.XX DEGREES	DP BIT 1 OF LOW REGISTER =
R0693			28
R0694		(MAX 359.99)	360/2 DEGREES

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P0695 -K-
R0696 TIME (HR. MIN. SEC) 00XXX. HR DP BIT 1 OF LOW REGISTER =
R0697 000XX. MIN -2
R0698 0XX.XX SEC 10 SEC
R0699 (DECIMAL ONLY.
R0700 MAX MIN COMP=59
R0701 MAX SEC COMP=59.99
R0702 MAX CAPACITY=745 HRS
R0703 39 MINS
R0704 14.55 SECS.
R0705 WHEN LOADING, ALL 3
R0706 COMPONENTS MUST BE
R0707 SUPPLIED.)

R0708 -L-
R0709 TIME (MIN/SEC) XXBXX MIN/SEC DP BIT 1 OF LOW REGISTER =
R0710 (B IS A BLANK -2
R0711 POSITION, DECIMAL 10 SEC
R0712 ONLY, DISPLAY OR
R0713 MONITOR ONLY. CANNOT
R0714 BE LOADED.
R0715 MAX MIN COMP=59
R0716 MAX SEC COMP=59
R0717 VALUES GREATER THAN
R0718 59 MIN 59 SEC
R0719 ARE DISPLAYED AS
R0720 59 MIN 59 SEC.)

R0721 -M-
R0722 TIME (SEC) XXX.XX SEC SP BIT 1 = 10 SEC -2
R0723 (MAX 163.83)

R0724 -N-
R0725 TIME (SEC) DP XXX.XX SEC DP BIT 1 OF LOW REGISTER =
R0726 -2
R0727 10 SEC

R0728 -P-
R0729 VELOCITY 2 XXXXX. FEET/SEC DP BIT 1 OF HIGH REGISTER =
R0730 (MAX 41994.) -7
R0731 2 METERS/CENTI-SEC

R0732 -Q-
R0733 POSITION 4 XXXX.X NAUTICAL MILES DP BIT 1 OF LOW REGISTER =
R0734 2 METERS

R0735 -S-
R0736 VELOCITY 3 XXXX.X FT/SEC DP BIT 1 OF HIGH REGISTER =
R0737 -7
R0738 2 METERS/CENTI-SEC

L ASSEMBLY AND OPERATION INFORMATION

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R0739	-T-		
R0740	G	XXX.XX G	SP BIT 1 = 10 ⁻² G
R0741		(MAX 163.83)	
R0742	-U-		
R0743	RENDEZVOUS	XXX.XX NAUT MI	DP LOW ORDER BIT OF LOW ORDER
R0744	RADAR RANGE		WORD = 9.38 FEET
R0745	-V-		
R0746	RENDEZVOUS	XXXXX. FEET/SEC	DP LOW ORDER BIT OF LOW ORDER
R0747	RADAR RANGE RATE		WORD = -.6278 FEET/SEC
R0748	-W-		
R0749	LANDING RADAR	XXXXX. FEET	DP LOW ORDER BIT OF LOW ORDER
R0750	ALTITUDE		WORD = 1.079 FEET
R0751	-X-		
R0752	LANDING RADAR	XXXXX. FEET/SEC	DP LOW ORDER BIT OF LOW ORDER
R0753	VELX		WORD = -.6440 FEET/SEC
R0754	-Y-		
R0755	LANDING RADAR	XXXXX. FEET/SEC	DP LOW ORDER BIT OF LOW ORDER
R0756	VELY		WORD = 1.212 FEET/SEC
R0757	-Z-		
R0758	LANDING RADAR	XXXXX. FEET/SEC	DP LOW ORDER BIT OF LOW ORDER
R0759	VELZ		WORD = .8648 FEET/SEC
R0760	-AA-		
R0761	INITIAL/FINAL	XXXXX. FEET	DP LOW ORDER BIT OF LOW ORDER
R0762	ALTITUDE		WORD = 2.345 FEET
R0763	-BB-		
R0764	ALTITUDE RATE	XXXXX. FEET/SEC	SP LOW ORDER BIT = .5
R0765		(MAX 08191.)	FEET/SEC
R0766	-CC-		
R0767	FORWARD/LATERAL	XXXXX. FEET/SEC	SP LOW ORDER BIT = .5571
R0768	VELOCITY	(MAX 09126.)	FEET/SEC
R0769	-DD-		
R0770	POTATIONAL HAND	XXXXX. DEG/SEC	SP FRACTIONAL PART OF PI RAD
R0771	CONTROLLER ANGULAR	(MAX 00044.)	4 SEC
R0772	RATES		
R0773	-EE-		
R0774	OPTICAL TRACKER	XXX.XX DEG.	DP LOW ORDER BIT OF LOW ORDER
R0775	AZIMUTH ANGLE		15
R0776			WORD = 360/2 DEGREES

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R0777	-JJ-		
R0778	POSITION5	XXX.XX NAUT MI	DP BIT 1 OF LOW REGISTER =
R0779			2 METERS
R0780	-KK-		16
R0781	WEIGHT2	XXXXX. LBS	SP FRACTIONAL PART OF 2 KG
R0782	-NN-		
R0783	TRIM DEGREES 2	XXX.XX DEG	SP BIT 1=.01SEC(TIME)
R0784		(MAX 032.76)	
R0785	-PP-		
R0786	2 INTEGERS	+XXBY	DP BIT 1 OF HIGH REGISTER =
R0787		(B IS A BLANK	1 UNIT OF XX
R0788		POSITION. DECIMAL	BIT 1 OF LOW REGISTER =
R0789		ONLY, DISPLAY OR	1 UNIT OF YY
R0790		MONITOR ONLY. CANNOT	(EACH REGISTER MUST
R0791		BE LOADED.)	CONTAIN A POSITIVE INTEGER
R0792		(MAX 99899)	LESS THAN 100)
R0793	-QQ-		
R0794	POSITION7	XXXX.X NAUT MI	DP BIT 1 OF LOW REGISTER =
R0795		(MAX 9058.9)	-4
R0796			2 METERS
R0797	-RR-		
R0798	COMPUTED ALTITUDE	XXXXX. FEET	DP BIT 1 OF LOW REGISTER =
R0799			-4
R0800			2 METERS
R0801	-SS-		
R0802	DP DEGREES	XXXX.X DEGREES	DP BIT 1 OF HIGH REGISTER =
R0803			1 DEGREE
R0804	-TT-		
R0805	LANDING RADAR	+DDDDX-	CHANNEL 33, BIT 6=NOT POSIT. 1
R0806	POSITION	(DECIMAL ONLY.	CHANNEL 33, BIT 7=NOT POSIT. 2
R0807		DISPLAY OR MONITOR	X = 1 FOR LR POSITION 1
R0808		ONLY. CANNOT BE	X = 2 FOR LR POSITION 2
R0809		LOADED.)	
R0810	-WW-		15
R0811	360-CDU DEGREES	XXX.XX DEGREES	SP BIT 1 = 360 - (360/2)
R0812		(MAX 359.99)	DEGREES
R0813			(USES 15 BITS FOR MAGNI-
R0814			TUDE AND 2-S COMP.)
R0815	-XX-		
R0816	POSITION 9	XXXXX. FEET	DP BIT 1 OF LOW REGISTER =
R0817			-9
R0818			2 METERS

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R0819	-YY-		
R0820	VELOCITY +	XXXX.X FEET/SEC	DP FRACTIONAL PART OF
R08201		(MAX 328.0)	METERS/CENTI-SEC
R0821	-AAA-		
R08211	RADIANS	XX.XXX RADIANS	DP BIT 1 OF HIGH REGISTER =
R08212		(MAX 31.999)	-9
R08213			2 RADIANS
R0822	THAT-S ALL ON THE NOUNS.		

ASSEMBLY AND OPERATION INFORMATION

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P0823 ALARM CODES FOR LUMINARY

R0824 *9 *18 *60 COLUMN

R0825 CODE * TYPE SET BY

R0826	00105	**	AOTMARK-SYSTEM-IN-USE	AOTMARK
R0827	00107		MORE THAN 5 MARK PAIRS	AOTMARK
R0828	00111		MARK MISSING	AOTMARK
R0829	00112		MARK OR MARK REJECT NOT BEING ACCEPTED	AOTMARK
R0830	00113		NO INBITS	AOTMARK
R0831	00114		MARK MADE BUT NOT DESIRED	AOTMARK
R0832	00115		NO MARKS IN LAST PAIR TO REJECT	AOTMARK
R0833	00206		ZERO ENCODE NOT ALLOWED WITH COARSE ALIGN	IMU MODE SWITCHING
R0834	00206		+ GIMBAL LOCK.	
R0835	00207		ISS TURNON REQUEST NOT PRESENT FOR 90 SEC	T4RUPT
R0836	00210		IMU NOT OPERATING	IMU MODE SWITCH, IMU-2, R02, P51, P57
R0838	00211		COARSE ALIGN ERROR	IMU MODE SWITCH
R0839	00212		PIPA FAIL BUT PIPA IS NOT BEING USED	IMU MODE SWITCH, T4RPT
R0840	00213		IMU NOT OPERATING WITH TURN-ON REQUEST	T4RUPT
R0841	00214		PROGRAM USING IMU WHEN TURNED OFF	T4RUPT
R0842	00217		BAD RETURN FROM IMUSTALL	P51, P52, P57
R0843	00220		IMU NOT ALIGNED - NO REFSMMAT	R02, R47
R0844	00401		DESIRED GIMBAL ANGLE YIELDS GIMBAL LOCK	INF ALIGN, IMU-2,
R0845				FINDCDUW
R0846	00402		FINDCDUW NOT CONTROLLING ATTITUDE	FINDCDUW
R0847	00404		TWO STARS NOT AVAILABLE IN ANY DETENT	R59, LUNAR SURFACE
R0848	00405		TWO STARS NOT AVAILABLE	P52
R0849	00421		W-MATRIX OVERFLOW	INTEGRV
R08495	00430	**	ACCELERATION OVERFLOW IN INTEGRATION	ORBITAL INTEGRATION
R0850	00501	P	RADAR ANTENNA OUT OF LIMITS	R23
R0851	00502		BAD RADAR GIMBAL ANGLE INPUT	V4IN72
R0852	00503	P	RADAR ANTENNA DESIGNATE FAIL	R21, NON-P IN V4IN72
R0853	00510		RADAR AUTO DISCRETE NOT PRESENT	R25
R0854	00511		LR NOT IN POSITION 2 OR REPOSITIONING	SERVICER
R0855	00514	P	PR GOES OUT OF AUTO MODE WHILE IN USE	P20
R0856	00515		RR CDU FAIL DISCRETE PRESENT	R25
R0857	00520		RADAR RUPT NOT EXPECTED AT THIS TIME	RADAR READ
R0858	00521		COULD NOT READ RADAR	P20
R0859	00522		LANDING RADAR POSITION CHANGE	RADAR READ
R0860	00523	P	LR ANTENNA DIDN'T ACHIEVE POSITION 2	SERVICER, V60 (NON-P IN V60)
R0862	00525	P	DELTA-THETA GREATER THAN 3 DEGREES	R22
R0863	00526	P	RANGE GREATER THAN 400 NAUT. MILES	P20, P22
R0864	00527	P	LOS NOT IN MODE II COVERAGE WHILE ON	R21, R24
R0865			LUNAR SURFACE	
R0866			OR VEHICLE MANEUVER REQUIRED	R24 (20)
R08665	00530	P	LOS NOT IN MODE2 COVERAGE	R21
R08666			ON LUNAR SURFACE AFTER 600 SECS.	
R0867	00600		IMAGINARY ROOTS ON FIRST ITERATION	P32, P72
R0868	00601		PERIGEE ALTITUDE CSI LT PHIN1	P32, P72.

L ASSEMBLY AND OPERATION INFORMATION

R0869	00602	PERIGEE ALTITUDE CDH LT PMIN2	P32,P72.
R0870	00603	CSI TO CDH TIME LT THIN12	P32,P72,P33,P73
R0871	00604	CDH TO TPI TIME LT THIN23	P32,P72.
R0872		OR COMPUTED CDH TIME GREATER THAN INPUT TPI TIME	
R0873	00605	NUMBER OF ITERATIONS EXCEEDS LOOP MAXIMUM	P32, P72
R0874	00606	OV EXCEEDS MAXIMUM	P32,P72.
R08745	00607 **	NO SOLN FROM TIME-THETA OR TIME-RADIUS	TIMETHET,TIMERAD
R0875	00611	NO TIG FOR GIVEN ELEV ANGLE	P34,P74
R0876	00701	ILLEGAL OPTION CODE SELECTED	P57
R0877	00777	PIPA FAIL CAUSED THE ISS WARNING	T4RUPT
R0878	01102	AGC SELF TEST ERROR	SELF CHECK
R0879	01103 **	UNUSED CCS BRANCH EXECUTED	ABORT
R0880	01104 *	DELAY ROUTINE BUSY	EXEC
R0881	01105	DOWNLINK TOO FAST	T4RUPT
R0882	01106	UPLINK TOO FAST	T4RUPT
R0883	01107	PHASE TABLE FAILURE. ASSUME	RESTART
R0884		ERASABLE MEMORY IS SUSPECT.	RESTART
R0885	01201 *	EXECUTIVE OVERFLOW-NO VAC AREAS	EXEC
R0886	01202 *	EXECUTIVE OVERFLOW-NO CORE SETS	EXEC
R0887	01203 *	WAITLIST OVERFLOW-TOO MANY TASKS	WAITLIST
R0888	01204 **	WAITLIST, VARDELAY, FIXDELAY, OR LONGCALL	WAITLIST ROUTINES
R0889		CALLED WITH ZERO OR NEGATIVE DELTA-TIME	
R0890	01206 **	SECOND JOB ATTEMPTS TO GO TO SLEEP	PINBALL
R0891	01206	VIA KY9D AND DISPLAY PROGRAM	
R0892	01207 *	NO VAC AREAS FOR MARKS	AOTMARK
R0893	01210 *	TWO PROGRAMS USING DEVICE AT SAME TIME	MODE SWITCHING
R0894	01211 *	ILLEGAL INTERRUPT OF EXTENDED VERB	AOTMARK
R0895	01301	ARCSIN-ARCCOS ARGUMENT TOO LARGE	INTERPRETER
R0896	01302 **	SQRT CALLED WITH NEGATIVE ARGUMENT	INTERPRETER
R0897	01406	BAD RETURN FROM ROOTPSRS	DESCENT GUIDANCE EQS.
R08975	01406 **	BAD RETURN FROM ROOTPSRS	IGNITION ALGORITHM
R08976		NOTE: 1406 IS A POODOR DURING THE IGNITION ALGORITHM	
R08977		AND AN ALARM DURING THE ACTUAL GUIDANCE PHASE.	
R0898	01407	VG INCFASING (DELTA-V ACCUMULATED	S40.B
R0899		GT. 90 DEGREES AWAY FROM DESIRED THRUST	S40.B
R08995		VECTOR.)	S40.B
R0900	01410	UNINTENTIONAL OVERFLOW IN GUIDANCE	DESCENT GUIDANCE EQS.
R0901	01412	DESCENT IGNALG NOT CONVERGING	P33
R0902	01501 **	KEYBOARD AND DISPLAY ALARM DURING	PINBALL
R0903	01501	INTERNAL-USE(INVSUB).ABORT	
R0904	01502 **	ILLEGAL FLASHING DISPLAY	GRPLAY
R0905	01520	V37 REQUEST NOT PERMITTED AT THIS TIME	V37
R0906	01600	OVERFLOW IN DRIFT TEST	IMU 4
R0907	01601	BAD IMU TORQUE	OPT PRE ALIGN CALIB
R0908	01601		IMU 4 (LEM)
R0909	01703	IGNITION TIME SLIPPED	M10TDAVE
R0910	01706	INCORRECT PROGRAM REQUESTED FOR VEHICLE	
R0911		CONFIGURATION	P40, P42

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R0912 02000 * DAP STILL IN PROGRESS AT NEXT TIMES RUPT DAP
R0913 02001 JET FAILURES HAVE DISABLED Y-Z TRANS. DAP
R0914 02002 JET FAILURES HAVE DISABLED X TRANSLATION DAP
R0915 02003 JET FAILURES HAVE DISABLED P-ROTATION DAP
R0916 02004 JET FAILURES HAVE DISABLED U-V ROTATION DAP
R0917 03777 ICDU FAIL CAUSED THE ISS WARNING T4RUPT
R0918 04777 ICDU, PIPA FAILS CAUSED THE ISS WARNING T4RUPT
R0919 07777 IMU FAIL CAUSED THE ISS WARNING T4RUPT
R0920 10777 IMU, PIPA FAILS CAUSED THE ISS WARNING T4RUPT
R0921 13777 IMU, ICDU FAILS CAUSED THE ISS WARNING T4RUPT
R0922 14777 IMU, ICDU, PIPA FAILS CAUSED THE ISS WARNING T4RUPT
R0923 * INDICATES AN ABORT CODE THAT RESULTS IN A SOFTWARE RESTART.

R0924 ** INDICATES A MORE SERIOUS ABORT CODE THAT RESULTS IN THE
R0925 PROGRAM GOING TO RGO.

R0926 P INDICATES A PRIORITY ALARM.

R0927 ALL OTHERS ARE NON-ABORTIVE

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P0928 CHECKLIST CODES FOR LUMINARY

R0929	*9	*17	*26	*9	COLUMN
R0931	RICODE	ACTION TO BE EFFECTED		PROGRAM	
R0933	00013	KEY IN	NORMAL OR GYRO TORQUE COARSE ALIGN	P52	
P0935	00014	PROCEED	DO IMU FINE ALIGN ROUTINE	R51, P63, P57	
R09352	00014	ENTER	DO LANDING SITE DETERMINATION (N89DISP)	P57OPTION2	
R0937	00015	PERFORM	CELESTIAL BODY ACQUISITION	R51, P51	
R0939	00062	SWITCH	AGC POWER DOWN	P06	
R0941	00201	SWITCH	RR MODE TO AUTOMATIC	P20, P22, R04	
R0943	00203	SWITCH	GUID CONTROL TO GNC. MODE TO AUTO...	P12, P42, P71	
R0945			ALSO THR CONT TO AUTO	P40, P63, P70	
R0947	00205	PERFORM	MANUAL ACQUISITION OF RR	R23	
R0949	00500	SWITCH	LR ANTENNA TO POSITION 1	P63	

R0951

R0952

R0953

R0954

SWITCH DENOTES CHANGE POSITION OF A CONSOLE SWITCH

PERFORM DENOTES START OR END OF A TASK

KEY IN DENOTES KEY IN OF DATA THRU THE DSKY

L ASSEMBLY AND OPERATION INFORMATION

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PC955 --- OPTION CODES FOR LUMINARY

R0956 THE SPECIFIED OPTION CODES WILL BE FLASHED IN COMPONENT R1 IN
 R0957 CONJUNCTION WITH V04N06 OR V04N12 (FOR EXTENDED VERBS) TO REQUEST THE
 R0958 ASTRONAUT TO LOAD INTO COMPONENT R2 THE OPTION HE DESIRES.

R0959 *9 *17 *32 *11 *25 COLUMN

R0961 OPTION
 R0962 CODE PURPOSE

INPUT FOR COMPONENT 2

PROGRAM(S)

APPLICABILITY

R0964 00001 SPECIFY IMU ORIENTATION

1=REF 2=NOM 3=REFSHMAT

P52

ALL

R0966

4=LAND SITE

R0967 00002 SPECIFY VEHICLE

1=THIS 2=OTHER

P21.R30

ALL

R0969 00003 SPECIFY TRACKING ATTITUDE

1=PREFERRED 2=OTHER

P63

ALL

R0971 00004 SPECIFY RADAR

1=RR 2=LR

R04

SUNDANCE + LUMINARY

R0973 00005 SPECIFY SDR PHASE

1=FIRST 2=SECOND

P38

COLDSSUS + LUMINARY

R0975 00006 SPECIFY RR COARSE ALIGN OPTION

1=LOCKON 2=CONTINUOUS DESIG.

V41N72

SUNDANCE + LUMINARY

R0977 00010 SPECIFY ALIGNMENT MODE

0=ANY TIME 1=REFSHMAT +G

P57

LUMINARY

R0979

2=TWO BODIES 3=ONE BODY + G

R0980 00012 SPECIFY ESM ORBIT OPTION

1=NO ORBIT CHANGE 2=CHANGE

P22

LUMINARY

R0982

ORBIT TO PASS OVER LM

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

USER'S PAGE NO. 1

0001	REF	1		COUNT	BANKSUM
R0002			MODULE 1 CONTAINS BANKS 0 THROUGH 5		
0003			4000	BLOCK	02
0004			4000	RADARFF	EQUALS
0005			4000	FFTAG1	EQUALS
0006			4000	FFTAG2	EQUALS
0007			4000	FFTAG3	EQUALS
0008			4000	FFTAG4	EQUALS
0009			4000	FFTAG7	EQUALS
0010			4000	FFTAG8	EQUALS
0011			4000	FFTAG9	EQUALS
0012			4000	FFTAG10	EQUALS
0013			4000	FFTAG11	EQUALS
0014			4000	FFTAG12	EQUALS
0015			4000	FFTAG13	EQUALS
0016	2 WORDS LEFT		5775	05775 1	BNKSUM 02
0016			5776	05776 1	
0017			6000	BLOCK	03
0018			6000	FFTAG5	EQUALS
0019			6000	FFTAG6	EQUALS
0020	17 WORDS LEFT		7756	07756 1	BNKSUM 03
0020			7757	07757 0	
0021			00,2000	BANK	00
0022			00,2000	DLAY JOB	EQUALS
0023	3 WORDS LEFT		00,3774	03774 0	BNKSUM 00
0023			00,3775	03775 1	
0024			01,2000	BANK	01
0025			01,2000	RESTART	EQUALS
0026			01,2000	LOADDAPI	EQUALS
0027	1 WORDS LEFT		01,3776	03776 1	BNKSUM 01
0028			04,2000	BANK	04
0029			04,2000	R02	EQUALS
0030			04,2000	VERB37	EQUALS
0031			04,2000	PINDALL4	EQUALS
0032			04,2000	CONICS1	EQUALS
0033			04,2000	KEYRUPT	EQUALS
0034			04,2000	R36LM	EQUALS
0035			04,2000	UPDATE2	EQUALS
0036			04,2000	E/PROG	EQUALS
00365			04,2000	ADTHARK2	EQUALS
0037	6 WORDS LEFT		04,3771	03771 0	BNKSUM 04
0037			04,3772	03772 0	

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

USER'S PAGE NO. 2 EU

0038		05,2000		BANK 05
0039		05,2000	FRANDRES	EQUALS
0040		05,2000	DOWNTLM	EQUALS
0041		05,2000	ABORTS1	EQUALS
0042		05,2000	EPHEM1	EQUALS
00425		05,2000	ASENT3	EQUALS
0043	5 WORDS LEFT	05,3772	03772 0	BNKSUM 05
0043		05,3773	03773 1	

R0044 MODULE 2 CONTAINS BANKS 6 THROUGH 13

0045		06,2000		BANK 06
0046		06,2000	INUCOMP	EQUALS
0047		06,2000	T4RUP	EQUALS
0048		06,2000	RCSMONT	EQUALS
00485		06,2000	MIDDGIM	EQUALS
00486		06,2000	EARTHLOC	EQUALS
0049	11 WORDS LEFT	06,3764	03764 1	BNKSUM 06
0049		06,3765	03765 0	

0050		07,2000		BANK 07
0051		07,2000	AUTMARK1	EQUALS
0052		07,2000	MODESW	EQUALS
00525		07,2000	ASENT2	EQUALS
0053	4 WORDS LEFT	07,3773	03773 1	BNKSUM 07
0053		07,3774	03774 0	

0054		10,2000		BANK 10
0055		10,2000	RTBLODES	EQUALS
0056		10,2000	DISPLAYS	EQUALS
0057		10,2000	PHASETAB	EQUALS
0058		10,2000	FLESHLOC	EQUALS
00585		10,2000	SLCTMU	EQUALS
0059	2 WORDS LEFT	10,3775	03775 1	BNKSUM 10
0059		10,3776	03776 1	

0060		11,2000		BANK 11
0061		11,2000	ORBITAL	EQUALS
0062		11,2000	F2DPS*11	EQUALS
0063		11,2000	INTVEL	EQUALS
0065	1 WORDS LEFT	11,3776	03776 1	BNKSUM 11

0066		12,2000		BANK 12
0067		12,2000	CONICS	EQUALS
00675		12,2000	ORBITAL1	EQUALS

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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00676		12.2000		INTPRET2	EQUALS
0068	1 WORDS LEFT	12.3776	03776 1	BKSUM	12

0069		13.2000		BANK	13
0070		13.2000		LATLONG	EQUALS
0071		13.2000		INTINIT	EQUALS
0072		13.2000		LEMGEOM	EQUALS
0073		13.2000		P76LOC	EQUALS
0074		13.2000		ORBITAL2	EQUALS
00745		13.2000		ABTFLGS	EQUALS
0075	8 WORDS LEFT	13.3767	03767 1	BKSUM	13
0075		13.3770	03770 1		

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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P0076 MODULE 3 CONTAINS BANKS 14 THROUGH 21

0077		14,2000		BANK 14
0078		14,2000	P50S1	EQUALS
0079		14,2000	STARTAB	EQUALS
00795		14,2000	ASENT4	EQUALS
0080	3 WORDS LEFT	14,3774	03774 0	BNKSUM 14
0080		14,3775	03775 1	

0081		15,2000		BANK 15
0082		15,2000	P50S	EQUALS
0083		15,2000	EPHEM	EQUALS
0084	1 WORDS LEFT	15,3776	03776 1	BNKSUM 15

0085		16,2000		BANK 16
0086		16,2000	DAPS1	EQUALS
0087	5 WORDS LEFT	16,3772	03772 0	BNKSUM 16
0087		16,3773	03773 1	

0088		17,2000		BANK 17
0089		17,2000	DAPS2	EQUALS
00895		17,2000	P40S3	EQUALS
0090	27 WORDS LEFT	17,3744	03744 0	BNKSUM 17
0090		17,3745	03745 1	

0091		20,2000		BANK 20
0092		20,2000	DAPS3	EQUALS
0093		20,2000	LOADDAP	EQUALS
00935		20,2000	RDDTRAP	EQUALS
0094	5 WORDS LEFT	20,3772	03772 0	BNKSUM 20
0094		20,3773	03773 1	

0095		21,2000		BANK 21
0096		21,2000	DAPS4	EQUALS
0098		21,2000	R10	EQUALS
0099		21,2000	R11	EQUALS
0100	7 WORDS LEFT	21,3770	03770 1	BNKSUM 21
0100		21,3771	03771 0	

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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P0101 MODULE 4 CONTAINS BANKS 22 THROUGH 27

0102		22,2000		BANK 22
0103		22,2000	KALCMON1	EQUALS
0104		22,2000	KALCMON2	EQUALS
0105		22,2000	R30LOC	EQUALS
0106		22,2000	RENDEZ	EQUALS
01065		22,2000	SERV2	EQUALS
01066		22,2000	LANDCNST	EQUALS
0107	4 WORDS LEFT	22,3773	03773 1	BKSUM 22
0107		22,3774	03774 0	

0108		23,2000		BANK 23
0109		23,2000	POWFLITE	EQUALS
0110		23,2000	POWFLIT1	EQUALS
0111		23,2000	INFLIGHT	EQUALS
0112		23,2000	APPERT	EQUALS
0113		23,2000	R61	EQUALS
0114		23,2000	R62	EQUALS
0115		23,2000	INTPRET1	EQUALS
0116		23,2000	MEASINC	EQUALS
0117		23,2000	MEASINC1	EQUALS
0118		23,2000	EXTV81	EQUALS
01185		23,2000	P12A	EQUALS
01186		23,2000	NORHL12	EQUALS
01187		23,2000	ASENT7	EQUALS
0119	8 WORDS LEFT	23,3767	03767 1	BKSUM 23
0119		23,3770	03770 1	

0120		24,2000		BANK 24
0121		24,2000	PLANTIN	EQUALS
0122		24,2000	P20S	EQUALS
0123	2 WORDS LEFT	24,3775	03775 1	BKSUM 24
0123		24,3776	03776 1	

0124		25,2000		BANK 25
0125		25,2000	P20S1	EQUALS
0126		25,2000	P20S2	EQUALS
0127		25,2000	KADARUPT	EQUALS
0128		25,2000	KLEADIN	EQUALS
0129		25,2000	R29S1	EQUALS
01295		25,2000	PLANTIN3	EQUALS
0130	7 WORDS LEFT	25,3770	03770 1	BKSUM 25
0130		25,3771	03771 0	

0131		26,2000		BANK 26
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L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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0132		26,2000		P2053	EQUALS
0133		26,2000		BAWLINGS	EQUALS
0134		26,2000		MANUVER	EQUALS
0135		26,2000		MANUVER1	EQUALS
01355		26,2000		PLANTIN1	EQUALS
01356		26,2000		PLANTIN2	EQUALS
0136	2 WORDS LEFT	26,3775	03775 1		BNKSUM 26
0136		26,3776	03776 1		

0137		27,2000		BANK	27
0138		27,2000		TDF-FF	EQUALS
0139		27,2000		TDF-FF1	EQUALS
0140		27,2000		P4051	EQUALS
0141		27,2000		VECPT	EQUALS
0142		27,2000		ASENT1	EQUALS
01425		27,2000		SERV3	EQUALS
0143	5 WORDS LEFT	27,3772	03772 0		BNKSUM 27
0143		27,3773	03773 1		

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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PD144 MODULE 5 CONTAINS BANKS 30 THROUGH 35

0145		30,2000		BANK 30
0146		30,2000	LOWSUPER	EQUALS
0147		30,2000	P12	EQUALS
0148		30,2000	ASENT	EQUALS
0149		30,2000	FCDUM	EQUALS
01495		30,2000	FLGGSUB	EQUALS
01496		30,2000	VB67A	EQUALS
01497		30,2000	ASENT5	EQUALS
0150	2 WORDS LEFT	30,3775	03775 1	BNKSUM 30
0150		30,3776	03776 1	

0151		31,2000		BANK 31
0152		31,2000	FTHROT	EQUALS
0153		31,2000	F2DPS*31	EQUALS
0154		31,2000	VB67	EQUALS
0155	14 WORDS LEFT	31,3761	03761 1	BNKSUM 31
0155		31,3762	03762 1	

0156		32,2000		BANK 32
0157		32,2000	P2054	EQUALS
0158		32,2000	F2DPS*32	EQUALS
0159		32,2000	ABDRTS	EQUALS
0160		32,2000	LR522	EQUALS
0161		32,2000	P66LOC	EQUALS
0163		32,2000	R47	EQUALS
01635		32,2000	SERV	EQUALS
0164	4 WORDS LEFT	32,3773	03773 1	BNKSUM 32
0164		32,3774	03774 0	

0165		33,2000		BANK 33
0166		33,2000	SERVICES	EQUALS
0167		33,2000	R29/SERV	EQUALS
01675		33,2000	ASENT6	EQUALS
0168	0 WORDS LEFT	33,2000	NO NEED	BNKSUM 33

0169		34,2000		BANK 34
0170		34,2000	STBLEURB	EQUALS
0171		34,2000	P30S1	EQUALS
0172		34,2000	CS1/COH1	EQUALS
0173		34,2000	ASCFLT	EQUALS
01735		34,2000	R12STUFF	EQUALS
01736		34,2000	SERV4	EQUALS
0174	2 WORDS LEFT	34,3775	03775 1	BNKSUM 34
0174		34,3776	03776 1	

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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0175	35,2000		BANK 35
0176	35,2000	CSI/COH	EQUALS
0177	35,2000	P305	EQUALS
0178	35,2000	GLM	EQUALS
0179	35,2000	P4052	EQUALS
0180	1 WORDS LEFT	35,3776 03776 1	BNKSUM 35

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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P0181 MODULE 6 CONTAINS BANKS 36 THROUGH 43

0182		36,2000		BANK 36
0183		36,2000	P40S	EQUALS
0184	10 WORDS LEFT	36,3765	03765 0	BNKSUM 36
0184		36,3766	03766 0	

0185		37,2000		BANK 37
0186		37,2000	P05P06	EQUALS
0187		37,2000	IMU2	EQUALS
0188		37,2000	IMU4	EQUALS
0189		37,2000	R31	EQUALS
0190		37,2000	INUSUPER	EQUALS
0191		37,2000	SERV1	EQUALS
0192	3 WORDS LEFT	37,3774	03774 0	BNKSUM 37
0192		37,3775	03775 1	

0193		40,2000		BANK 40
0194		40,2000	PINBALL1	EQUALS
0195		40,2000	SELSUPR	EQUALS
0196		40,2000	PINSUPER	EQUALS
01965		40,2000	R31LOC	EQUALS
0197	52 WORDS LEFT	40,3713	03713 1	BNKSUM 40
0197		40,3714	03714 0	

0198		41,2000		BANK 41
0199		41,2000	PINBALL2	EQUALS
0200	38 WORDS LEFT	41,3731	03731 1	BNKSUM 41
0200		41,3732	03732 1	

0201		42,2000		BANK 42
0202		42,2000	SBAND	EQUALS
0203		42,2000	PINBALL3	EQUALS
0204	5 WORDS LEFT	42,3772	03772 0	BNKSUM 42
0204		42,3773	03773 1	

0205		43,2000		BANK 43
0206		43,2000	EXTVERBS	EQUALS
0207		43,2000	SELFCHC	EQUALS

0208	21 WORDS LEFT	43,3752	03752 1	BNKSUM 43
0208		43,3753	03753 0	

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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0209	REF	1		23,2521	H16ZERDS EQUALS ZEROVECS	ZERO VECTOR ALWAYS IN HIGH MEMORY
0210	REF	1		12,2006	L06ZERDS EQUALS ZEROVEC	ZERO VECTOR ALWAYS IN LOW MEMORY
0211	REF	1		23,2517	H10PHALF EQUALS UNITX	
0212	REF	1		12,2004	L00PHALF EQUALS XUNIT	
0213	REF	1		23,2511	H10P1/4 EQUALS DP1/4TH	
0214	REF	1		04,3036	L00P1/4 EQUALS D1/4	ZDEC .25
0215	REF	2	LAST 37	23,2517	H1UNITX EQUALS UNITX	
0216	REF	1		23,2515	H1UNITY EQUALS UNITY	
0217	REF	1		23,2513	H1UNITZ EQUALS UNITZ	
0218	REF	2	LAST 37	12,2004	L0UNITX EQUALS XUNIT	ZDEC .5
0219	REF	1		12,2002	L0UNITY EQUALS YUNIT	ZDEC 0
0220	REF	1		12,2000	L0UNITZ EQUALS ZUNIT	ZDEC 0
R0221						

0222	REF	1		22,3541	DELRSPL EQUALS SPLRET	CUL PGM. ALSO CALLED BY R30 IN LUMINARY
R0223					ROPE-SPECIFIC ASSIGNS OBVIATING NEED TO CHECK COMPUTER FLAG IN	DETERMINING INTEGRATION AREA ENTRIES.
0225	REF	1		13,2734	ATOPTHIS EQUALS ATOPLEM	
0226	REF	1		13,2661	ATOPOTH EQUALS ATOPCSM	
0227	REF	1		13,3043	OTHPREC EQUALS CSMPREC	
0228	REF	1		0174	MOONTHIS EQUALS LMOONFLG	
0229	REF	1		0173	MOONOTH EQUALS CMOONFLG	
0230	REF	1		13,2747	NOVATHIS EQUALS NOVEALEM	
0231	REF	1		12,2017	RMM = LODPMAX	
0232	REF	1		12,2021	RME = LODPMAX1	
0233	REF	1		13,3057	THISPREC EQUALS LEMPREC	
0234	REF	2	LAST 37	23,2513	THISAXIS = UNITZ	
0235	REF	1		23,2513	NB1NB2 EQUALS THISAXIS	FOR R31
0236	REF	1		5011	ERASID EQUALS BITS2-10	DOWNLINK ERASABLE DUMP ID
0237	REF	1		4752	DELAYNUM EQUALS TWO	

L CONTROLLED CONSTANTS

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PC

P0001 DPS AND APS ENGINE PARAMETERS

0002 REF 1 36.2000 SETLOC P405
0003 36.2000 BANK
0004 REF 1 COUNT* 11/P40

R0005 *** THE ORDER OF THE FOLLOWING SIX CONSTANTS MUST NOT BE CHANGED ***

0006 36.2000 01056 0 FDPS 2DEC 4.3670 B-7 9817.5 LBS FORCE IN NEWTONS
0006 36.2001 37167 0
0007 36.2002 00457 1 MDDTDP 2DEC 0.1480 B-3 32.62 LBS/SEC IN KGS/CS.
0007 36.2003 03250 0
0008 36.2004 77777 0 DTDECAY 2DEC -38
0008 36.2005 77731 1
0009 36.2006 00307 0 FAPS 2DEC 1.5569 B-7 3500 LBS FORCE IN NEWTONS
0009 36.2007 11040 0
0010 36.2010 00151 1 MDDTAPS 2DEC 0.05135 B-3 11.32 LBS/SEC IN KGS/CS
0010 36.2011 05214 0
0011 36.2012 77777 0 ATDECAY 2DEC -10
0011 36.2013 77765 0

R0012 *****

0013 36.2014 00026 0 FRCS4 2DEC 0.17792 B-7 400 LBS FORCE IN NEWTONS
0013 36.2015 30605 1
0014 36.2016 00013 0 FRCS2 2DEC 0.08896 B-7 200 LBS FORCE IN NEWTONS
0014 36.2017 14303 1
0015 REF 1 27.2000 SETLOC P40S1
0016 27.2000 BANK
0017 REF 1 COUNT* 11/P40

R0018 *** APS IMPULSE DATA FOR P42 *****

0019 27.2000 00000 1 K1VAL 2DEC 124.55 B-23 2800 LB-SEC
0019 27.2001 07622 0
0020 27.2002 00000 1 K2VAL 2DEC 31.138 B-24 700 LB-SEC
0020 27.2003 00762 1
0021 27.2004 00030 1 K3VAL 2DEC 1.5569 B-10 FAPS (3500 LBS THRUST)
0021 27.2005 35104 1

R0022 *****

0023 27.2006 00016 0 S40.136 2DEC .4671 B-9 .4671 M NEWTONS (DPS)
0023 27.2007 36237 1
0024 27.2010 35711 0 S40.136 2DEC .4671 B+1 540.136 SHIFTED LEFT 10.
0024 27.2011 35663 1
0025 REF 1 27.2000 SETLOC ASENT1
0026 27.2012 BANK
0027 REF 1 COUNT* 11/P70

0028 27.2012 03631 0 (1/DVIA 2DEC 15.20 B-7 2 SECONDS WORTH OF INITIAL ASCENT
0028 27.2013 23146 0

L CONTROLLED CONSTANTS

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EO 53

A0029

A0030

A0031

A0032

A0033

A0034

0035

0035

0036

0036

A0037

0038

0038

A0039

A0040

A0041

A0042

0043

0044

0045

0046

0046

0047

0048

0049

0050

0051

0052

0053

0054

0055

0056

0057

0057

27,2014 33226 1 K(1/DV) 2DEC 436.70 B-9

27,2015 14632 0

27,2016 05306 1 (AT)A 2DEC 3.2883 E-4 B9

27,2017 15503 0

27,2020 26337 1 (TBUP)A 2DEC 91902 B-17

27,2021 30000 1

30,2000

30,2000

30,2000 02445 0 AT/FCS

30,2001 00274 0

33,2000

33,2000

*** THE ORDER OF THE FOLLOWING TWO CONSTANTS MUST NOT BE CHANGED ***

33,2000 41545 0 APSVEX DEC -3030 E-2 B-5 9942 FT/SEC IN H/CS.

33,2001 42341 1 DPSVEX DEC* -2.95588868E+ 18-05* VE (DPS) +2.95588868E+ 3

31,2000

31,2000

31,2000

31,2000

31,2001

33316 0

SETLOC ASENT

BANK

COUNT# 33/ASENT

2DEC -0000785 B+10 4 JETS IN A DAY-LEN

SETLOC SERVICES

BANK

COUNT# 33/SERV

SETLOC F2DPS*3)

BANK

COUNT# 33/F2DPS

SETLOC F2DPS*3)

BANK

COUNT# 33/F2DPS

2DEC* +3.50132708E- 58+08* A-(T) +3.50132708E- 3

STAGE ACCELERATION -- INVERTED (H/CS)

1) PREDICATED ON A LIFTOFF MASS OF

4869.9 KG (SNA-B-D-027 7/11/68)

2) PREDICATED ON A CONTRIBUTION TO VEH-

ICLE ACCELERATION FROM RCS THRUSTERS

EQUIV. TO 1 JET ON CONTINUOUSLY.

DPS ENGINE THRUST IN NEWTONS / 100 GS.

INITIAL ASC. STG. ACCELERATION ** H/CS.

ASSUMPTIONS SAME AS FOR (1/DV)A.

ESTIMATED BURN-UP TIME OF THE ASCENT STG.

ASSUMPTIONS SAME AS FOR (1/DV)A WITH THE

ADDITIONAL ASSUMPTION THAT NET MASS-FLOW

RATE = 5.299 KG/SEC = 5.135 (APS) +

.164 (1 RCS JET).

L CONTROLLED CONSTANTS

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P0058 THROTTLING AND THRUST DETECTION PARAMETERS

0059	REF	2	LAST	38	36,2000		SETLOC P405			
0060					36,2020		BANK			
0061	REF	2	LAST	38 TO 38:	16	16*	COUNT# 11/P40			
0062					36,2020	00030 1	THRESH1	DEC	24	
0063					36,2021	00014 1	THRESH3	DEC	12	
0064	REF	1			4737		HIRTHROT =	BIT13		
0065	REF	1			6000		SETLOC F4TAG5			
0066					6000		BANK			
0067	REF	1					COUNT# 11/P40			
0068					6000	00464 1	THRESH2	DEC	308	
0069	REF	1			31,2000		SETLOC FTHROT			
0070					31,2002		BANK			
0071	REF	1					COUNT# 11/THROT			
0072					31,2002	07401 0	FMAXDD	DEC	+	3841
									FSAT	+4.81454413 + 4
0073					31,2003	06613 0	FMAXPS	DEC	+	3467
									FMAX	+4.345467691 + 4
0074					31,2004	00024 1	THRUTLAG	DEC	+	20
									TAU (TH)	+1.99999999E- 1
00745					31,2005	00307 0	SCALEFAC	2DEC+	+	7.97959872E+ 26-16*
00745					31,2006	17534 0			BITPERF	+7.97959872E- 2
0075	REF	1			32,2000		SETLOC F2DPS*32			
0076					32,2000		BANK			
0077	REF	1					COUNT# 11/F2DPS			
0078					32,2000	00044 1	OPSTHRESH	DEC	26	(THRESH1 + THRESH3 FOR 16:1)

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P0082 LM HARDWARE-RELATED PARAMETERS

0083	REF	1	25,2000			SETLOC RADARUPT	
0084			25,2000			BANK	
0085	REF	1				COUNT* \$\$/RRUPT	
0086			25,2000	47777 0	LVELBIAS DEC	-12288	LANDING RADAR BIAS FOR 153.6 KC.
0087			25,2001	00001 0	RDOTBIAS ZDEC	17000	BIAS COUNT FOR RR RANGE RATE.
0087			25,2002	01150 1			
0088	REF	1	32,2000			SETLOC LRS22	
0089			32,2001			BANK	
0090	REF	1				COUNT* \$\$/LRS22	
0091			32,2001	70123 0	RDOTCONV ZDEC	-.0019135344	87 CONVERTS RR RDOT READING TO M/LS AT 2(7)
0091			32,2002	40702 0			
0092			32,2003	13337 1	RANGCONV ZDEC	2.859024	8-3 CONVERTS RR RANGE READING TO M. AT 2(1-29)
0092			32,2004	10776 0			
0098	REF	2 LAST 39	33,2000			SETLOC SERVICES	
0099			33,2002			BANK	
0100	REF	2 LAST 39 TO 39:	2	2*		COUNT* \$\$/SERV	
0101			33,2002	61000 0	HBEAMANT ZDEC	-.4687018041	RANGE BEAM IN LR ANTENNA COORDINATES.
0101			33,2003	71210 1			
0102			33,2004	00000 1	ZDEC	0	
0102			33,2005	00000 1			
0103			33,2006	72333 1	ZDEC	-.1741224271	
0103			33,2007	45546 1			
0104			33,2010	65363 1	HSCAL ZDEC	-.3288792	SCALES 1.079 FT/BIT TO 2(22)M.
0104			33,2011	64451 0			
R0105	***** THE SEQUENCE OF THE FOLLOWING CONSTANTS MUST BE PRESERVED *****						
0106			33,2012	21241 0	VZSCAL ZDEC	+.5410829105	SCALES .8668 FT/SEC/BIT TO 2(18) M/CS.
0106			33,2013	03216 1			
0107			33,2014	30153 0	VYSCAL ZDEC	+.7565672446	SCALES 1.212 FT/SEC/BIT TO 2(18) M/CS.
0107			33,2015	23101 0			
0108			33,2016	63105 0	VXSCAL ZDEC	-.4020045770	SCALES -.644 FT/SEC/BIT TO 2(18) M/CS.
0108			33,2017	61733 1			
P0109	*****						
0110			33,2020	01507 1	KPIP DEC	.0512	SCALES DELV TO UNITS OF 2(5) M/CS.
0111			33,2021	00321 1	KPIP1 ZDEC	.0128	SCALES DELV TO UNITS OF 2(7) M/CS.
0111			33,2022	26706 1			
0112			33,2023	00150 0	KPIP2 ZDEC	.0064	SCALES DELV TO UNITS OF 2(8) M/CS.
0112			33,2024	33343 0			

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0113		33.2025	02630 0	ALTCONV	2DEC	1.399078846	B-4 CONVERTS M*2(-24) TO BIT UNITS *2(-25).
0113		33.2026	25010 1				
0114		33.2027	24402 1	ARCONV1	2DEC	656.167979	B-10 CONV. ALTRATE COMP. TO BIT UNITS
0114		33.2030	26003 0				
0115	REF	1	21.2000			SETLOC R10	
0116			21.2000			BANK	
0117	REF	1				COUNT* 11/R10	
0118		21.2000	24402 1	ARCONV	OCT	24402	656.16797988-10 CONV ALTRATE TO BIT UNIT
0119		21.2001	01551 1	ARTOA	DEC	.1066098	B-1 .25/2.345 B-1 4X/SEC CYCLE RATE.
0120		21.2002	21357 0	ARTOAZ	DEC	.0021322	B8 (.5)/(2.345)(100)
0121		21.2003	22316 0	VELCONV	OCT	22316	586.914 B-10 CONV VEL. TO BIT UNITS.
0122		21.2004	01507 1	KPIPI(5)	DEC	.0512	SCALES DELV TO M/CS*2(-5).
0123		21.2005	00547 1	MAXVBITS	OCT	00547	MAX. DISPLAYED VELOCITY 199.9989 FT/SEC.
0124	REF	1	20.2000			SETLOC DAPS2	
0125			20.2000			BANK	
0126	REF	1				COUNT* 11/DAPAD	
0127		20.2000	01150 1	TORRJET1	DEC	.03757	550 / .2 SCALED AT (+16) 64 / 180

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PD128 PARAMETERS RELATING TO MASS, INERTIA, AND VEHICLE DIMENSIONS

0129	REF	1		05,2000			SETLOC FRANDRES	
0130				05,2000			BANK	
0131	REF	1					COUNT* 11/START	
0132				05,2000	02357 1	FULLAPS	DEC - 5050 B-16	NOMINAL FULL ASCENT MASS -- 2(16) KG.
0133	REF	1		01,2000			SETLOC 10ADDAPI	
0134				01,2000			BANK	
0135	REF	1					COUNT* 11/EO3	
0136				01,2000	76466 1	MINLMD	DEC -2850 B-16	MIN. DESCENT STAGE MASS -- 2(16) KG.
0137				01,2001	76731 0	MINMINLM	DEC -2200 B-16	MIN ASCENT STAGE MASS -- 2(16) KG.
0138	REF	1		4741		MINCSM	- 81711	MIN CSM MASS (OK FOR 1/ACCS) = 9050 LBS
0139	REF	2	LAST	42	20,2000		SETLOC DAPS1	
0140					20,2001		BANK	
0141	REF	2	LAST	42 TO 43:	1	1*	COUNT* 11/DAPAD	
0142				20,2001	01046 1	LOASCENT	DEC 2200 B-16	MIN ASCENT LEM MASS -- 2(16) KG.
0143				20,2002	07361 1	HIDESCNT	DEC 15300 B-16	MAX DESCENT LEM MASS -- 2(16) KG.
0144				20,2003	00666 1	LODESCNT	DEC 1750 B-16	MIN DESCENT STAGE (ALONE) -- 2(16) KG.

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P0145 PHYSICAL CONSTANTS (TIME - INVARIANT)

0146	REF	1	37,2000		SETLOC IMU2
0147			37,2000		BANK
0148	REF	1			COUNT* 15/P07

0149			37,2000	07623 1	OKEG/MS	2DEC	.24339048
0149			37,2001	26552 1			

0150	REF	1	22,2000		SETLOC R30LOC
0151			22,2000		BANK
0152	REF	1			COUNT* 11/R30

R0153 *** THE ORDER OF THE FOLLOWING TWO CONSTANTS MUST BE PRESERVED *****

0154			22,2000	27533 1	1/RTMUM	2DEC*	.45162595 E-4 B14*
0154			22,2001	07571 0			
0155			22,2002	25004 1	1/RTMUE	2DEC*	.50087529 E-5 B17*
0155			22,2003	06702 1			

R0156 *****

0157	REF	2	LAST	38	27,2000	SETLOC P40S1
0158					27,2022	BANK
0159	REF	1				COUNT* 11/S40.9

0160			27,2022	55340 0	EARTHMU	2DEC*	-4.986032 E10 B-36*	M(3)/CS(2)
0160			27,2023	61710 0				

0165	REF	2	LAST	38	27,2000	SETLOC ASENT1
0166					27,2024	BANK
0167	REF	1				COUNT* 11/P12

0168			27,2024	00072 1	MUM(-37)	2DEC*	4.9027780 E8 B-37*	
0168			27,2025	16206 1				
0169			27,2026	00344 1	MOONRATE	2DEC*	.26616994890062991 E-7 B+19*	RAO/CS.
0169			27,2027	24331 0				

0170	REF	3	LAST	41	33,2000	SETLOC SERVICES
0171					33,2031	BANK
0172	REF	3	LAST	41 TO 42:	23 25*	COUNT* 11/SERV

R0173 *** THE ORDER OF THE FOLLOWING TWO CONSTANTS MUST BE PRESERVED *****

0174			33,2031	61377 0	-MUOT	2DEC*	-7.9720645 E+12 B-44*
0174			33,2032	55754 1			
0175			33,2033	77644 1	-MUOT1	2DEC*	-9.8055560 E+10 B-44*
0175			33,2034	65556 1			

R0176 *****

0177			33,2035	64453 1	-MUOTMUN	2DEC*	-9.8055560 E+10 B-38*
0177			33,2036	55670 0			
0178			33,2037	00002 0	RESQ	2DEC*	40.6809913 E12 B-58*
0178			33,2040	11777 0			

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0179		33,2041	01023 1	20J	ZDEC	3.24692010 E-2	
0179		33,2042	37155 1				
0180		33,2043	00065 1	2J	ZDEC	3.24692010 E-3	
0180		33,2044	06244 0				
0181	REF	1	14,2000		SETLOC	P50S1	
0182			14,2000		BANK		
0183	REF	1			COUNT*	\$\$/LDSAM	
0184		14,2000	26723 0	RSUBEM	ZDEC	384402000 E-29	
0184		14,2001	00450 0				
0185		14,2002	00065 1	RSUBH	ZDEC	1738090 E-29	
0185		14,2003	01265 1				
0186		14,2004	00302 0	RSUBE	ZDEC	6370166 E-29	
0186		14,2005	24533 1				
0187		14,2006	00052 0	RDE	ZDEC	.00257125	
0187		14,2007	04047 0				
0188	REF	1	04,2000		SETLOC	CONICS1	
0189			04,2000		BANK		
0190	REF	1			COUNT*	\$\$/LT-LG	
0191		04,2000	00302 0	EPAD	ZDEC	6373338 E-29	PAD RADIUS
0191		04,2001	17755 0				
0192		04,2002	00065 1	504RM	ZDEC	1738090 E-29	METERS E-29 (EQUATORIAL MOON RADIUS)
0192		04,2003	01265 1				
0193	REF	2 LAST 45	04,2000		SETLOC	CONICS1	
0194			04,2004		BANK		
0195	REF	1			COUNT*	\$\$/CONIC	
R0196	*** THE ORDER OF THE FOLLOWING CONSTANTS MUST BE PRESERVED ***						
0197		04,2004	22437 1	MUTABLE	ZDEC*	3.986032 E10 E-36* MUE	
0197		04,2005	16067 1				
0198		04,2006	15625 1		ZDEC*	.25087606 E-10 E+34* 1/MUE	
0198		04,2007	21042 1				
0199		04,2010	30276 1		ZDEC*	1.99650495 E5 E-18* SQRT(MUE)	
0199		04,2011	04773 0				
0200		04,2012	25004 1		ZDEC*	.50087529 E-5 E+17* 1/SQRT(MUE)	
0200		04,2013	06702 1				
0201		04,2014	16471 1		ZDEC*	4.902778 E8 E-30* MUM	
0201		04,2015	01352 1				
0202		04,2016	21412 0		ZDEC*	.203966 E-8 E+28* 1/MUM	
0202		04,2017	20500 0				
0203		04,2020	25477 1		ZDEC*	2.21422176 E4 E-15* SQRT(MUM)	
0203		04,2021	03367 0				
0204		04,2022	27533 1		ZDEC*	.45162595 E-4 E+14* 1/SQRT(MUM)	
0204		04,2023	07571 0				

R0205 *****

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0206 REF 1 13,2000
0207 13,2000

SETLOC INTINIT
BANK
COUNT# 11/INTIN

0208 REF 1

0209 13,2000

07112 1 DMEGM00N 2DEC# 2.66169947 E-8 8+23*

0209 13,2001

06620 0

0210 REF 1 13,2000

SETLOC ORBITAL2

0211 13,2002

BANK

0212 REF 1

COUNT# 11/DEBIT

R0213 *** THE ORDER OF THE FOLLOWING CONSTANTS MUST NOT BE CHANGED *****

0214 13,2002

27446 1

2DEC# 1.32715445 E16 B-54* S

0214 13,2003

14620 0

0215 13,2004

16471 1

MUM

2DEC# 4.9027780 E8 B-30* M

0215 13,2005

01352 1

0216 13,2006

22437 1

MUEARTH

2DEC# 3.986032 E10 B-36*

0216 13,2007

16067 1

0217 13,2010

00000 1

2DEC# 0

0217 13,2011

00000 1

0218 13,2012

02302 1

J4REQ/J3

2DEC# .4991607391 E7 B-26*

0218 13,2013

24736 0

0219 13,2014

77651 0

2DEC# -176236.02 B-25

0219 13,2015

76237 0

0220 13,2016

77776 1

2J3RE/J2

2DEC# -.1355426363 E5 B-27*

0220 13,2017

53032 0

0221 13,2020

10407 0

2DEC# .5067493316 E18 B-60*

0221 13,2021

05344 1

0222 13,2022

13710 0

J2REQSQ

2DEC# 1.75501139 E21 B-72*

0222 13,2023

35320 0

0223 13,2024

12160 0

3J22R2MU

2DEC# 9.20479048 E16 B-58*

0223 13,2025

12124 0

R0224

0225 REF 1 27,2000

SETLOC TOP-FF1

0226 27,2030

BANK

0227 REF 1

COUNT# 11/TFE

0228 27,2030

24775 1

1/RTMU

2DEC# .5065790271 E-5 B17* MODIFIED EARTH MU

0228 27,2031

30424 0

0229 REF 1 42,2000

SETLOC SBAND

0230 42,2000

BANK

0231 REF 1

COUNT# 11/K05

0232 42,2000

26723 0

REMDIST

2DEC# 384402000 B-29 MEAN DISTANCE BETWEEN EARTH AND MOON.

0232 42,2001

00450 0

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P0233 PHYSICAL CONSTANTS (TIME - VARIANT)

0234	REF	1	14,2000	SETLOC	STARTAB		
0235			14,2010	BANK			
0236	REF	1		COUNT*	65/STARS		
0237			14,2010	15262	0	2DEC	+ .8342971408 B-1 STAR 37 X
0237			14,2011	21773	1		
0238			14,2012	74130	0	2DEC	- .2392481515 B-1 STAR 37 Y
0238			14,2013	42420	1		
0239			14,2014	70033	0	2DEC	- .4966976975 B-1 STAR 37 Z
0239			14,2015	41533	1		
0240			14,2016	15014	0	2DEC	+ .0139832631 B-1 STAR 36 X
0240			14,2017	04650	0		
0241			14,2020	67067	1	2DEC	- .5557243189 B-1 STAR 36 Y
0241			14,2021	60150	0		
0242			14,2022	02551	1	2DEC	+ .1691204557 B-1 STAR 36 Z
0242			14,2023	15723	0		
0243			14,2024	07210	0	2DEC	+ .4541086270 B-1 STAR 35 X
0243			14,2025	01664	1		
0244			14,2026	67276	0	2DEC	- .5392368197 B-1 STAR 35 Y
0244			14,2027	62232	0		
0245			14,2030	13262	0	2DEC	+ .7092312789 B-1 STAR 35 Z
0245			14,2031	00563	1		
0246			14,2032	05076	0	2DEC	+ .3201817378 B-1 STAR 34 X
0246			14,2033	35561	0		
0247			14,2034	70716	0	2DEC	- .4446021946 B-1 STAR 34 Y
0247			14,2035	40260	1		
0248			14,2036	62466	1	2DEC	- .8370786986 B-1 STAR 34 Z
0248			14,2037	64656	0		
0249			14,2040	10652	1	2DEC	+ .5520184464 B-1 STAR 33 X
0249			14,2041	04246	0		
0250			14,2042	63235	0	2DEC	- .7933187400 B-1 STAR 33 Y
0250			14,2043	44200	0		
0251			14,2044	73710	0	2DEC	- .2567508745 B-1 STAR 33 Z
0251			14,2045	66230	0		
0252			14,2046	07204	0	2DEC	+ .4537196908 B-1 STAR 32 X
0252			14,2047	33712	0		
0253			14,2050	61747	1	2DEC	- .8779508801 B-1 STAR 32 Y
0253			14,2051	72343	0		
0254			14,2052	02343	1	2DEC	+ .1527766153 B-1 STAR 32 Z
0254			14,2053	21362	0		
0255			14,2054	03237	1	2DEC	+ .2069525789 B-1 STAR 31 X
0255			14,2055	13301	1		
0256			14,2056	62030	0	2DEC	- .8719885748 B-1 STAR 31 Y
0256			14,2057	65332	0		
0257			14,2060	70715	0	2DEC	- .4436288486 B-1 STAR 31 Z
0257			14,2061	71267	1		
0258			14,2062	01745	0	2DEC	+ .1217293692 B-1 STAR 30 X
0258			14,2063	06477	0		
0259			14,2064	63531	0	2DEC	- .7702732847 B-1 STAR 30 Y
0259			14,2065	75365	0		

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0260	14.2066	12010 0	2DEC	+.6259880410 B-1	STAR 30	Z
0260	14.2067	03005 1				
0261	14.2070	76146 0	2DEC	-.1124304773 B-1	STAR 29	X
0261	14.2071	77014 1				
0262	14.2072	60371 1	2DEC	-.9694934200 B-1	STAR 29	Y
0262	14.2073	75073 1				
0263	14.2074	03370 0	2DEC	+.2178116072 B-1	STAR 29	Z
0263	14.2075	12003 1				
0264	14.2076	76125 0	2DEC	-.1146237858 B-1	STAR 28	X
0264	14.2077	40037 1				
0265	14.2100	72436 0	2DEC	-.3399692557 B-1	STAR 28	Y
0265	14.2101	77062 0				
0266	14.2102	61041 0	2DEC	-.9334250333 B-1	STAR 28	Z
0266	14.2103	54164 0				
0267	14.2104	72277 0	2DEC	-.3516499609 B-1	STAR 27	X
0267	14.2105	51044 0				
0268	14.2106	62641 0	2DEC	-.8240752703 B-1	STAR 27	Y
0268	14.2107	45471 1				
0269	14.2110	70711 1	2DEC	-.4441196390 B-1	STAR 27	Z
0269	14.2111	70546 1				
0270	14.2112	67364 1	2DEC	-.5216876930 B-1	STAR 26	X
0270	14.2113	47073 0				
0271	14.2114	64425 0	2DEC	-.7160644554 B-1	STAR 26	Y
0271	14.2115	77777 0				
0272	14.2116	07157 0	2DEC	+.4511047742 B-1	STAR 26	Z
0272	14.2117	16322 0				
0273	14.2120	63327 1	2DEC	-.7861763936 B-1	STAR 25	X
0273	14.2121	64446 0				
0274	14.2122	67515 1	2DEC	-.5217996305 B-1	STAR 25	Y
0274	14.2123	55266 0				
0275	14.2124	05230 0	2DEC	+.3311371675 B-1	STAR 25	Z
0275	14.2125	25476 0				
0276	14.2126	64754 0	2DEC	-.6898393233 B-1	STAR 24	X
0276	14.2127	72604 0				
0277	14.2130	71235 0	2DEC	-.4182330640 B-1	STAR 24	Y
0277	14.2131	72553 1				
0278	14.2132	66427 0	2DEC	-.5909338474 B-1	STAR 24	Z
0278	14.2133	42171 0				
0279	14.2134	66546 0	2DEC	-.5812035376 B-1	STAR 23	X
0279	14.2135	70765 1				
0280	14.2136	73260 1	2DEC	-.2909171294 B-1	STAR 23	Y
0280	14.2137	71643 0				
0281	14.2140	14121 0	2DEC	+.7599800468 B-1	STAR 23	Z
0281	14.2141	30153 0				
0282	14.2142	61247 1	2DEC	-.9170097662 B-1	STAR 22	X
0282	14.2143	73310 1				
0283	14.2144	72313 0	2DEC	-.3502146628 B-1	STAR 22	Y
0283	14.2145	41247 0				
0284	14.2146	74744 0	2DEC	-.1908999176 B-1	STAR 22	Z
0284	14.2147	44566 1				

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0285	14.2150	70606 0	2DEC	-.4523440203 B-1	STAR 21	X
0285	14.2151	54564 1				
0286	14.2152	77153 0	2DEC	-.0493710140 B-1	STAR 21	Y
0286	14.2153	61536 0				
0287	14.2154	61601 1	2DEC	-.8904759346 B-1	STAR 21	Z
0287	14.2155	47046 0				
0288	14.2156	60604 0	2DEC	-.9525211695 B-1	STAR 20	X
0288	14.2157	76224 1				
0289	14.2160	77031 0	2DEC	-.0593434796 B-1	STAR 20	Y
0289	14.2161	73354 1				
0290	14.2162	73161 0	2DEC	-.2986331746 B-1	STAR 20	Z
0290	14.2163	63065 1				
0291	14.2164	60431 1	2DEC	-.9656605484 B-1	STAR 19	X
0291	14.2165	51702 0				
0292	14.2166	00656 1	2DEC	+.0525933156 B-1	STAR 19	Y
0292	14.2167	33013 0				
0293	14.2170	04044 0	2DEC	+.2544280809 B-1	STAR 19	Z
0293	14.2171	10627 0				
0294	14.2172	62164 0	2DEC	-.8608205219 B-1	STAR 18	X
0294	14.2173	45040 1				
0295	14.2174	07325 1	2DEC	+.4636213989 B-1	STAR 18	Y
0295	14.2175	37443 0				
0296	14.2176	03267 1	2DEC	+.2098647835 B-1	STAR 18	Z
0296	14.2177	06626 0				
0297	14.2200	63471 0	2DEC	-.7742591356 B-1	STAR 17	X
0297	14.2201	50471 0				
0298	14.2202	11660 1	2DEC	+.6152504197 B-1	STAR 17	Y
0298	14.2203	04151 0				
0299	14.2204	75501 1	2DEC	-.1482892839 B-1	STAR 17	Z
0299	14.2205	46664 1				
0300	14.2206	70430 1	2DEC	-.4657947941 B-1	STAR 16	X
0300	14.2207	46540 1				
0301	14.2210	07507 1	2DEC	+.4774785033 B-1	STAR 16	Y
0301	14.2211	20100 1				
0302	14.2212	13727 1	2DEC	+.7450164351 B-1	STAR 16	Z
0302	14.2213	05455 0				
0303	14.2214	72160 0	2DEC	-.3612508532 B-1	STAR 15	X
0303	14.2215	64202 0				
0304	14.2216	11144 0	2DEC	+.5747270840 B-1	STAR 15	Y
0304	14.2217	05203 0				
0305	14.2220	64200 1	2DEC	-.7342932655 B-1	STAR 15	Z
0305	14.2221	65331 0				
0306	14.2222	71322 1	2DEC	-.4118589524 B-1	STAR 14	X
0306	14.2223	41512 1				
0307	14.2224	16402 0	2DEC	+.9065485360 B-1	STAR 14	Y
0307	14.2225	16205 1				
0308	14.2226	01365 0	2DEC	+.0924226975 B-1	STAR 14	Z
0308	14.2227	04034 1				
0309	14.2230	75054 1	2DEC	-.1820751783 B-1	STAR 13	X
0309	14.2231	56052 0				

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0310	14.2232	17030 1	2DEC	+.9404899869 B-1	STAR 13	Y
0310	14.2233	17635 1				
0311	14.2234	73321 0	2DEC	-.2869271926 B-1	STAR 13	Z
0311	14.2235	57603 0				
0312	14.2236	77010 0	2DEC	-.0614937230 B-1	STAR 12	X
0312	14.2237	47623 0				
0313	14.2240	11515 0	2DEC	+.6031563286 B-1	STAR 12	Y
0313	14.2241	01640 1				
0314	14.2242	63215 1	2DEC	-.7952469957 B-1	STAR 12	Z
0314	14.2243	52176 0				
0315	14.2244	02143 0	2DEC	+.1371725575 B-1	STAR 11	X
0315	14.2245	26755 1				
0316	14.2246	12715 1	2DEC	+.6813721061 B-1	STAR 11	Y
0316	14.2247	31470 0				
0317	14.2250	13401 0	2DEC	+.7189685267 B-1	STAR 11	Z
0317	14.2251	31222 1				
0318	14.2252	03157 1	2DEC	+.2011399589 B-1	STAR 10	X
0318	14.2253	27504 0				
0319	14.2254	17402 1	2DEC	+.9690337941 B-1	STAR 10	Y
0319	14.2255	12312 1				
0320	14.2256	75552 1	2DEC	-.1432348512 B-1	STAR 10	Z
0320	14.2257	63657 0				
0321	14.2260	05471 0	2DEC	+.3507315038 B-1	STAR 9	X
0321	14.2261	06122 0				
0322	14.2262	16220 0	2DEC	+.8926333307 B-1	STAR 9	Y
0322	14.2263	16362 1				
0323	14.2264	04417 1	2DEC	+.2831839492 B-1	STAR 9	Z
0323	14.2265	32762 0				
0324	14.2266	06443 1	2DEC	+.4105636020 B-1	STAR 8	X
0324	14.2267	12622 1				
0325	14.2270	07766 1	2DEC	+.4988110001 B-1	STAR 8	Y
0325	14.2271	10237 0				
0326	14.2272	14154 1	2DEC	+.7632988371 B-1	STAR 8	Z
0326	14.2273	36154 1				
0327	14.2274	13200 1	2DEC	+.7032235469 B-1	STAR 7	X
0327	14.2275	31653 0				
0328	14.2276	13244 1	2DEC	+.7075846047 B-1	STAR 7	Y
0328	14.2277	21036 1				
0329	14.2300	01067 1	2DEC	+.0692868685 B-1	STAR 7	Z
0329	14.2301	23106 1				
0330	14.2302	10560 0	2DEC	+.5450107404 B-1	STAR 6	X
0330	14.2303	27227 0				
0331	14.2304	10402 0	2DEC	+.5314955466 B-1	STAR 6	Y
0331	14.2305	00275 1				
0332	14.2306	65477 0	2DEC	-.6484410356 B-1	STAR 6	Z
0332	14.2307	77044 1				
0333	14.2310	00153 0	2DEC	+.0130968840 B-1	STAR 5	X
0333	14.2311	11212 0				
0334	14.2312	00077 1	2DEC	+.0078062795 B-1	STAR 5	Y
0334	14.2313	36275 1				

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0335	14,2314	17777 0	2DEC	+.9998837600 B-1	STAR 5	Z
0335	14,2315	01617 1				
0336	14,2316	07674 0	2DEC	+.4917678276 B-1	STAR 4	X
0336	14,2317	21771 0				
0337	14,2320	03416 1	2DEC	+.2204887125 B-1	STAR 4	Y
0337	14,2321	07626 1				
0338	14,2322	62413 0	2DEC	-.8423473935 B-1	STAR 4	Z
0338	14,2323	57536 0				
0339	14,2324	07516 1	2DEC	+.4775639450 B-1	STAR 3	X
0339	14,2325	06414 0				
0340	14,2326	01673 1	2DEC	+.1166004340 B-1	STAR 3	Y
0340	14,2327	06065 1				
0341	14,2330	15735 1	2DEC	+.8708254803 B-1	STAR 3	Z
0341	14,2331	31531 1				
0342	14,2332	16745 0	2DEC	+.9342640400 B-1	STAR 2	X
0342	14,2333	17555 1				
0343	14,2334	02615 1	2DEC	+.1735073142 B-1	STAR 2	Y
0343	14,2335	13716 0				
0344	14,2336	73010 1	2DEC	-.3115219339 B-1	STAR 2	Z
0344	14,2337	40311 0				
0345	14,2340	15776 0	2DEC	+.8748658918 B-1	STAR 1	X
0345	14,2341	34660 0				
0346	14,2342	00325 0	2DEC	+.0260879174 B-1	STAR 1	Y
0346	14,2343	26625 1				
0347	14,2344	07572 0	2DEC	+.4836621670 B-1	STAR 1	Z
0347	14,2345	05105 0				
0348	14,2346	15472 1	CATALOG DEC	6970		
R0349	*****					

0350	REF 1	05,2000	SETLOC EPHEM1
0351		05,2001	BANK
0352	REF 1		COUNT* 55/EPHEM
0353		05,2001	20000 0 KONMAT
0353		05,2002	00000 1
0354		05,2003	00000 1
0354		05,2004	00000 1
0355		05,2005	00000 1
0355		05,2006	00000 1
0356		05,2007	00000 1
0356		05,2010	00000 1
0357		05,2011	16533 0
0357		05,2012	30007 0
0358		05,2013	77333 1
0358		05,2014	56654 0
0359		05,2015	00000 1
0359		05,2016	00000 1
0360		05,2017	06273 1
0360		05,2020	03275 1

SETLOC EPHEM1

BANK

COUNT* 55/EPHEM

2DEC +.0 B-1

2DEC

2DEC

2DEC

2DEC .9 745 B-1

K1 COS(GBL)

2DEC -.05571 B-1

K2 SIN(GBL)SIN(IN)

2DEC

2DEC .39784 B-1

K3 SIN(GBL)

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0361	05,2021	01242 1		2DEC	.501354 B-1	K4 COS(OBL)SIN(1N)	*
0361	05,2022	24467 1					
0362	05,2023	00020 0	CSTODAY	2DEC	8640000 B-33		* NOTE *
0362	05,2024	17260 0					
0363	05,2025	00002 0	RCB-13	OCT	00000		* TABLES CONTAIN *
0364	05,2026	00000 1		OCT	00000		* CONSTANTS FOR *
0365	05,2027	22572 1	RATESP	2DEC	.01660055 B+4	LOMR	* 1969 - 1970 *
0365	05,2030	27214 0					
0366	05,2031	01315 1		2DEC	.00273779 B+4	LOSR	
0366	05,2032	26177 1					
0367	05,2033	77731 1		2DEC	-.00014715 B+4	LONR	
0367	05,2034	55217 0					
0368	05,2035	32055 0		2DEC	.815282316	LOMD	
0369	05,2036	22576 0					
0369	05,2037	10624 0		2DEC	.2746749 0	LOSD	
0369	05,2040	10605 0					
0370	05,2041	37436 1		2DEC	.986209450	LOMI	
0370	05,2042	01655 0					
0371	05,2043	01065 0	VAL67	2DEC	-.0172666666 A+1	ANOD	
0371	05,2044	31323 1					
0372	05,2045	20770 0		2DEC	-.500784445	ANOG	
0372	05,2046	13725 0					
0373	05,2047	02245 0		2DEC	.036291712 B+1	1/27	
0373	05,2050	06475 1					
0374	05,2051	00162 1		2DEC	.003505277 B+1	BALD	
0374	05,2052	33431 1					
0375	05,2053	22566 1		2DEC	.385465625	BAFL	
0375	05,2054	24130 0					
0376	05,2055	02000 0		2DEC	.03125 B+1	1/30	
0376	05,2056	00000 1					
0377	05,2057	00256 0		2DEC	.005325277 B+1	CMOD	
0377	05,2060	17752 1					
0378	05,2061	77512 1		2DEC	-.01106341030	CARG	
0378	05,2062	67453 1					
0379	05,2063	00131 1		2DEC	.002737925 B+1	1/365	
0379	05,2064	26730 1					
0380	*****						

0381	REF	1	26,2000	SETLOC PLANTIN2
0382			26,2000	BANK
0383	REF	1		COUNT* 147/LURDT
0384			26,2000	17775 1 COSI
0384			26,2001	02052 1
0385			26,2002	00333 1 SINI
0385			26,2003	10374 0
0386			26,2004	77665 1 NUDDOT
0386			26,2005	42175 1
0387			26,2006	22211 0 FOOT
0387			26,2007	00625 0

0384	26,2000	17775 1	COSI	2DEC	.98954173 B-1	COS (5521.5 SEC) B-1
0384	26,2001	02052 1				
0385	26,2002	00333 1	SINI	2DEC	.01676579 B-1	SIN (5521.5 SEC) B-1
0385	26,2003	10374 0				
0386	26,2004	77665 1	NUDDOT	2DEC	-.457335121 E-2	REVS/CSEC B+28=-1.07047011 E-8 RAD/SEC
0386	26,2005	42175 1				
0387	26,2006	22211 0	FOOT	2DEC	.570863327	REVS/CSEC B+27= 2.67240410 E-6 RAD/SEC
0387	26,2007	00625 0				

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0388	26.2010	77777 0	RDDT	2DEC	-3.07500686 E-4	REVS/CSEC	B+28=-7.19757301 E-14	RAD/SEC
0388	26.2011	77767 1						
0389	26.2012	37436 1	NODIO	2DEC	.986209434	REVS B-0	= 6.19653663041	RAD
0389	26.2013	01613 1						
0390	26.2014	32417 1	FSUBO	2DEC	.829090536	REVS B-0	= 5.20932947829	RAD
0390	26.2015	32160 1						
0391	26.2016	02052 1	BSUBO	2DEC	.0651201393	REVS B-0	= 0.40916190299	RAD
0391	26.2017	35552 0						
0392	26.2020	37116 0	WEARTH	2DEC	.975561375	REVS/CSEC	B+23= 7.29211494 E-5	RAD/SEC
0392	26.2021	32523 1						

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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A000001
R000002

*** CHANNEL DESCRIPTIONS WORDS ARE ALLOCATED IN ERASABLE ASSIGNMENTS ***

R000005
A0001

CHANNEL 1 IDENTICAL TO COMPUTER REGISTER L (0001)

R0002
A0003

CHANNEL 2 IDENTICAL TO COMPUTER REGISTER C (0002)

R0004
R0005
A0008

CHANNEL 3 HISCALAR; INPUT CHANNEL; MOST SIGNIFICANT 14 BITS FROM 23 STAGE BINARY COUNTER. SCALE FACTOR IS 823 IN CSEC, SO MAX VALUE ABOUT 23.3 HOURS AND LEAST SIGNIFICANT BIT 5.12 SECS.

R0009
R0011
R0013
A0015

CHANNEL 4 LISCALAR; INPUT CHANNEL; NEXT MOST SIGNIFICANT 14 BITS FROM THE 23 STAGE BINARY COUNTER ASSOCIATED WITH CHANNEL 3. SCALE FACTOR IS 89 IN CSEC. SO MAX VAL IS 5.12 SEC AND LEAST SIGNIFICANT BIT IS 1/3200 SEC. SCALE FACTOR OF D.P. WORD WITH CHANNEL 3 IS 823 CSEC.

R0016
A0018

CHANNEL 5 PYJETS; OUTPUT CHANNEL; PITCH PCS JET CONTROL. (REACTION CONTROL SYSTEM) USES BITS 1-6.

R0019
A0021

CHANNEL 6 ROLLJETS; OUTPUT CHANNEL; ROLL PCS JET CONTROL. (REACTION CONTROL SYSTEM) USES BIT 1-6.

R0022
R0024
A0026

CHANNEL 7 SUPERBANK; OUTPUT CHANNEL; NOT RESET BY RESTART; FIXED-EXTENSION BITS USED TO SELECT THE APPROPRIATE FIXED MEMORY BANK IF FBANK IS 50 OCTAL OR MORE. USES BITS 5-7.

R0027
R0029
R0031
A0033

CHANNEL 10 DUTD; OUTPUT CHANNEL; REGISTER USED TO TRANSMIT LATCHING-RELAY DRIVING INFORMATION FOR THE DISPLAY SYSTEM. BITS 15-12 ARE SET TO THE ROW NUMBER (1-14 OCTAL) OF THE RELAY TO BE CHANGED AND BITS 11-1 CONTAIN THE REQUIRED SETTINGS FOR THE RELAYS IN THE ROW.

R0034
R0036
A0038

CHANNEL 11 DSALMOUT; OUTPUT CHANNEL; REGISTER WHOSE BITS ARE USED FOR ENGINE ON-OFF CONTROL AND TO DRIVE INDIVIDUAL INDICATORS OF THE DISPLAY SYSTEM. BITS 1-7 ARE A RELAYS.

R0039
A0040

BIT 1 ISS WARNING

R0041
A0042

BIT 2 LIGHT COMPUTER ACTIVITY LAMP

R0043
A0044

BIT 3 LIGHT UPLINK ACTIVITY LAMP

R0045
A0046

BIT 4 LIGHT TEMP CAUTION LAMP

R0047
A0048

BIT 5 LIGHT KEYBOARD RELEASE LAMP

R0049
A0050

BIT 6 FLASH VERB AND NOUN LAMPS

R0051

BIT 7 LIGHT OPERATOR ERROR LAMP

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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A0052		
R0053	BIT 8	SPARE
A0054		
R0055	BIT 9	TEST CONNECTOR OUTBIT
A0056		
R0057	BIT 10	CAUTION RESET
A0058		
R0059	BIT 11	SPARE
A0060		
R0061	BIT 12	SPARE
A0062		
R0063	BIT 13	ENGINE ON
A0064		
R0065	BIT 14	ENGINE OFF
A0066		
R0067	BIT 15	SPARE
A0068		
R0069	CHANNEL 12	CHAN12; OUTPUT CHANNEL; BITS USED TO DRIVE NAVIGATION AND SPACECRAFT HARDWARE
A0071		
R0072	BIT 1	ZERO RR CDU; CDU'S GIVE RADAR INFORMATION FOR LM
A0073		
R0074	BIT 2	ENABLE CDU RADAR ERROR COUNTERS
A0075		
R0076	BIT 3	NOT USED
A0077		
R0078	BIT 4	COARSE ALIGN ENABLE OF IMU
A0079		
R0080	BIT 5	ZERO IMU CDU'S
A0081		
R0082	BIT 6	ENABLE IMU ERROR COUNTER, CDU ERROR COUNTER.
A0083		
R0084	BIT 7	SPARE
A0085		
R0086	BIT 8	DISPLAY INERTIAL DATA
A0087		
R0088	BIT 9	-PITCH GIMBAL TRIM (BELL MOTION) DESCENT ENGINE
A0089		
R0090	BIT 10	+PITCH GIMBAL TRIM (BELL MOTION) DESCENT ENGINE
A0091		
R0092	BIT 11	-ROLL GIMBAL TRIM (BELL MOTION) DESCENT ENGINE
A0093		
R0094	BIT 12	+ROLL GIMBAL TRIM (BELL MOTION) DESCENT ENGINE
A0095		
R0096	BIT 13	LR POSITION 2 COMMAND
A0097		
R0098	BIT 14	ENABLE RENDEZVOUS RADAR LOCK-ON; AUTO ANGLE TRACKING
A0099		
P0100	BIT 15	ISS TURN ON DELAY COMPLETE
A0101		

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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RO102	CHANNEL 13	CHAN13: OUTPUT CHANNEL	
AO103			
RO104	BIT 1	RADAR C	PROPER SETTING OF THE A.D.C. MATRIX
RO105	BIT 2	RADAR B	SELECTS CERTAIN RADAR
RO106	BIT 3	RADAR A	PARAMETERS TO BE READ.
AO107			
PO108	BIT 4	RADAR ACTIVITY	
AO109			
RO110	BIT 5	NOT USED (CONNECTS AN ALTERNATE INPUT TO UPLINK)	
AO111			
RO112	BIT 6	BLOCK INPUTS TO UPLINK CELL	
AO113			
RO114	BIT 7	DOWNLINK TELEMETRY WORD ORDER CODE BIT	
AO115			
RO116	BIT 8	RHC COUNTER ENABLE (READ HAND CONTROLLER ANGLES)	
AO117			
RO118	BIT 9	START RHC READ INTO COUNTERS IF BIT 8 SET	
AO119			
RO120	BIT 10	TEST ALARMS, TEST DSKY LIGHTS	
AO121			
RO122	BIT 11	ENABLE STANDBY	
AO123			
RO124	BIT 12	RESET TRAP 31-A	ALWAYS APPEAR TO BE SET TO 0
AO125			
RO126	BIT 13	RESET TRAP 31-B	ALWAYS APPEAR TO BE SET TO 0
AO127			
RO128	BIT 14	RESET TRAP 32	ALWAYS APPEAR TO BE SET TO 0
AO129			
RO130	BIT 15	ENABLE T6 RUPT	
AO131			
RO132	CHANNEL 14	CHAN14: OUTPUT CHANNEL; USED TO CONTROL COMPUTER COUNTER CELLS (CDU, GYRO, SPACECRAFT FUNC.	
AO134			
RO135	BIT 1	OUTLINK ACTIVITY (NOT USED)	
AO136			
RO137	BIT 2	ALTITUDE RATE OR ALTITUDE SELECTOR	
AO138			
RO139	BIT 3	ALTITUDE METER ACTIVITY	
AO140			
RO141	BIT 4	THRUST DRIVE ACTIVITY FOR DESCENT ENGINE	
AO142			
RO143	BIT 5	SPARE	
AO144			
RO145	BIT 6	GYRO ENABLE POWER FOR PULSES	
AO146			
RO147	BIT 7	GYRO SELECT B	PAIR OF BITS IDENTIFIES AXIS OF -
RO148	BIT 8	GYRO SELECT A	GYRO SYSTEM TO BE TORQUED.
AO149			
RO150	BIT 9	GYRO TORQUING COMMAND IN NEGATIVE DIRECTION	
AO151			

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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R0152	BIT 10	GYRO ACTIVITY
A0153		
R0154	BIT 11	DRIVE CDU S
A0155		
R0156	BIT 12	DRIVE CDU T
A0157		
R0158	BIT 13	DRIVE CDU Z
A0159		
R0160	BIT 14	DRIVE CDU Y
A0161		
R0162	BIT 15	DRIVE CDU X
A0163		

R0164	CHANNEL 15	MNKEYIN: INPUT CHANNEL; KEY CODE INPUT FROM KEYBOARD OF DSKY. SENSED BY PROGRAM WHEN
R0166		PROGRAM INTERRUPT #5 IS RECEIVED. USES BITS 5-1
A0167		

R0168	CHANNEL 16	NAVKEYIN: INPUT CHANNEL; OPTICS MARK INFORMATION AND NAVIGATION PANEL DSKY (CM) OR THRUST
R0170		CONTROL (LM) SENSED BY PROGRAM WHEN PROGRAM INTERRUPT #6 IS RECEIVED. USES BITS 3-7 ONLY.
A0172		
R0173	BIT 1	NOT ASSIGNED
A0174		
R0175	BIT 2	NOT ASSIGNED
A0176		
R0177	BIT 3	OPTICS X-AXIS MARK SIGNAL FOR ALIGN OPTICAL TELESCOPE
A0178		
R0179	BIT 4	OPTICS Y-AXIS MARK SIGNAL FOR AUT
A0180		
R0181	BIT 5	OPTICS MARK REJECT SIGNAL
A0182		
R0183	BIT 6	DESCENT+ : CREW DESIRED SLOWING RATE OF DESCENT
A0184		
R0185	BIT 7	DESCENT- : CREW DESIRED SPEEDING UP RATE OF DESCENT
A0186		

R0187	NOTE: ALL BITS IN CHANNELS 30-33 ARE INVERTED AS SENSED BY THE PROGRAM, SO THAT A VALUE OF ZERO MEANS
R0189	THAT THE INDICATED SIGNAL IS PRESENT.
A0190	

R0191	CHANNEL 30	INPUT CHANNEL
A0192		
R0193	BIT 1	ABORT WITH DESCENT STAGE
A0194		
R0195	BIT 2	UNUSED
A0196		
R0197	BIT 3	ENGINE ARMED SIGNAL
A0198		
R0199	BIT 4	ABORT WITH ASCENT ENGINE STAGE
A0200		
R0201	BIT 5	AUTO THROTTLE: COMPUTER CONTROL OF DESCENT ENGINE

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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A0202	BIT 6	DISPLAY INERTIAL DATA
R0203		
A0204	BIT 7	RR CDU FAIL
R0205		
A0206	BIT 8	SPARE
R0207		
A0208	BIT 9	IMU OPERATE WITH NO MALFUNCTION
R0209		
A0210	BIT 10	LM COMPUTER (NOT AGS) HAS CONTROL OF LM
R0211		
A0212	BIT 11	IMU GAGE COMMAND TO DRIVE IMU GIMBAL ANGLES TO 0.
R0213		
A0214	BIT 12	IMU CDU FAIL (MALFUNCTION OF IMU CDU.SI)
R0215		
A0216	BIT 13	IMU FAIL (MALFUNCTION OF IMU STABILIZATION LOOPS)
R0217		
A0218	BIT 14	ISS TURN ON REQUESTED
R0219		
A0220	BIT 15	TEMPERATURE OF STABLE MEMBER WITHIN DESIGN LIMITS
R0221		
A0222		
R0223	CHANNEL 31	INPUT CHANNEL; BITS ASSOCIATED WITH THE ATTITUDE CONTROLLER, TRANSLATIONAL CONTROLLER, AND SPACECRAFT ATTITUDE CONTROL; USED BY RCS DAP
R0225		
A0226	BIT 1	ROTATION (BY PHC) COMMANDED IN POSITIVE PITCH DIRECTION; MUST BE IN MINIMUM IMPULSE MODE. ALSO POSITIVE ELEVATION CHANGE FOR LANDING POINT DESIGNATOR
R0227		
R0229	BIT 2	AS BIT 1 EXCEPT NEGATIVE PITCH AND ELEVATION
A0231		
R0232	BIT 3	ROTATION (BY RHC) COMMANDED IN POSITIVE YAW DIRECTION; MUST BE IN MINIMUM IMPULSE MODE.
A0233		
R0234	BIT 4	AS BIT 3 EXCEPT NEGATIVE YAW
A0236		
R0237	BIT 5	ROTATION (BY RHC) COMMANDED IN POSITIVE ROLL DIRECTION; MUST BE IN MINIMUM IMPULSE MODE. ALSO POSITIVE AZIMUTH CHANGE FOR LANDING POINT DESIGNATOR
A0238		
R0239	BIT 6	AS BIT 5 EXCEPT NEGATIVE ROLL AND AZIMUTH
R0241		
A0243	BIT 7	TRANSLATION IN +X DIRECTION COMMANDED BY THC
R0244		
A0245	BIT 8	TRANSLATION IN -X DIRECTION COMMANDED BY THC
R0246		
A0247	BIT 9	TRANSLATION IN +Y DIRECTION COMMANDED BY THC
R0248		
A0249	BIT 10	TRANSLATION IN -Y DIRECTION COMMANDED BY THC
R0250		
A0251	BIT 11	TRANSLATION IN +Z DIRECTION COMMANDED BY THC
R0252		
A0253	BIT 12	TRANSLATION IN -Z DIRECTION COMMANDED BY THC
R0254		
A0255		
R0256		

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A0257
R0258 BIT 13 ATTITUDE HOLD MODE ON SCS MODE CONTROL SWITCH
A0259
R0260 BIT 14 AUTO STABILIZATION OF ATTITUDE ON SCS MODE SWITCH
A0261
R0262 BIT 15 ATTITUDE CONTROL OUT OF DETENT (RHC NOT IN NEUTRAL)
A0263

R0264 CHANNEL 32 INPUT CHANNEL
A0265
R0266 BIT 1 THRUSTERS 2 & 4 DISABLED BY CREW
A0267
R0268 BIT 2 THRUSTERS 5 & 8 DISABLED BY CREW
A0269
R0270 BIT 3 THRUSTERS 1 & 3 DISABLED BY CREW
A0271
R0272 BIT 4 THRUSTERS 6 & 7 DISABLED BY CREW
A0273
R0274 BIT 5 THRUSTERS 14 & 16 DISABLED BY CREW
A0275
R0276 BIT 6 THRUSTERS 13 & 15 DISABLED BY CREW
A0277
R0278 BIT 7 THRUSTERS 9 & 12 DISABLED BY CREW
A0279
R0280 BIT 8 THRUSTERS 10 & 11 DISABLED BY CREW
A0281
R0282 BIT 9 DESCENT ENGINE GIMBALS DISABLED BY CREW
A0284
R0285 BIT 10 APPARENT DESCENT ENGINE GIMBAL FAILURE
A0286
R0287 BIT 14 INDICATES PROCEED KEY IS DEPRESSED
A0288

R0289 CHANNEL 33 CHAN33; INPUT CHANNEL; FOR HARDWARE STATUS AND COMMAND INFORMATION. BITS 15-11 ARE FLIP-
R0291 FLOP BITS RESET BY A CHANNEL "WRITE" COMMAND THAT ARE RESET BY A RESTART & BY T4FURT LOOP.
A0293
R0294 BIT 1 SPARE
A0295
R0296 BIT 2 RR AUTO-POWER ON
A0297
R0298 BIT 3 RR RANGE LOW SCALE
A0299
R0300 BIT 4 RR DATA GOOD
A0301
R0302 BIT 5 LR RANGE DATA GOOD
A0303
R0304 BIT 6 LR POS1
A0305
R0306 BIT 7 LR POS2
A0307

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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R0308	BIT 8	LR VEL DATA GOOD
A0309		
R0310	BIT 9	LR RANGE LOW SCALE
A0311		
R0312	BIT 10	BLOCK UPLINK INPUT
A0313		
R0314	BIT 11	UPLINK TOO FAST
A0315		
R0316	BIT 12	DOWNLINK TOO FAST
A0317		
R0318	BIT 13	PIPA FAIL
A0319		
R0320	BIT 14	WARNING OF REPEATED ALARMS: RESTART, COUNTER FAIL, VOLTAGE FAIL, AND SCALAR DOUBLE.
A0322		
R0323	BIT 15	LGC OSCILLATOR STOPPED
A0324		
R0325	CHANNEL 34	DNT M1; OUTPUT CHANNEL; DOWNLINK 1 FIRST OF TWO WORDS SERIALIZATION.
R0326	CHANNEL 35	DNT M2; OUTPUT CHANNEL DOWNLINK 2 SECOND OF TWO WORDS SERIALIZATION.
A0330		

L FLAGWORD ASSIGNMENTS

USER'S PAGE NO. 1

FD 54

A0001

R0002 FLAGWORDS 0-11 ARE DOWNLINKED AND CAN BE SET AND CLEARED BY UP-FLAG AND DOWN-FLAG INSTRUCTIONS IN THE
 R0004 INTERPRETER. THESE WERE PREVIOUSLY LISTED UNDER "INTERPRETIVE SWITCH-BIT ASSIGNMENTS" IN
 R0006 THE ERASABLE LOG SECTION. FLAGWORDS 12 & 13 WERE PREVIOUSLY PADMODES AND DAPMODES AND
 R0008 ARE STILL DOWNLINKED UNDER THOSE NAMES.

A0009

R0010 ALPHABETICAL LIST OF FLAGWORDS

R0011	FLAGWORD	DEC. NUMBER	BIT AND FLAG	BIT NAME
R0012	ACCOKFLG	207	BIT 3 FLAG 13	ACCSOKAY
R0013	ACC4-2FL	199	BIT 11 FLAG 13	ACC4OR2X
R0014	ACHODFLG	032	BIT 13 FLAG 2	ACHODBIT
R0015	ALTSCALE	186	BIT 9 FLAG 12	ALTSCBIT
R0016	ANTENFLG	183	BIT 12 FLAG 12	ANTENBIT
R0017	AORBSFLG	205	BIT 5 FLAG 13	AORBSYST
R0018	AORBTFLG	200	BIT 10 FLAG 13	AORBTTRAN
R0019	APSESW	130	BIT 5 FLAG 8	APSESBIT
R0020	APSFLAG	152	BIT 13 FLAG 10	APSFLBIT
R0021	ASTNFLAG	108	BIT 12 FLAG 7	ASTNBIT
R0022	ATTFLAG	104	BIT 1 FLAG 6	ATTFLBIT
R0023	AUTOMODE	193	BIT 2 FLAG 12	AUTOMBIT
R0024	AUTR1FLG	209	BIT 1 FLAG 13	AUTRATE1
R0025	AUTR2FLG	208	BIT 2 FLAG 13	AUTRATE2
R0026	AUXFLAG	103	BIT 2 FLAG 6	AUXFLBIT
R0027	AVEGFLAG	115	BIT 5 FLAG 7	AVEGFBIT
R0028	AVEMIDSW	149	BIT 1 FLAG 9	AVEMDBIT
R0029	AVFLAG	040	BIT 5 FLAG 2	AVFLBIT
R0030	CALCMAN2	043	BIT 2 FLAG 2	CALC2BIT
R0031	CALCMAN3	042	BIT 3 FLAG 2	CALC3BIT
R0032	CDESFLAG	180	BIT 15 FLAG 12	CDESBIT
R0033	CMOONFLG	123	BIT 12 FLAG 8	CMOONBIT
R0034	COGAFLAG	131	BIT 4 FLAG 8	COGAFBIT
R0037	CSMDKFLG	197	BIT 13 FLAG 13	CSMDCKBIT
R0038	CULTFLAG	053	BIT 7 FLAG 3	CULTBIT
R0040	DAPBOOLS		FLAGWORD 13	
R0041	DBSEFLG	206	BIT 4 FLAG 13	DBSELELT
R0042	DESIGFLG	185	BIT 10 FLAG 12	DESIGBIT
R0043	DIDFLAG	016	BIT 14 FLAG	DIDFLBIT
R0044	DIMOFLAG	059	BIT 1 FLAG 3	DIMOBIT
R0045	DMENFLG	081	BIT 9 FLAG 5	DMENFBIT
R0046	DRIFTDFL	202	BIT 8 FLAG 13	DRIFTBIT
R0047	DRIFTFLG	030	BIT 15 FLAG 2	DRFTBIT
R0048	DSKYFLAG	075	BIT 15 FLAG 5	DSKYFBIT

L FLACWORD ASSIGNMENTS

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R0049	D6OR9FLG	058	BIT 2	FLAG 3	D6OR9BIT
R0050	ENGONFLG	083	BIT 7	FLAG 5	ENGONBIT
R0051	ERADFLAG	017	BIT 13	FLAG 1	ERADBIT
R0052	ETPIFLAG	038	BIT 7	FLAG 2	ETPIBIT
R0054	FINALFLG	039	BIT 6	FLAG 2	FINALBIT
R0056	FLAGWRD0	(000-014)	(STATE +0)		
R0057	FLAGWRD1	(015-029)	(STATE +1)		
R0058	FLAGWRD2	(030-044)	(STATE +2)		
R0059	FLAGWRD3	(045-059)	(STATE +3)		
R0060	FLAGWRD4	(060-074)	(STATE +4)		
R0061	FLAGWRD5	(075-089)	(STATE +5)		
R0062	FLAGWRD6	(090-104)	(STATE +6)		
R0063	FLAGWRD7	(105-119)	(STATE +7)		
R0064	FLAGWRD8	(120-134)	(STATE +8D)		
R0065	FLAGWRD9	(135-149)	(STATE +9D)		
R0066	FLAP	142	BIT 8	FLAG 9	FLAPBIT
R0067	FLGWRD10	(150-164)	(STATE +10D)		
R0068	FLGWRD11	(165-179)	(STATE +11D)		
R0069	FLGWRD12	(180-194)	(STATE +12D)		
R0070	FLGWRD13	(195-209)	(STATE +13D)		
R0071	FLPC	138	BIT 12	FLAG 9	FLPCBIT
R0072	FLPI	139	BIT 11	FLAG 9	FLPIBIT
R0073	FLRCS	149	BIT 10	FLAG 9	FLRCSBIT
R0074	FLUNDISP	125	BIT 10	FLAG 8	FLUNDBIT
R0075	FLVR	136	BIT 14	FLAG 9	FLVRBIT
R0077	FREEFLAG	012	BIT 3	FLAG 0	FREEFBIT
R00775	FSPASFLG	005	BIT 10	FLAG 0	FSPASBIT
R0078	GLOKFAIL	046	BIT 14	FLAG 3	GLOKFBIT
R0079	GMBDRVSW	095	BIT 10	FLAG 6	GMBDRBIT
R0080	GUESSW	028	BIT 2	FLAG 1	GUESSBIT
R0081	HFLSHFLG	179	BIT 1	FLAG 11	HFLSHBIT
R0082	IDLEFLAG	113	BIT 7	FLAG 7	IDLEFBIT
R0083	IGNFLAG	107	BIT 13	FLAG 7	IGNFLBIT
R0084	IMPULSW	036	BIT 9	FLAG 2	IMPULBIT
R0085	IMUSE	007	BIT 8	FLAG 0	IMUSEBIT
R0086	INF INFLG	128	BIT 7	FLAG 8	INF INBIT
R0087	INITALGN	133	BIT 2	FLAG 8	INITABIT
R0088	INTFLAG	151	BIT 14	FLAG 10	INTFLBIT
R0089	INTYPFLG	056	BIT 4	FLAG 3	INTYRBIT
R0090	ITSWICH	105	BIT 15	FLAG 7	ITSWBIT
R0091	JSWITCH	001	BIT 14	FLAG 0	JSWCHBIT
R0092	LETABORT	141	BIT 9	FLAG 9	LETABBIT
R0093	LMONFLG	124	BIT 11	FLAG 8	LMONBIT
R0094	LOKONSW	010	BIT 5	FLAG 0	LOKONBIT
R0095	LOSCMFLG	033	BIT 12	FLAG 2	LOSCMBIT
R0096	LRALTFLG	190	BIT 5	FLAG 12	LRALTBIT
R0097	LRBYPASS	165	BIT 15	FLAG 11	LRBYBIT
R0098	LRINH	172	BIT 8	FLAG 11	LRINHBIT
R0099	LRPOSFLG	189	BIT 6	FLAG 12	LRPOSBIT
R0100	LRVELFLG	187	BIT 8	FLAG 12	LRVELBIT

EQUIVALENT FLAG NAME: OPTNSW

L FLAGWORD ASSIGNMENTS

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RO101	LUNAFLAG	048	BIT 12 FLAG 3	LUNABIT
RO102	MANUFLAG	106	BIT 14 FLAG 7	HANDFBIT
RO103	MGLVFLAG	088	BIT 2 FLAG 5	HGLVFBIT
RO104	MIDAVFLAG	148	BIT 2 FLAG 9	MIDAVBIT
RO105	MIDFLAG	002	BIT 13 FLAG 0	MIDFLBIT
RO106	MIDIFLAG	147	BIT 3 FLAG 9	MIDI0BIT
RO107	MKOVFLAG	072	BIT 3 FLAG 4	MKOVBIT
RO108	MOONFLAG	003	BIT 12 FLAG 0	MOONBIT
RO109	MRKIDFLAG	060	BIT 15 FLAG 4	MRKIDBIT
RO110	MRKNVFLAG	066	BIT 9 FLAG 4	MRKNVBIT
RO111	MRUPTFLAG	070	BIT 5 FLAG 4	MRUPTBIT
RO112	MUNFLAG	097	BIT 8 FLAG 6	MUNFLBIT
RO113	MWAITFLAG	064	BIT 11 FLAG 4	MWAITBIT
RO114	NEEDFLAG	011	BIT 4 FLAG 0	NEEDLBIT
RO115	NEWIFLAG	122	BIT 13 FLAG 8	NEWIBIT
RO116	NJETSFLAG	015	BIT 15 FLAG	NJETSBIT
RO117	NODDFLAG	044	BIT 1 FLAG 2	NODD0BIT
RO118	NOLRREAD	170	BIT 10 FLAG 11	NOLRRBIT
RO119	NORMSW	110	BIT 10 FLAG 7	NORMSBIT
RO120	NORRMON	086	BIT 4 FLAG 5	NORRMBIT
RO121	NOR29FLAG	049	BIT 11 FLAG 3	NR29FBIT
RO122	NOTHROTL	076	BIT 12 FLAG 5	NOTHRBIT
RO123	NOUPFLAG	024	BIT 6 FLAG 1	NOUPFBIT
RO124	NRMNVFLAG	067	BIT 8 FLAG 4	NRMNVBIT
RO125	NRMIDFLAG	062	BIT 13 FLAG 4	NRMIDBIT
RO126	NRUPTFLAG	071	BIT 4 FLAG 4	NRUPTBIT
RO127	NTARGFLAG	102	BIT 3 FLAG 6	NTARGBIT
RO128	NWAITFLAG	065	BIT 10 FLAG 4	NWAITBIT
RO129	OLDESFLAG	014	BIT 1 FLAG 0	OLDESBIT
RO130	OPTNSW	038	BIT 7 FLAG 2	OPTNBIT
RO132	ORBWFLAG	054	BIT 6 FLAG 3	ORBWFBIT
RO133	ORDERSW	129	BIT 6 FLAG 8	ORDERBIT
RO134	OURRCFLAG	198	BIT 12 FLAG 13	OURRCBIT
RO135	PDSPFLAG	063	BIT 12 FLAG 4	PDSPFBIT
RO136	PFRATFLAG	041	BIT 4 FLAG 2	PFRATBIT
RO137	PINBRFLAG	069	BIT 6 FLAG 4	PINBRBIT
RO139	PRECIFLAG	052	BIT 8 FLAG 3	PRECIBIT
RO140	PRIDDFLAG	061	BIT 14 FLAG 1	PRIDDBIT
RO141	PRDNVFLAG	068	BIT 7 FLAG 4	PRDNVBIT
RO142	PSTHIGAT	169	BIT 11 FLAG 11	PSTHIBIT
RO143	PULSEFLAG	195	BIT 15 FLAG 13	PULSES
RO1432	P21FLAG	004	BIT 11 FLAG 0	P21FLBIT
RO144	P25FLAG	006	BIT 9 FLAG 0	P25FLBIT
RO145	P39/79SW	126	BIT 9 FLAG 8	P39SWBIT
RO146	QUITFLAG	145	BIT 5 FLAG 9	QUITBIT
RO147	RADMODES		FLGWRD12	
RO148	RASFLAG		FLGWRD10	
RO149	RCDUFAIL	188	BIT 7 FLAG 12	RCDUFBIT
RO150	RCDUOFLAG	182	BIT 13 FLAG 12	RCDU0BIT
RO151	READLR	174	BIT 6 FLAG 11	READLBIT

EQUIVALENT FLAG NAME: ETPIFLAG

L FLAGWORD ASSIGNMENTS

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EQ 54

RO152	READRFLG	051	BIT 9 FLAG 3	READRBIT
RO154	READVEL	175	BIT 5 FLAG 11	READVBIT
RO155	REDFLAG	099	BIT 6 FLAG 6	REDFLBIT
RO156	REFSMFLG	047	BIT 13 FLAG 3	REFSMBIT
RO157	REINTFLG	158	BIT 7 FLAG 10	REINTRIT
RO158	REMODFLG	181	BIT 14 FLAG 12	REMODBIT
RO159	RENDWFLG	089	BIT 1 FLAG 5	RENDWBIT
RO160	REPOSHUN	184	BIT 11 FLAG 12	REPOSBIT
RO161	RHGSCFLG	203	BIT 7 FLAG 13	RHGSCBIT
RO162	RNDVZFLG	008	BIT 7 FLAG 0	RNDVZBIT
RO163	RNGEDATA	176	BIT 4 FLAG 11	RNGEDBIT
RO164	RNGSCFLG	080	BIT 10 FLAG 5	RNGSCBIT
RO1642	RODFLAG	018	BIT 12 FLAG 1	RODFLBIT
RO1644	ROTFLAG	144	BIT 6 FLAG 9	ROTFLBIT
RO165	RPQFLAG	120	BIT 15 FLAG 8	RPQFLBIT
RO166	RRDATAFL	191	BIT 4 FLAG 12	RRDATABIT
RO167	RRNHSW	009	BIT 6 FLAG 0	RRNBBIT
RO168	RRRSFLAG	192	BIT 3 FLAG 12	RRRSBIT
RO169	RVSW	111	BIT 9 FLAG 7	RVSWBIT
RO170	RO4FLAG	051	BIT 9 FLAG 3	RO4FLBIT
RO172	R10FLAG	013	BIT 2 FLAG 0	R10FLBIT
RO173	R61FLAG	020	BIT 10 FLAG 1	R61FLBIT
RO174	R77FLAG	079	BIT 11 FLAG 5	R77FLBIT
RO175	SCALBAD	177	BIT 3 FLAG 11	SCABBIT
RO176	SLOPESW	027	BIT 3 FLAG 1	SLOPEBIT
RO177	SNUFFER	077	BIT 13 FLAG 5	SNUFFBIT
RO178	SOLNSW	087	BIT 3 FLAG 5	SOLNSBIT
RO179	SRCHOPTN	031	BIT 14 FLAG 2	SRCHBIT
RO180	STATEFLG	055	BIT 5 FLAG 3	STATEBIT
RO181	STEERSW	034	BIT 11 FLAG 2	STEERBIT
RO182	SURFFLAG	127	BIT 8 FLAG 8	SURFFBIT
RO183	SWANDISP	109	BIT 11 FLAG 7	SWANDBIT
RO184	S32.1F1	090	BIT 15 FLAG 6	S32BIT1
RO185	S32.1F2	092	BIT 14 FLAG 6	S32BIT2
RO186	S32.1F3A	092	BIT 13 FLAG 6	S32BIT3A
RO187	S32.1F3B	093	BIT 12 FLAG 6	S32BIT3B
RO188	TFFSW	119	BIT 1 FLAG 7	TFFSWBIT
RO189	TRACKFLG	025	BIT 5 FLAG 1	TRACKBIT
RO190	TURNDNFL	194	BIT 1 FLAG 12	TURNDNBIT
RO191	ULLAGFLG	204	BIT 6 FLAG 13	ULLAGER
RO192	UPDATFLG	023	BIT 7 FLAG 1	UPDATBIT
RO193	UPLOCKFL	116	BIT 4 FLAG 7	UPLOCBIT
RO194	USEQRFLG	196	BIT 14 FLAG 13	USEQRJTS
RO195	VEHUPFLG	022	BIT 8 FLAG 1	VEHUPBIT
RO196	VELDATA	173	BIT 7 FLAG 11	VELDABIT
RO197	VERIFLAG	117	BIT 3 FLAG 7	VERIFBIT
RO198	VFLAG	050	BIT 10 FLAG 3	VFLAGBIT
RO199	VFLSHFLG	178	BIT 2 FLAG 11	VFLSHBIT
RO200	VINTFLAG	057	BIT 3 FLAG 3	VINTFBIT
RO201	VXINH	168	BIT 12 FLAG 11	VXINHBIT

EQUIVALENT FLAG NAME: RO4FLAG

EQUIVALENT FLAG NAME: READRFLG

L FLAGWORD ASSIGNMENTS

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R0202	V37FLAG	114	BIT 6 FLAG 7	V37FLBIT
R0203	V67FLAG	112	BIT 8 FLAG 7	V67FLBIT
R0204	V82EMFLG	118	BIT 2 FLAG 7	V82EMBIT
R0205	XDELVFLG	037	BIT 8 FLAG 2	XDELVBIT
R0206	XDSPFLAG	074	BIT 1 FLAG 4	XDSPBIT
R0207	XORFLG	171	BIT 9 FLAG 11	XORFLBIT
R0208	XOVINFLG	201	BIT 9 FLAG 13	XOVINBIT
R0210	3AXISFLG	084	BIT 6 FLAG 5	3AXISBIT
R0211	360SW	134	BIT 1 FLAG 8	360SWBIT
A0212				

R0213 ASSIGNMENT AND DESCRIPTION OF FLAGWORDS

0214	REF	1	0074	FLAGWORD =	STATE +0	(000-014)	
A0215						(SET)	(RESET)
A0216					BIT 15 FLAG 0	(S)	
A0217					GOOD		
A0218					BIT15		
A0219							
A0220					BIT 14 FLAG 0	(S)	
0221			0001	JSWITCH =	0010	INTEGRATION OF W	INTEGRATION OF STATE
0222	REF	1	4736	JSWCHBIT =	BIT14	MATRIX	VECTOR
A0223							
A0224					BIT 13 FLAG 0	(S)	
0225			0002	MIDFLAG =	0020	INTEGRATION WITH	INTEGRATION WITH OF
A0226						SECONDARY BODY AND	SOLAR PERTURBATIONS
0227	REF	2	LAST 40	4737	MIDFLBIT =	BIT13	SOLAR PERTURBATIONS
A0228							
A0229					BIT 12 FLAG 0	(L)	
0230			0003	MOONFLAG =	0030	MOON IS SPHERE OF	EARTH IS SPHERE OF
0231	REF	1	4740	MOONBIT =	BIT12	INFLUENCE	INFLUENCE
A0232							
A0233					BIT 11 FLAG 0		
0234			0004	P21FLAG =	0040	USE BASE VECTORS	1ST PASS -- CALC
0235	REF	2	LAST 43	4741	P21FLBIT =	BIT11	ALREADY CALCULATED
A0236							2LATE BASE VECTORS
A0237					BIT 10 FLAG 0		
0238			0005	FSPASFLG =	0050	FIRST PASS THROUGH	NOT FIRST PASS THRU
0239	REF	1	4742	FSPASBIT =	BIT10	REPOSITION ROUTINE	REPOSITION ROUTINE
A0240							

L FLAGWORD ASSIGNMENTS

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A0241				BIT 9 FLAG 0	(S)	
0242		0006	P25FLAG =	0060	P25 OPERATING	P25 NOT OPERATING
0243	REF 1	4743	P25FLBIT =	BIT9		
A0244						
A0245				BIT 8 FLAG 0	(S)	
0246		0007	IMUSE =	0070	IMU IN USE	IMU NOT IN USE
0247	REF 1	4744	IMUSEBIT =	BIT8		
A0248						
A0249				BIT 7 FLAG 0	(S)	
0250		0010	RNDVZFLG =	0090	P20 RUNNING (RADAR	P20 NOT RUNNING
0251	REF 1	4745	RNDVZBIT =	BIT7	IN USE)	
A0252						
A0253				BIT 6 FLAG 0	(S)	
0254		0011	RRNBSW =	0090	RADAR TARGET IN	RADAR TARGET IN
0255	REF 1	4746	RRNBBIT =	BIT6	FB COORDINATES	SM COORDINATES
A0256						
A0257				BIT 5 FLAG 0	(S)	
0258		0012	LCKONSW =	0100	RADAR LOCK-ON	RADAR LOCK-ON NOT
0259	REF 1	4747	LCKONBIT =	BIT5	DESIRED	DESIRED
A0260						
A0261				BIT 4 FLAG 0	(S)	
0262		0013	NEEDLFLG =	0110	TOTAL ATTITUDE	A/P FOLLOWING
0263	REF 1	4750	NEEDLBIT =	BIT4	ERROR DISPLAYED	ERROR DISPLAYED
A0264						
A0265				BIT 3 FLAG 0		
0266		0014	FREEFLAG =	0120	(USED BY P51-53 TEMP IN MANY DIFFERENT	
A0267					ROUTINES & BY LUNAR + SOLAR EPHEMERIDES)	
0268	REF 1	4751	FREEFBIT =	BIT3		
A0269						
A0270				BIT 2 FLAG 0		
0271		0015	R10FLAG =	0130	R10 OUTPUTS DATA TO BESIDES OUTPUT WHEN	
0272	REF 1	4752	R10FLBIT =	BIT2	ALTITUDE & ALTITUDE SET. R10 ALSO OUTPUT	
A0273					RATE METERS ONLY TO FORWARD & LATERAL	
A0274					VELOCITY CROSSPOINT	
A0275						
A0276				BIT 1 FLAG 0	(L)	
0277		0016	OLDESFLG =	0140	R29 GYRO CMD LOOP	R29 GYRO CMD LOOP
0278	REF 1	4753	OLDESBIT =	BIT1	REQUESTED	NOT REQUESTED
A0279						
0280	REF 2 LAST 65	0075	FLAGWORD1 =	STATE +1	(015-029)	

L FLAGWORD ASSIGNMENTS

USER'S PAGE NO.

7

LD S4

A0281

(SET)

(RESET)

A0282

0283

0284

A0285

REF 1

0017

4735

NJETSFLG =

NJETSBIT =

BIT 15 FLAG 1

0150

BIT15

(S)

TWO JET RCS BURN

FOUR JET RCS BURN

A0286

0287

0288

A0289

REF 2 LAST 65

0020

4736

DIOFLAG =

DIOFLBIT =

BIT 14 FLAG 1

0151

BIT14

(L)

INERTIAL DATA IS

PERFORM DATA DISPLAY

AVAILABLE

INITIALIZATION FUNC

A0290

0291

0292

A0293

REF 3 LAST 65

0021

4737

ERAFLAG =

ERAFBIT =

BIT 13 FLAG 1

0170

BIT13

(S)

COMPUTE REARTH

USE CONSTANT REARTH

FISCHER ELLIPSOID

PAD RADIUS

A0294

0295

0296

A0297

A02975

REF 2 LAST 65

0022

4740

RDOFLAG =

RDOFLBIT =

BIT 12 FLAG 1

0180

BIT12

IF IN P66, NORMAL

IF IN P66, RE-INIT-

OPERATION CONTINUES. IALIZATION IS PER-

RESTART CLEARS FLAG FORMED AND FLAG IS

A0298

A0299

A02995

A0300

0301

0302

A0303

REF 2 LAST 65

0024

4742

R61FLAG =

R61FLBIT =

BIT 11 FLAG 1

0190

BIT11

BIT 10 FLAG 1

0200

BIT10

(L)

RUN R61 LEM

RUN R65 LEM

A0304

A0305

A0306

A0307

BIT 9 FLAG 1

0210

BIT9

A0308

0309

0310

A0311

REF 2 LAST 66

0026

4744

VERUPFLG =

VERUPBIT =

BIT 8 FLAG 1

0220

BIT8

(S)

CSM STATE VECTOR

LEM STATE VECTOR

BEING UPDATED

BEING UPDATED

A0312

0313

0314

A0315

REF 2 LAST 66

0027

4745

UPDATFLG =

UPDATBIT =

BIT 7 FLAG 1

0230

BIT7

(S)

UPDATING BY MARKS

UPDATING BY MARKS

ALLOWED

NOT ALLOWED

A0316

0317

A0318

0319

REF 2 LAST 66

0030

4746

NOUPFLAG =

NOUPFBIT =

BIT 6 FLAG 1

0240

BIT6

(S)

NEITHER CSM

EITHER STATE

NOR LM STATE VECTOR

VECTOR MAY BE

MAY BE UPDATED

UPDATED

L FLAGWORD ASSIGNMENTS

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10 54

A0320

A0321

0322

0323

A0324

REF 2 LAST 66

0031

4747

TRACKFLG =

TRACKBIT =

BIT 9 FLAG 1 (S)

0250

BIT9

TRACKING ALLOWED

TRACKING NOT ALLOWED

A0325

A0326

A0327

A0328

BIT 4 FLAG 1

0260

BIT4

A0329

0330

A0331

0332

A0333

REF 2 LAST 66

0033

4751

SLOPESW =

SLOPEBIT =

BIT 3 FLAG 1 (S)

0270

BIT3

ITERATE WITH BIAS

ITERATE WITH REGULAR

METHOD IN ITERATOR

FALSE METHOD IN

ITERATOR

A0334

0335

0336

A0337

REF 2 LAST 66

0034

4752

GUESSW =

GUESSBIT =

BIT 2 FLAG 1 (S)

0280

BIT2

NO STARTING VALUE

STARTING VALUE FOR

FOR ITERATION

ITERATION EXISTS

A0338

A0339

A0340

BIT 1 FLAG 1

0290

0341

REF 3 LAST 66

0076

FLAGWRD2 =

STATE +2

(030-044)

A0342

(SET)

(RESET)

A0343

0344

0345

A0346

REF 2 LAST 67

0036

4735

DRIFTFLG =

DRIFTBIT =

BIT 15 FLAG 2 (S)

0300

BIT15

TDRUPT CALLS GYRO

TDRUPT DOES NO GYRO

COMPENSATION

COMPENSATION

A0347

0348

0349

A0350

REF 3 LAST 67

0037

4736

SEARCHOPTN =

SEARCHBIT =

BIT 14 FLAG 2 (S)

0310

BIT14

RADAR IN AUTOMATIC

RADAR NOT IN AUTO-

SEARCH OPTION(R24)

MATIC SEARCH OPTION

A0351

0352

0353

A0354

REF 4 LAST 67

0040

4737

ACMDBFLG =

ACMDBBIT =

BIT 13 FLAG 2 (S)

0320

BIT13

MANUAL ACQUISITION

AUTO ACQUISITION

BY RENDESVOUS RADAR

BY RENDESVOUS RADAR

A0355

0356

A0357

0358

REF 3 LAST 67

0041

4740

LOSCNFLG =

LOSCNBIT =

BIT 12 FLAG 2 (S)

0330

BIT12

LINE OF SIGHT BEING

LINE OF SIGHT NOT

COMPUTED (R21)

BEING COMPUTED

L FLAGWORD ASSIGNMENTS

USER'S PAGE NO. 9 ED 54

A0359 IN R29 (L): RR GYRO IN R29 (L): RR GYRO
A0360 CMD LOOP RUNNING CMD LOOP OFF

A0361
0362 0042 STEERSW = BIT 11 FLAG 2 (S)
0363 REF 3 LAST 65 4741 STEERBIT = 0340 SUFFICIENT THRUST INSUFFICIENT THRUST
A0364 4741 BIT 11 IS PRESENT IS PRESENT

A0365
A0368 BIT 10 FLAG 2 (S)

A0369
0370 0044 IMPULSW = BIT 9 FLAG 2 (S)
A0371 4743 IMPULBIT = 0360 MINIMUM IMPULSE STEERING BURN (NO
0372 REF 2 LAST 66 4743 BURN (CUTOFF TIME CUTOFF TIME YET
A0373 SPECIFIED) AVAILABLE)

A0374
0375 0045 XDELVFLG = BIT 8 FLAG 2 (S)
0376 REF 3 LAST 67 4744 XDELVBIT = 0370 EXTERNAL DELTAV VG LAMBERT (AIMPOINT)
A0377 4744 BIT 8 COMPUTATION VG COMPUTATION

A0378
0379 0046 ETPIFLAG = BIT 7 FLAG 2 (S)
A0380 4745 ETPIBIT = 0380 ELEVATION ANGLE TPI TIME SUPPLIED
0381 REF 3 LAST 67 4745 4777 SUPPLIED FOR FOR P34,74 TO COMPUT
A0382 4777 P34,74 ELEVATION

A0383
0384 REF 1 0046 OPTNSW = BIT 7 FLAG 2 (L)
0385 REF 4 LAST 69 4745 ETPIFLAG SDR PHASE OF P38/78 SDR PHASE OF P38/78
A0386 4745 BIT 7

A0387
0388 0047 FINALFLG = BIT 6 FLAG 2 (S)
A0389 4746 FINALBIT = 0390 LAST PASS THROUGH INTERIM PASS THROUGH
0390 REF 3 LAST 67 4746 4776 RENDEZVOUS PROGRAM RENDEZVOUS PROGRAM
A0391 4776 COMPUTATIONS COMPUTATIONS

A0392
0393 0050 AVFLAG = BIT 5 FLAG 2 (S)
0394 REF 3 LAST 68 4747 AVFLBIT = 0400 LEM IS ACTIVE CSM IS ACTIVE
A0395 4747 BIT 5 VEHICLE VEHICLE

A0396
0397 0051 PFRATFLG = BIT 4 FLAG 2 (S)
0398 REF 2 LAST 66 4750 PFRATBIT = 0410 PREFERRED ATTITUDE PREFERRED ATTITUDE
A0399 4750 BIT 4 COMPUTED NOT COMPUTED

A0400 BIT 3 FLAG 2 (S)

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0401 0402 A0403	REF 3 LAST 68	0052 4751	CALCMAN3 = CALC3BIT =	0420 BIT3	NO FINAL ROLL	FINAL ROLL IS NECESSARY
A0404 0405 0406 A0407	REF 3 LAST 68	0053 4752	CALCMAN2 = CALC2BIT =	BIT 2 FLAG 2 0430 BIT2	(S) PERFORM MANEUVER STARTING PROCEDURE	BYPASS STARTING PROCEDURE
A0408 0409 0410 A0411	REF 2 LAST 66	0054 4753	NODDFLAG = NODDBIT =	BIT 1 FLAG 2 0440 BIT1	(S) V37 NOT PERMITTED	V37 PERMITTED
0412 A0413	REF 4 LAST 68	0077	FLAGWRD3 =	STATE +3	(045-059)	
A0414 A0415 A0416				BIT 19 FLAG 3 045D	(SET)	(RESET)
A0417 0418 0419 A0420	REF 4 LAST 68	0056 4736	GLOCKFAIL = GLOCKBIT =	BIT 14 FLAG 3 046D BIT14	(S) GIMBAL LOCK HAS OCCURRED	NOT IN GIMBAL LOCK
A0421 0422 0423 A0424	REF 5 LAST 68	0057 4737	REFSMFLG = REFSNBIT =	BIT 13 FLAG 3 047D BIT13	*** PROTECTED FROM FRESH START *** REFSMAT GOOD	REFSMAT NO GOOD
A0425 0426 0427 A0428	REF 4 LAST 68	0060 4740	LUNAFLAG = LUNABIT =	BIT 12 FLAG 3 048D BIT12	(S) LUNAR LAT-LONG	EARTH LAT-LONG
A0429 0430 0431 A0432	REF 4 LAST 69	0061 4741	NR29FLG = NR29FBIT =	BIT 11 FLAG 3 049D BIT11	(L) R29 NOT ALLOWED	R29 ALLOWED (R29 DES- IGNATE, POWERED FLT)
A0433 0434 0435 A0436	REF 3 LAST 67	0062 4742	VFLAG = VFLAGBIT =	BIT 10 FLAG 3 050D BIT10	(S) LESS THAN TWO STARS	TWO STARS IN FIELD IN FIELD OF VIEW OF VIEW
A0437 0438 A0439		0063	R04FLAG =	BIT 9 FLAG 3 051D	(S) ALARM 521 SUPPRESSED	ALARM 521 ALLOWED

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0440 A0441	REF 3 LAST 69	4743	R04FLBIT =	BIT9		
A0442						
0443	REF 1	0063	READRFLG =	BIT 9 FLAG 3 (L)	READING RR DATA	NOT READING RR DATA
0444	REF 4 LAST 71	4743	READRBIT =	BIT9	PURSUANT TO R29	PURSUANT TO R29
A0445						
A0446						
0447		0064	PRECIFLG =	BIT 6 FLAG 3 (S)	NORMAL INTEGRATION	ENGAGES 4-TIME STEP
A0448					IN POC	(POC) LOGIC IN INTE-
0449	REF 4 LAST 69	4744	PRECIBIT =	BIT8		GRATION
A0450						
A0451						
0452		0065	CULTFLAG =	BIT 7 FLAG 3 (S)	STAR OCCULTED	STAR NOT OCCULTED
0453	REF 5 LAST 69	4745	CULTBIT =	BIT7		
A0454						
A0455						
0456		0066	ORBWFLAG =	BIT 6 FLAG 3 (S)	W MATRIX VALID FOR	W MATRIX INVALID FOR
0457	REF 4 LAST 69	4746	ORBWFBIT =	BIT6	ORBITAL NAVIGATION	ORBITAL NAVIGATION
A0458						
A0459						
0460		0067	STATEFLG =	BIT 5 FLAG 3 (S)	PERMANENT STATE	PERMANENT STATE
0461	REF 4 LAST 69	4747	STATEBIT =	BIT5	VECTOR UPDATED	VECTOR NOT UPDATED
A0462						
A0463						
0464		0070	INTYPFLG =	BIT 4 FLAG 3 (S)	CUNIC INTEGRATION	ENCKE INTEGRATION
0465	REF 3 LAST 69	4750	INTYPBIT =	BIT4		
A0466						
A0467						
0468		0071	VINTEFLAG =	BIT 3 FLAG 3 (S)	CSM STATE VECTOR	LEM STATE VECTOR
0469	REF 4 LAST 70	4751	VINTFBIT =	BIT3	BEING INTEGRATED	BEING INTEGRATED
A0470						
A0471						
0472		0072	D6DR9FLG =	BIT 2 FLAG 3 (S)	DIMENSION OF W IS 9	DIMENSION OF W IS 6
0473	REF 4 LAST 70	4752	D6DR9BIT =	BIT2	FOR INTEGRATION	FOR INTEGRATION
A0474						
A0475						
0476		0073	DIMCFLAG =	BIT 1 FLAG 3 (S)	W MATRIX IS TO BE	W MATRIX IS NOT TO
0477	REF 3 LAST 70	4753	DIMCBIT =	BIT1	USED	BE USED
A0478						
0479	REF 5 LAST 70	0100	FLAGWRD4 =	STATE +4	(060-074)	

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A0480

(SET)

(RESET)

A0481

0482

0483

REF 3 LAST 68

0074

4735

MRKIDFLG =

MRKIDBIT =

BIT 15 FLAG 4

060C

BIT15

(S)

MARK DISPLAY IN

ENDIDLE

NO MARK DISPLAY IN

ENDIDLE

A0484

A0485

0486

0487

REF 5 LAST 70

0075

4736

PRIIDFLG =

PRIIDBIT =

BIT 14 FLAG 4

061E

BIT14

(S)

PRIORITY DISPLAY IN NO PRIORITY DISPLAY

ENDIDLE

IN ENDIDLE

A0488

A0489

0490

0491

REF 6 LAST 70

0076

4737

NRMIDFLG =

NRMIDBIT =

BIT 13 FLAG 4

062D

BIT13

(S)

NORMAL DISPLAY IN

ENDIDLE

NO NORMAL DISPLAY

IN ENDIDLE

A0492

A0493

0494

A0495

0496

REF 5 LAST 70

0077

4740

PDSPLAG =

PDSPEBIT =

BIT 12 FLAG 4

063B

BIT12

(S)

P20 SETS SD AS TO LEAVE AS NORMAL DISP

TURN A NORMAL DIS-

PLAY INTO A PRIORITY

DISPLAY IN R60

A0497

A0498

A0499

0500

A0501

0502

REF 5 LAST 70

0100

4741

NWAITFLG =

NWAITBIT =

BIT 11 FLAG 4

064B

BIT11

(S)

HIGHER PRIORITY

DISPLAY OPERATING

WHEN MARK DISPLAY

INITIATED

NO HIGHER PRIORITY

DISPLAY OPERATING

WHEN MARK DISPLAY

INITIATED

A0503

A0504

0505

A0506

0507

REF 4 LAST 70

0101

4742

NWAITFLG =

NWAITBIT =

BIT 10 FLAG 4

065D

BIT10

(S)

HIGHER PRIORITY

DISPLAY OPERATING

WHEN NORMAL

DISPLAY INITIATED

NO HIGHER PRIORITY

DISPLAY OPERATING

WHEN NORMAL DISPLAY

INITIATED

A0508

A0509

0510

A0511

0512

REF 5 LAST 71

0102

4743

MRKNVFLG =

MRKNVBIT =

BIT 9 FLAG 4

066E

BIT9

(S)

ASTRONAUT USING

KEYBOARD WHEN MARK

DISPLAY INITIATED

ASTRONAUT NOT USING

KEYBOARD WHEN MARK

DISPLAY INITIATED

A0513

A0514

0515

A0516

0517

REF 5 LAST 71

0103

4744

NRMNVFLG =

NRMNVBIT =

BIT 8 FLAG 4

067E

BIT8

(S)

ASTRONAUT USING

KEYBOARD WHEN

NORMAL DISPLAY

INITIATED

ASTRONAUT NOT USING

KEYBOARD WHEN

NORMAL DISPLAY

INITIATED

A0518

A0519

0520

0104

PRONVFLG =

BIT 7 FLAG 4

068D

(S)

ASTRONAUT USING

ASTRONAUT NOT USING

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[illegible]

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A0560						BIT 13 FLAG 5	(S,L)	
0561				0115	SHUFFER =	0770	U,V JETS DISABLED	U,V JETS ENABLED
A0562							DURING OPS	DURING OPS
0563	REF	7	LAST	72	4737	SHUFFERBIT =	BIT13	BURNS (V65)
A0564								BURNS (V75)
A0565						BIT 12 FLAG 5	(S)	
0566					0116	NOTHROTL =	0780	INHIBIT FULL
0567	REF	6	LAST	72	4740	NOTHRBIT =	BIT12	PERMIT FULL THROTTLE
A0568								
A0569						BIT 11 FLAG 5	(S,L)	
0570					0117	R77FLAG =	0790	R77 IS ON.
A0571								R77 IS NOT ON.
A0572								SUPPRESS ALL RADAR
0573	REF	6	LAST	72	4741	R77FLBIT =	BIT11	ALARMS AND TRACKER
A0574								FAILS
A0575						BIT 10 FLAG 5	(S)	
0576					0120	RNGSCFLG =	0800	SCALE CHANGE HAS
A0577								ND SCALE CHANGE HAS
0578	REF	5	LAST	72	4742	RNGSCBIT =	BIT10	OCCURRED DURING
A0579								RR READING
A0580						BIT 9 FLAG 5	(S)	
0581					0121	DMENFLG =	0810	DIMENSION OF W IS 9
0582	REF	6	LAST	72	4743	DMENBIT =	BIT9	DIMENSION OF W IS 6
A0583								FOR INCORPORATION
A0584						BIT 8 FLAG 5	(S)	
A0585								
A0586								
A0587								
A0588						BIT 7 FLAG 5	(S)	
0589					0123	ENGONFLG =	0830	ENGINE TURNED ON
0590	REF	7	LAST	73	4745	ENGONBIT =	BIT7	ENGINE TURNED OFF
A0591								
A0592						BIT 6 FLAG 5	(S)	
0593					0124	3AXISFLG =	0840	MANEUVER SPECIFIED
A0594								BY THREE AXES
0595	REF	6	LAST	73	4746	3AXISBIT =	BIT6	MANEUVER SPECIFIED
A0596								BY ONE AXIS; R60
								CALLS VECPOINT.
A0597						BIT 5 FLAG 5		
A0598								
A0599								
A0600						BIT 4 FLAG 5	(S)	

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0601			0126	NORRMON =	0849	BYPASS RR GIMBAL	PERFORM
0602	REF	5	LAST	73	4750	MONITOR	RR GIMBAL MONITOR
A0603							
A0604							
0605					0127	SOLNSW =	BIT 3 FLAG 5 (S)
A0606							LAMBERT DOES NOT CONVERGE, OR TIME-RADTIME-RADIUS 1.04
0607	REF	6	LAST	73	4751	SOLNSBIT =	NEARLY CIRCULAR CIRCULAR
A0608							
A0609							
0610					0130	MGLVFLAG =	BIT 2 FLAG 5 (S)
A0611							LOCAL VERTICAL COORDINATES COMPUTED
0612	REF	5	LAST	71	4752	MGLVBIT =	MIDDLE GIMBAL ANGLE COMPUTED
A0613							
A0614							
0615					0131	RENDWFLG =	BIT 1 FLAG 5 (S)
A0616							W MATRIX VALID FOR RENDEZVOUS NAVIGATION
0617	REF	5	LAST	73	4753	RENDWBIT =	W MATRIX INVALID FOR RENDEZVOUS NAVIGATION
A0618							
0619	REF	7	LAST	73	0102	FLAGWRD6 =	STATE +6 (090-104)
A0620							(SET) (RESET)
A0621							
0622					0132	S32.1F1 =	BIT 15 FLAG 6 (S)
0623	REF	5	LAST	73	4735	S32BIT1 =	DELTA V AT CSI TIME DVT1 LESS THEN MAX
A0624							ONE EXCEEDS MAX
A0625							
0626					0133	S32.1F2 =	BIT 14 FLAG 6 (S)
0627	REF	6	LAST	72	4736	S32BIT2 =	0910 FIRST PASS OF REITERATION OF
A0628							NEWTON ITERATION NEWTON
A0629							
0630					0134	S32.1F3A =	BIT 13 FLAG 6 (S)
0631	REF	8	LAST	74	4737	S32BIT3A =	BIT 13 AND BIT 12 FUNCTION AS AN ORDERED
A0632							PAIR (13,12) INDICATING THE POSSIBLE OC-
A0633							CURRANCE OF 2 NEWTON ITERATIONS FOR S32.1
A0634							IN THE PROGRAM IN THE FOLLOWING ORDER:
0635					0135	S32.1F3B =	BIT 12 FLAG 6 (0,1) (I.E. BIT 13 RESET, BIT 12 SET)
0636	REF	7	LAST	74	4740	S32BIT3B =	= FIRST NEWTON ITERATION BEING DONE
A0637							(0,0) = FIRST PASS OF SECOND NEWT. ITERAT.
A0638							(1,1) = 50 FT/SEC STAGE OF SEC. NEWT. ITER
A0639							(1,0) = REMAINDER OF SECOND NEWTON ITERA.
A0640							
A0643							BIT 11 FLAG 6 (S)

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A0644					BIT 10 FLAG 6 (S)		
0645			0137	GMBDRVSW =	095D	TRIMGIMB OVER	TRIMGIMB NOT OVER
0646	REF	6	LAST 74	4742	GMBDRBIT =	0110	
A0647							
A0648					BIT 9 FLAG 6		
A0649					096D		
A0650					BIT 9		
A0651							
A0654					BIT 8 FLAG 6 (S)		
0655			0141	MUNFLAG =	097D	SERVICER CALLS	SERVICER CALLS
0656	REF	6	LAST 72	4744	MUNFLBIT =	111B	CALCRVG
A0657							
A0658					BIT 7 FLAG 6 (L)		
0659			0142	=	098D		
0660	REF	8	LAST 74	4745	=	BIT 7	
A0661							
A0662					BIT 6 FLAG 6 (L)		
0663			0143	REDFLAG =	099D	LANDING SITE	LANDING SITE
A0664						REDESIGNATION	REDESIGNATION NOT
0665	REF	7	LAST 74	4746	REDFLBIT =	BIT 6	PERMITTED
A0666							
A0667					BIT 5 FLAG 6		
A0668					100D		
A0669							
A0670					BIT 4 FLAG 6		
A0671					101D		
A0672					BIT 3 FLAG 6 (S)		
0673			0146	NTARGFLG =	102D	ASTRONAUT DID	ASTRONAUT DID NOT
A0674						OVERWRITE DELTA	OVERWRITE DELTA
0675	REF	7	LAST 75	4751	NTARGBIT =	BIT 3	VELOCITY
A0676						OR TPM (P34,35)	
A0677					BIT 2 FLAG 6		
0678			0147	AUXFLAG =	103D	PROVIDING IDLEFLAG	SERVICER WILL SKIP
0679	REF	6	LAST 75	4752	AUXFLBIT =	BIT 2	DVMON ON ITS NEXT
A0680						ICER WILL EXERCISE	PASS EVEN IF THE
A0681						DVMON ON ITS NEXT	IDLEFLAG IS NOT SET.
A0682						PASS.	IT WILL THEN SET
A0683							AUXFLAG.
A0684					BIT 1 FLAG 6 (L)		
0685			0150	ATTFLAG =	104D	LEM ATTITUDE EXISTS	NO LEM ATTITUDE
A0686						IN MOON-FIXED	AVAILABLE IN MOON-

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ADDRESS	REF	6	LAST	75	4753	ATTFLBIT =	BIT1	COORDINATES	FIXED COORDINATES
0687 A0688									
0689 A0690	REF	8	LAST	75	0103	FLAG*3D7 =	STATE +7	(105-119)	(SET) (RESET)
0691 0692 0693 A0694					0151 4735	ITSWICH = ITSWBIT =	BIT 15 FLAG 7 105D BIT15	(S) P34:TPI TIME TO BE COMPUTED	TPI HAS BEEN COMPUTED
0695 0696 A0697 0698 A0699					0152 4736	MANUFLAG = MANUFBIT =	BIT 14 FLAG 7 106D BIT14	(S) ATTITUDE MANEUVER GOING DURING RR SEARCH	NO ATTITUDE MANEUVER DURING RR SEARCH
0700 0701 0702 A0703					0153 4737	IGNFLAG = IGNFLBIT =	BIT 13 FLAG 7 107D BIT13	(S) TIG HAS ARRIVED	TIG HAS NOT ARRIVED
0704 0705 0706 A0707					0154 4740	ASTNFLAG = ASTNBIT =	BIT 12 FLAG 7 108D BIT12	(S) ASTRONAUT HAS PRAYED IGNITION	ASTRONAUT HAS NOT PRAYED IGNITION
0708 0709 0710 A0711					0155 4741	SWANDISP = SWANDBIT =	BIT 11 FLAG 7 109D BIT11	(L) LANDING ANALOG DISPLAYS ENABLED	LANDING ANALOG DISPLAYS SUPPRESSED
0712 0713 0714 A0715					0156 4742	NORMSW = NORMSBIT =	BIT 10 FLAG 7 110D BIT10	(S) UNIT NORMAL INPUT TO LAMBERT	LAMBERT COMPUTES ITS OWN UNIT NORMAL
0716 0717 0718 0719 A0720					0157 4743	RVSW = RVSWBIT =	BIT 9 FLAG 7 111D BIT9	(S) DO NOT COMPUTE FINAL STATE VECTOR IN TIME-THETA	COMPUTE FINAL STATE VECTOR IN TIME-THETA
0721 0722 0723 0724 A0725					0160 4744	V67FLAG = V67FLBIT =	BIT 8 FLAG 7 112D BIT8	(S) ASTRONAUT OVERWRITE W-MATRIX INITIAL VALUES	ASTRONAUT DOES NOT OVERWRITE W-MATRIX INITIAL VALUES

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ADDRESS	DATA	DESCRIPTION	ADDRESS	DATA	DESCRIPTION	ADDRESS	DATA	DESCRIPTION
A0726	0727	REF 9 LAST 76	0161	IDLEFLAG =	BIT 7 FLAG 7	(S)		
0728	0729		4745	IDLEFBIT =	1130	NO DV MONITOR	CONNECT DV MONITOR	
					BIT7			
A0730	0731	REF 9 LAST 76	0162	V37FLAG =	BIT 6 FLAG 7	(S)		
0732	0733		4746	V37FLBIT =	1140	AVERAGED (SERVICER)	AVERAGED (SERVICER)	
					BIT6	RUNNING	OFF	
A0734	0735	REF 6 LAST 73	0163	AVEGFLAG =	BIT 5 FLAG 7	(S)		
0736	0737		4747	AVEGFBIT =	1150	AVERAGED (SERVICER)	AVERAGED (SERVICER)	
					BIT5	DESIRED	NOT DESIRED	
A0738	0739	REF 6 LAST 75	0164	UPLOCKFL =	BIT 4 FLAG 7	(S)		
0740	0741		4750	UPLOCBIT =	1160	K-KBAR-K FAIL	NO K-KBAR-K FAIL	
					BIT4			
A0742	0743	REF 8 LAST 76	0165	VERIFLAG =	BIT 3 FLAG 7	(S)		
0744	0745		4751	VERIFBIT =	1170	CHANGED WHEN V3DE OCCURS AT END OF P27		
					BIT3			
A0746	0747	REF 7 LAST 76	0166	VB2EHFLG =	BIT 2 FLAG 7	(L,C)		
0748	0749		4752	VB2EHBIT =	1180	MOON VICINITY	EARTH VICINITY	
					BIT2			
A0750	0751	REF 7 LAST 77	0167	TFFSW =	BIT 1 FLAG 7	(S)		
0752	0753		4753	TFFSWBIT =	1190	CALCULATE TPERIGEE	CALCULATE TFF	
					BIT1			
0754	0755	REF 9 LAST 77	0104	FLAGWRDB =	STATE +60	(120-134)		
							(SET)	(RESET)
A0756	0757	REF 7 LAST 77	0170	RPQFLAG =	BIT 15 FLAG 8	(S)		
0758	0759		4735	RPQFLBIT =	1200	RPQ NOT COMPUTED	RPQ COMPUTED	
					BIT15	(RPQ = VECTOR BE-		
A0760	0761					TWEEN SECONDARY BODY		
						AND PRIMARY BODY		
A0762	0763				BIT 14 FLAG 8			
0764	0765				1210			
					BIT14			

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A0766					BIT 13 FLAG 8	(S)
0767				0172	1220	FIRST PASS THROUGH SUCCEEDING ITERATION
0768	REF 10	LAST 77		4737	BIT 13	INTEGRATION OF INTEGRATION
A0769						
A0770					BIT 12 FLAG 8	*** PROTECTED FROM FRESH START ***
0771				0173	1230	PERMANENT-CSM-STATE PERMANENT-CSM-STATE
0772	REF 9	LAST 77		4740	BIT 12	IN LUNAR SPHERE IN EARTH SPHERE
A0773						
A0774					BIT 11 FLAG 8	*** PROTECTED FROM FRESH START ***
0775				0174	1240	PERMANENT LM STATE PERMANENT LM STATE
0776	REF 8	LAST 77		4741	BIT 11	IN LUNAR SPHERE IN EARTH SPHERE
A0777						
A0778					BIT 10 FLAG 8	(L)
0779				0175	1250	CURRENT GUIDANCE CURRENT GUIDANCE
0780	REF 8	LAST 77		4742	BIT 10	DISPLAYS INHIBITED DISPLAYS PERMITTED
A0781						
A0782					BIT 9 FLAG 8	(L)
0783				0176	1260	P39/79 OPERATING P38/P78 OPERATING
0784	REF 8	LAST 77		4743	BIT 9	
A0785						
A0786					BIT 8 FLAG 8	*** PROTECTED FROM FRESH START ***
0787				0177	1270	LM ON LUNAR SURFACE LM NOT ON LUNAR
0788	REF 8	LAST 77		4744	BIT 8	SURFACE
A0789						
A0790					BIT 7 FLAG 8	(S)
0791				0200	1280	NO CONIC SOLUTION CONIC SOLUTION
A0792						CLOSURE THROUGH EXISTS
0793	REF 10	LAST 78		4745	BIT 7	(INFINITY REQUIRED)
A0794						
A0795					BIT 6 FLAG 8	(S)
0796				0201	1290	ITERATOR USES 2ND ITERATOR USES 1ST
0797	REF 9	LAST 78		4746	BIT 6	ORDER MINIMUM MODE ORDER STANDARD MODE
A0798						
A0799					BIT 5 FLAG 8	(S)
0800				0202	1300	RDESIRED OUTSIDE RDESIRED INSIDE
A0801						PERICENTER-APDCENTER PERICENTER-APDCENTER
0802	REF 7	LAST 78		4747	BIT 5	RANGE IN TIME-RADI RANGE IN TIME-RADIUS
A0803						
A0804					BIT 4 FLAG 8	(S)
0805				0203	1310	NO CONIC SOLUTION - CONIC SOLUTION
A0806						TOD CLOSE TO RECTA EXISTS (COGA DOES NOT

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0807 A0808	REF 7 LAST 78	4750	CDGAFBIT =	BIT4	LINEAR(CDGA OVRFLWS) OVERFLOW)
A0809 A0810			=	BIT 3 FLAG 8 1320	
A0811 0812 0813 A0814	REF 8 LAST 78	0205 4752	INITALGN = INITABIT =	BIT 2 FLAG 8 1330 BIT2	(L) INITIAL PASS THRU SECOND PASS THRU P57 P57 (CHECK RESET-MILLARD)
A0815 0816 0817 A0818	REF 8 LAST 78	0206 4753	360SW = 360SWBIT =	BIT 1 FLAG 8 1340 BIT1	(S) TRANSFER ANGLE NEAR TRANSFER ANGLE NOT 360 DEGREES NEAR 360 DEGREES
0819 A0820 A0821	REF 10 LAST 78	0105	FLAGWRD9 =	STATE +90	(135 - 149) (SET) (RESET)
A0822 A0823 A08231			=	BIT 15 FLAG 9 1350 BIT15	
A0824 0825 0826 A0827	REF 8 LAST 77	0210 4736	FLVR = FLVRBIT =	BIT 14 FLAG 9 1360 BIT14	(L) VERTICAL RISE NON-VERTICAL RISE (ASCENT GUIDANCE)
A0828 A0829 A0830			=	BIT 13 FLAG 9 1370	
A0831 0832 0833 A0834	REF 10 LAST 79	0212 4740	FLPC = FLPCBIT =	BIT 12 FLAG 9 1380 BIT12	(L) NO POSITION CONTROL POSITION CONTROL (ASCENT GUIDANCE)
A0835 0836 0837 A0838	REF 9 LAST 79	0213 4741	FLPI = FLPIBIT =	BIT 11 FLAG 9 1390 BIT11	(L) PRE-IGNITION PHASE REGULAR GUIDANCE (ASCENT GUIDANCE)
A0839 0840 0841 A0842	REF 9 LAST 79	0214 4742	FLACS = FLACSBIT =	BIT 10 FLAG 9 1400 BIT10	(L) RCS INJECTION MODE MAIN ENGINE MODE (ASCENT GUIDANCE)
A0843				BIT 9 FLAG 9	(L)

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0844				0215	LETABORT =	141D	ABORT PROGRAMS	ABORT PROGRAMS
0845	REF	9	LAST	79	LETABBIT =	BIT9	ARE ENABLED	ARE NOT ENABLED
A0846								
A0847						BIT 8 FLAG 9	(L)	
0848				0216	FLAP =	142D	APS CONTINUED ABORT	APS ABORT IS NOT A
A0849							AFTER UPS STAGING	CONTINUATION
0850	REF	9	LAST	79	FLAPBIT =	BIT8	(ASCENT GUIDANCE)	
A0851								
A0852						BIT 7 FLAG 9	(L)	
A0853						143D		
A0854						BIT 6 FLAG 9	(L)	
0855				0220	ROTFLAG =	144D	P70 AND P71 WILL	P70 AND P71 WILL NOT
0856	REF	10	LAST	79	ROTFLBIT =	BIT6	FORCE VEHICLE	FORCE VEHICLE
A0857							ROTATION IN THE	ROTATION IN THE
A0858							PREFERRED DIRECTION	PREFERRED DIRECTION
A0859						BIT 5 FLAG 9	(S)	
0860				0221	QUITFLAG =	145D	DISCONTINUE INTEGR.	CONTINUE INTEGRATION
0861	REF	8	LAST	79	QUITBIT =	BIT5		
A0862								
A0863						BIT 4 FLAG 9		
A0864						146D		
A0865						BIT4		
A0866								
A0867						BIT 3 FLAG 9	(L)	
0868				0223	MIDIFLAG =	147D	INTEGRATE TO TOEC	INTEGRATE TO THE
0869	REF	9	LAST	78	MIDIFBIT =	BIT3	THEN-PRESENT TIME	
A0870								
A0871						BIT 2 FLAG 9	(L)	
0872				0224	MIDAVFLG =	148D	INTEGRATION ENTERED	INTEGRATION WAS
A0873							FROM ONE OF MIDTOAV	NOT ENTERED VIA
0874	REF	9	LAST	80	MIDAVBIT =	BIT2	PORTALS	MIDTOAV
A0875								
A0876						BIT 1 FLAG 9	(S)	
0877				0225	AVEMIDSW =	149D	AVETDMID-CALLING	NO AVETDMID W INTEGR.
A0878							FOR W-MATRIX INTEGR	ALLOW SET-UP RN, VN.
0879	REF	9	LAST	80	AVEMDBIT =	BIT1	DONT WRITE OVER RN, PIPTIME	
A0880							VN, PIPTIME	
A0881								
0882	REF	1			PASFLAG	EQUALS	FLGHRDID	WAS ONLY AN INSTALL- ERASALL FLAG
A0883				0106				

L FLAGWORD ASSIGNMENTS

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ADDRESS	REF	LAST	VALUE	FLAGWORD	STATE	DESCRIPTION
0884	11	80	0106	FLGWRD10 =	STATE +100	(150 - 164)
A0885						(SET) (RESET)
A0886					BIT 15 FLAG 10	
A0887				=	150D	
A0888						
A0889					BIT 14 FLAG 10	(L,C)
0890			0227	INTFLAG =	1510	INTEGRATION IN
0891	9	80	4736	INTELBIT =	BIT 14	INTEGRATION NOT IN
A0892						PROGRESS
A0893					BIT 13 FLAG 10	(S,L)
0894			0230	APSFLAG =	1520	ASCENT STAGE
0895	11	79	4737	APSELBIT =	BIT 13	DESCENT STAGE
A0896						***PROTECTED FROM FRESH START***
A0897					BIT 12 FLAG 10	
A0898				=	1530	
A0899						
A0900					BIT 11 FLAG 10	
A0901				=	1540	
A0902						
A0903					BIT 10 FLAG 10	
A0904				=	1550	
A0905						
A0906					BIT 9 FLAG 10	
A0907				=	1560	
A0908						
A0909					BIT 8 FLAG 10	
A0910				=	1570	
A0911						
A0912					BIT 7 FLAG 10	(L,C)
0913			0236	REINTFLG =	1580	INTEGRATION ROUTINE
0914	11	79	4745	REINTBIT =	BIT 7	INTEGRATION ROUTINE
A0915						TO BE RESTARTED
A0916					BIT 6 FLAG 10	
A0917				=	1590	
A0918						
A0919					BIT 5 FLAG 10	
A0920				=	1600	
A0921						

L FLAGWORD ASSIGNMENTS

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A0922
A0923
A0924BIT 4 FLAG 10
1610A0925
A0926
A0927BIT 3 FLAG 10
1620A0928
A0929
A0930BIT 2 FLAG 10
1630A0931
A0932
A0933BIT 1 FLAG 10
1640

A0934

0935 REF 12 LAST 82

0107

FLGWR011 = STATE +110 (165 - 179)

A0936

(SET)

(RESET)

A0937
0938

0245

LRBYPASS = BIT 15 FLAG 11 (L)(R12)

0939 REF 8 LAST 78

4735

LRBYBIT =

BIT 5

BYPASS ALL LANDING DO NOT BYPASS LR
RADAR UPDATES UPDATES

A0940

A0941
A0942
A0943
A0944BIT 14 FLAG 11
1660
BIT 14A0945
A0946
A0947
A0948BIT 13 FLAG 11
1670
BIT 13A0949
0950
A0951
0952
A0953

REF 11 LAST 80

0250

4740

VXINH =

VXINHBIT =

BIT 12 FLAG 11 (L)(R12)
1680IF Z VELOCITY DATA UPDATE X AXIS
UNREASONABLE. VELOCITY
BYPASS X VELOCITY
UPDATE ON NEXT PASSA0954
0955
0956
A0957

REF 10 LAST 80

0251

4741

PSTHIGAT =

PSTHIBIT =

BIT 11 FLAG 11 (L)(R12)
1690
BIT 11

PAST HIGATE PREHIGATE

A0958

BIT 10 FLAG 11 (L)(R12)

L FLAGWORD ASSIGNMENTS

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0959		0252	NOLRREAD =	1700	LANDING RADAR	LR NOT REPOSITIONING
A0960					REPOSITIONING:	
0961	REF 10 LAST 80	4742	NOLRRBIT =	BIT10	BYPASS UPDATE	
A0962						
A0963				BIT 9 FLAG 11	(L)(R12)	
0964		0253	XDRFLG =	1710	BELOW LIMIT	ABOVE LIMIT
A0965					INHIBIT X AXIS	NOT INHIBIT
0966	REF 10 LAST 81	4743	XDRFLBIT =	BIT9	VERRIDE	
A0967						
A0968				BIT 8 FLAG 11		
0969		0254	LRINH =	1720	LANDING RADAR UP-	LR UPDATES INHIBITED
0970	REF 10 LAST 81	4744	LRINHBIT =	BIT8	DATES PERMITTED	BY ASTRONAUT
A0971					BY ASTRONAUT	
A0972						
A0973				BIT 7 FLAG 11	(L)(R12)	
0974		0255	VELDATA =	1730	LR VELOCITY	LR VELOCITY MEASURE
0975	REF 12 LAST 82	4745	VELDABIT =	BIT7	MEASUREMENT MADE	NOT MADE
A0976						
A0977				BIT 6 FLAG 11	(L)(R12)	
0978		0256	READLR =	1740	OK TO READ LR	DO NOT READ LR RANGE
0979	REF 11 LAST 81	4746	READLBIT =	BIT6	RANGE DATA	DATA
A0980						
A0981				BIT 5 FLAG 11	(L)(R12)	
0982		0257	READVEL =	1750	OK TO READ LR	DO NOT READ LR
0983	REF 9 LAST 81	4747	READVBIT =	BIT5	VELOCITY DATA	VELOCITY DATA
A0984						
A0985				BIT 4 FLAG 11	(L)(R12)	
0986		0260	RNGEDATA =	1760	LR ALTITUDE	LR ALTITUDE MEASURE
0987	REF 8 LAST 80	4750	RNGEDBIT =	BIT4	MEASUREMENT MADE	NOT MADE
A0988						
A0989				BIT 3 FLAG 11		
0990		0261	SCALBAD =	1770	LR LOW SCALE DIS-	LR SCALE DISCREP
0991	REF 10 LAST 81	4751	SCABBIT =	BIT3	CRETE NOT PRESENT	APPEARS OK
A0992					WHEN IT SHOULD BE	
A0993						
A0994				BIT 2 FLAG 11	(L)(R12)	
0995		0262	VFLSHFLG =	1780	LR VELOCITY FAIL	LR VEL FAIL LAMP
0996	REF 10 LAST 81	4752	VFLSHBIT =	BIT2	LAMP SHOULD BE	SHOULDN'T FLASH
A0997					FLASHING	
A0998						
A0999				BIT 1 FLAG 11	(L)(R12)	

FLAGWORD ASSIGNMENTS

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1000				0263	HFLSHFLG =	179D	LR ALTITUDE FAIL	LR ALTITUDE FAIL
1001	REF 10	LAST	81	4753	HFLSHBIT =	BIT1	LAMP SHOULD BE	LAMP SHOULD NOT BE
A1002							FLASHING	FLASHING
A1003								
1004	REF 1			0110	RADMODES EQUALS	FLGWRD12	PADAR FLAG WORD	
A1005								
1006	REF 13	LAST	83	0110	FLGWRD12 =	STATE +120	(180 - 194)	HAS RADMODES
A1007							(SET)	(RESET)
A1008						BIT 15 FLAG 12		
1009				0264	CDESFLAG =	180D	CONTINUOUS DESIG-	LGC CHECKS FOR LOCK-
1010	REF 9	LAST	83	4735	CDESBIT =	BIT 5	NATE. LGC COMMANDS	ON WHEN ANTENNA
A1011							RR REGARDLESS OF	BEING DESIGNATED
A1012							LOCK-ON	
A1013								
A1014						BIT 14 FLAG 12		
1015				0265	REMODEFLG =	181D	CHANGE IN ANTENNA	NO REMODE REQUEST-
1016	REF 10	LAST	82	4736	REMODEBIT =	BIT 14	MODE BEEN REQUESTED OR OCCURRING	
A1017							I.E., REMODE	
A1018								
A1019						BIT 13 FLAG 12		
1020				0266	RCDOUFLG =	182D	RR COU'S BEING	RR COU'S NOT BEING
1021	REF 12	LAST	82	4737	RCDOUBIT =	BIT 13	ZERDED	ZERDED
A1022								
A1023						BIT 12 FLAG 12		
1024				0267	ANTENFLG =	183D	RR ANTENNA MODE IS	RR ANTENNA IN MODE-1
1025	REF 12	LAST	83	4740	ANTENBIT =	BIT 12	MODE 2	
A1026								
A1027						BIT 11 FLAG 12		
1028				0270	REPOSFLG =	184D	REPOSITION MONITOR.	NO REPOSITION TAKING
1029	REF 11	LAST	83	4741	REPOSBIT =	BIT 11	RR REPOSITION IS	PLACE
A1030							TAKING PLACE	
A1031								
A1032						BIT 10 FLAG 12		
1033				0271	DESIGFLG =	185D	RR DESIGNATE	RR DESIGNATE NOT
1034	REF 11	LAST	84	4742	DESIGBIT =	BIT 10	REQUESTED OR IN	REQUESTED OR IN
A1035							PROGRESS	PROGRESS
A1036								
A1037						BIT 9 FLAG 12		
1038				0272	ALTSCALE =	186D	LR ALTITUDE READING	LR ALTITUDE READING
1039	REF 11	LAST	84	4743	ALTSCBIT =	BIT 9	IS ON HIGH SCALE	IS ON LOW SCALE

L FLAGWORD ASSIGNMENTS

USER'S PAGE NO. 26 TO 34

A1040

A1041

1042 0273

1043 REF 11 LAST 84 4744

A1044

BIT 8 FLAG 12
 LRVELFLG = 1870 LR VELOCITY DATA NO LR VELOCITY DATA
 LRVELBIT = BIT8 FAIL FAIL

A1045

1046 0274

1047 REF 13 LAST 84 4745

A1048

BIT 7 FLAG 12
 RCDUFAIL = 1880 RR CDU FAIL HAS RR CDU FAIL OCCURRED
 RCDUFBIT = BIT7 NOT OCCURRED

A1049

1050 0275

1051 REF 12 LAST 84 4746

A1052

BIT 6 FLAG 12
 LRPOSEFLG = 1890 LANDING RADAR LR POSITION 1
 LRPOSEBIT = BIT6 POSITION 2

A1053

1054 0276

1055 REF 10 LAST 84 4747

A1056

A1057

BIT 5 FLAG 12
 LRALTFLG = 1900 LR ALTITUDE DATA NO LR ALTITUDE DATA
 LRALTBIT = BIT5 FAIL. COULD NOT BE FAIL
 READ SUCCESSFULLY.

A1058

1059 0277

1060 REF 9 LAST 84 4750

A1061

A1062

BIT 4 FLAG 12
 RRDATAFL = 1910 RR DATA FAIL. NO RR DATA FAIL.
 RRDATAFT = BIT4 DATA COULD NOT BE
 READ SUCCESSFULLY

A1063

1064 0300

1065 REF 11 LAST 84 4751

A1066

BIT 3 FLAG 12
 RRRSFLAG = 1920 RR RANGE READING RR RANGE READING ON
 RRRSBIT = BIT3 ON THE HIGH SCALE THE LOW SCALE

A1067

1068 0301

1069 REF 11 LAST 84 4752

A1070

A1071

BIT 2 FLAG 12
 AUTOMODE = 1930 RR NOT IN AUTO MODE. RR IN AUTO MODE
 AUTOMBIT = BIT2 AUTO MODE DISCRETE
 IS NOT PRESENT

A1072

1073 0302

1074 REF 11 LAST 85 4753

A1075

A1076

A1077

BIT 1 FLAG 12
 TURNONFL = 1940 RR TURN-ON SEQUENCE NO RR TURN-ON
 TURNONBIT = BIT1 IN PROGRESS. (ZERO SEQUENCE IN PROGRESS
 CDU'S. FIX ANTENNA
 MODE)

1078 REF 1

A1079

0111

DAPBOOLS EQUALS FLAGWORD13

DIGITAL AUTOPILOT FLAGWORD

L FLAGWORD ASSIGNMENTS

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FL 54

1080	REF 14 LAST 85	0111	FLGWRD13 =	STATE +130	(195 - 209)	WAS DAPDOOLS
A1081					(SET)	(RESET)
A1082				BIT 15 FLAG 13		
1083		0303	PULSEFLG =	1950	MINIMUM IMPULSE	NOT IN MINIMUM
1084	REF 10 LAST 85	4735	PULSES =	BIT15	COMMAND MODE IN	IMPULSE COMMAND MODE
A1085					"ATT HOLD" (V76)	(V77)
A1086						
A1087				BIT 14 FLAG 13		
1088		0304	USEQRFLG =	1960	GIMBAL UNUSABLE.	TRIM GIMBAL MAY BE
1089	REF 11 LAST 85	4736	USEQRJTS =	BIT14	USE JETS ONLY.	USED.
A1090						
A1091				BIT 13 FLAG 13		
1092		0305	CSMDKFLG =	1970	CSM DOCKED. USE	CSM NOT DOCKED TO LM
1093	REF 13 LAST 85	4737	CSMDOCKD =	BIT13	BACKUP DAP	
A1094						
A1095				BIT 12 FLAG 13		
1096		0306	OURRCFLG =	1980	CURRENT DAP PASS	CURRENT DAP PASS IS
1097	REF 13 LAST 85	4740	OURRCBIT =	BIT12	IS RATE COMMAND	NOT RATE COMMAND
A1098						
A1099				BIT 11 FLAG 13		
1100		0307	ACC4-2FL =	1990	4 JET X-AXIS TRANS-	2 JET X-AXIS TRANS-
1101	REF 12 LAST 85	4741	ACC4OR2X =	BIT11	LATION REQUESTED	LATION REQUESTED
A1102						
A1103				BIT 10 FLAG 13		
1104		0310	ACRBTFLO =	2000	B SYSTEM FOR X-	A SYSTEM FOR X-
1105	REF 12 LAST 85	4742	ACRBTRAN =	BIT10	TRANSLATION	TRANSLATION PREFERRED
A1106						
A1107				BIT 9 FLAG 13		
1108		0311	XOVINFLC =	2010	X-AXIS OVERRIDE	X-AXIS OVERRIDE OKAY
1109	REF 12 LAST 85	4743	XOVINHIB =	BIT9	LOCKED OUT	
A1110						
A1111				BIT 8 FLAG 13		
1112		0312	DRIFTDFL =	2020	ASSUME 0 OFFSET	USE OFFSET ACCELE-
1113	REF 12 LAST 86	4744	DRIFTBIT =	BIT8	DRIFTING FLIGHT.	TION ESTIMATE
A1114						
A1115				BIT 7 FLAG 13		
1116		0313	RHCSCFLG =	2030	NORMAL RHC SCALING	FINE RHC SCALING
1117	REF 14 LAST 86	4745	RHCSCALE =	BIT7	REQUESTED	REQUESTED
A1118						

L SUBROUTINE CALLS

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ED 54

0001	0000	SUBRO LUMERASE	120
0002 *	0000	SUBRO LNYAIDE	001
0003	0000	SUBRO LEHP20S	127
0004	0000	SUBRO LEHP30S	103
0005	0000	SUBRO KISSING	050
0006	0000	SUBRO FLY	132
0007	0000	SUBRO LEHP50S	115
0008	0000	SUBRO SKIPPER	087
0009	0000	SUBRO LMOAP	015

*** END OF MAIN PROGRAM ***

L ERASABLE ASSIGNMENTS

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R0001 CONVENTIONS AND NOTATIONS UTILIZED FOR ERASABLE ASSIGNMENTS.

R0002 EQUALS IS USED IN TWO WAYS. IT IS OFTEN USED TO CHAIN A GROUP
R0003 OF ASSIGNMENTS SO THAT THE GROUP MAY BE MOVED WITH THE
R0004 CHANGING OF ONLY ONE CARD. EXAMPLE.

A0005	X	EQUALS	START	
A0006	Y	EQUALS	X	+SIZE.X
A0007	Z	EQUALS	Y	+SIZE.Y

R0008 (X, Y, AND Z ARE CONSECUTIVE AND BEGIN AT START.)
R0009 (SIZE.X AND SIZE.Y ARE THE RESPECTIVE SIZES OF X AND Y,
R0010 USUALLY NUMERIC. IE. 1, 2, 6, 180 ETC.)

R0011 EQUALS OFTEN IMPLIES THE SHARING OF REGISTERS (DIFFERENT NAMES
R0012 AND DIFFERENT DATA). EXAMPLE.

A0013	X	EQUALS	Y
-------	---	--------	---

R0014 = MEANS THAT MULTIPLE NAMES HAVE BEEN GIVEN TO THE SAME DATA.
R0015 (THIS IS LOGICAL EQUIVALENCE, NOT SHARING) EXAMPLE.

A0016	X	=	Y
-------	---	---	---

R0017 THE SIZE AND UTILIZATION OF AN ERASABLE ARE OFTEN INCLUDED IN
R0018 THE COMMENTS IN THE FOLLOWING FORM. M(SIZE)N.

R0019 M REFERS TO THE MOBILITY OF THE ASSIGNMENT.
R0020 B MEANS THAT THE SYMBOL IS REFERENCED BY BASIC
R0021 INSTRUCTIONS AND THUS IS E-BANK SENSITIVE.
R0022 I MEANS THAT THE SYMBOL IS REFERENCED ONLY BY
R0023 INTERPRETIVE INSTRUCTIONS, AND IS THUS E-BANK
R0024 INSENSITIVE AND MAY APPEAR IN ANY E-BANK.

R0025 SIZE IS THE NUMBER OF REGISTERS INCLUDED BY THE SYMBOL.

R0026 N INDICATES THE NATURE OR PERMANENCE OF THE CONTENTS.
R0027 PL MEANS THAT THE CONTENTS ARE PAD LOADED.
R0028 DSP MEANS THAT THE REGISTER IS USED FOR A DISPLAY.
R0029 PRM MEANS THAT THE REGISTER IS PERMANENT, IE. IT
R0030 IS USED DURING THE ENTIRE MISSION FOR ONE
R0031 PURPOSE AND CANNOT BE SHARED.
R0032 TMP MEANS THAT THE REGISTER IS USED TEMPORARILY OR
R0033 IS A SCRATCH REGISTER FOR THE ROUTINE TO WHICH
R0034 IT IS ASSIGNED. THAT IS, IT NEED NOT BE SET
R0035 PRIOR TO INVOCATION OF THE ROUTINE NOR DOES IT
R0036 CONTAIN USEFUL OUTPUT TO ANOTHER ROUTINE. THUS

L ERASABLE ASSIGNMENTS

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R0037 IT MAY BE SHAPED WITH ANY OTHER ROUTINE WHICH
R0038 IS NOT ACTIVE IN PARALLEL.
R0039 IN MEANS INPUT TO THE ROUTINE AND IT IS PROBABLY
R0040 TEMPORARY FOR A HIGHER-LEVEL ROUTINE/PROGRAM.
R0041 OUT MEANS OUTPUT FROM THE ROUTINE, PROBABLY
R0042 TEMPORARY FOR A HIGHER-LEVEL ROUTINE/PROGRAM.

L ERASABLE ASSIGNMENTS

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P0043 SPECIAL REGISTERS.

0044	0000	A	EQUALS 0	L AND Q ARE BOTH CHANNELS AND REGISTERS.
0045	0001	L	EQUALS 1	
0046	0002	Q	EQUALS 2	
0047	0003	EBANK	EQUALS 3	
0048	0004	FBANK	EQUALS 4	
0049	0005	Z	EQUALS 5	
0050	0006	BBANK	EQUALS 6	ADJACENT TO FBANK AND BBANK FOR DXCH Z (DTCH) AND DXCH FBANK (DTCH).
A0051				REGISTER 7 IS A ZERO-SOURCE, USED BY ZL.
0052	0010	ARUPT	EQUALS 10	INTERRUPT STORAGE.
0053	0011	LRUPT	EQUALS 11	
0054	0012	QRUPT	EQUALS 12	SAMPLED TIME 1 & 2. (13 AND 14 ARE SPARES.) USUALLY HOLDS FBANK OR BBANK. RESUME ADDRESS AS WELL.
0055	0013	SAMPTIME	EQUALS 13	
0056	0015	ZRUPT	EQUALS 15	
0057	0016	BANKRUPT	EQUALS 16	
0058	0017	BRUPT	EQUALS 17	
0059	0020	CYR	EQUALS 20	
0060	0021	SR	EQUALS 21	
0061	0022	CYL	EQUALS 22	
0062	0023	EDDP	EQUALS 23	EDITS INTERPRETIVE OPERATION CODE PAIRS.
0063	0024	TIME2	EQUALS 24	
0064	0025	TIME1	EQUALS 25	
0065	0026	TIME3	EQUALS 26	
0066	0027	TIME4	EQUALS 27	
0067	0030	TIME5	EQUALS 30	
0068	0031	TIME6	EQUALS 31	
0069	0032	CDUX	EQUALS 32	
0070	0033	CDUY	EQUALS 33	
0071	0034	CDUZ	EQUALS 34	
0072	0035	CDUT	EQUALS 35	REND RADAR TRUNNION CDU
0073	0036	CDUS	EQUALS 36	REND RADAR SHAFT CDU
0074	0037	PIPAX	EQUALS 37	
0075	0040	PIPAY	EQUALS 40	
0076	0041	PIPAZ	EQUALS 41	
0077	0042	Q-RHCCTR	EQUALS 42	RHC COUNTER REGISTERS
0078	0043	P-RHCCTR	EQUALS 43	
0079	0044	R-RHCCTR	EQUALS 44	
0080	0045	INLINK	EQUALS 45	
0081	0046	RNRAD	EQUALS 46	
0082	0047	GYROCMD	EQUALS 47	
0083	0050	CDUXCMD	EQUALS 50	
0084	0051	CDUYCMD	EQUALS 51	
0085	0052	CDUZCMD	EQUALS 52	
0086	0053	CDUTCMD	EQUALS 53	RADAR TRUNNION COMMAND
0087	0054	CDUSCMD	EQUALS 54	RADAR SHAFT COMMAND

L ERASABLE ASSIGNMENTS

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0088	0055	THRUST	EQUALS 55
0089	0056	LEMONH	EQUALS 56
0090	0057	OUTLINK	EQUALS 57
0091	0060	ALTM	EQUALS 60

R0092 INTERPRETIVE REGISTERS ADDRESSED RELATIVE TO VAC AREA.

0093	0042	LVSQUARE	EQUALS 34D	SQUARE OF VECTOR INPUT TO ARVAL AND UNIT
0094	0044	LV	EQUALS 36D	LENGTH OF VECTOR INPUT TO UNIT.
0095	0046	X1	EQUALS 38D	INTERPRETIVE SPECIAL REGISTERS RELATIVE
0096	0047	X2	EQUALS 39D	TO THE WORK AREA.
0097	0050	S1	EQUALS 40D	
0098	0051	S2	EQUALS 41D	
0099	0052	QPRET	EQUALS 42D	

R0100 INPUT/OUTPUT CHANNELS

*** CHANNEL ZERO IS TO BE USED IN AN INDEXED OPERATION ONLY. ***

A0101		0001	LCHAN	EQUALS 1
0102	REF 1	0002	QCHAN	EQUALS 0
0103	REF 1	0003	HISCALAR	EQUALS 3
0104		0004	LUSCALAR	EQUALS 4
0105		0005	CHAN5	EQUALS 5
0106		0006	CHAN6	EQUALS 6
0107		0007	SUPERBNK	EQUALS 7
0108		0010	OUTO	EQUALS 10
0109		0011	OSALMOUT	EQUALS 11
0110		0012	CHAN12	EQUALS 12
0111		0013	CHAN13	EQUALS 13
0112		0014	CHAN14	EQUALS 14
0113		0015	MNKEYIN	EQUALS 15
0114		0016	NAVKEYIN	EQUALS 16
0115		0030	CHAN30	EQUALS 30
0116		0031	CHAN31	EQUALS 31
0117		0032	CHAN32	EQUALS 32
0118		0033	CHAN33	EQUALS 33
0119		0034	DNTH1	EQUALS 34
0120		0035	DNTH2	EQUALS 35

SUPER-BANK.

R0122 END OF CHANNEL ASSIGNMENTS

L ERASABLE ASSIGNMENTS

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PO123 INTERPRETIVE SWITCH BIT ASSIGNMENTS
AO124

RO125 ** FLAGWORDS AND BITS NOW ASSIGNED AND DEFINED IN THEIR OWN LOG SECTION. **

L ERASABLE ASSIGNMENTS

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P0127 GENERAL ERASABLE ASSIGNMENTS.

0128 0061 SETLOC 61
R0129 INTERRUPT TEMPORARY STORAGE POOL. (110)

R0131 (ITEMP1 THROUGH RUPTREG4)

R0132 ANY OF THESE MAY BE USED AS TEMPORARIES DURING INTERRUPT OR WITH INTERRUPT INHIBITED. THE ITEMP SERIES
R0134 IS USED DURING CALLS TO THE EXECUTIVE AND WAITLIST - THE RUPTREGS ARE NOT.

0136 0061 0061 ITEMP1 ERASE
0137 REF 1 0061 WAITEXIT EQUALS ITEMP1
0138 REF 2 LAST 95 0061 EXECTEM1 EQUALS ITEMP1

0139 0062 0062 ITEMP2 ERASE
0140 REF 1 0062 WAITBANK EQUALS ITEMP2
0141 REF 2 LAST 95 0062 EXECTEM2 EQUALS ITEMP2

0142 0063 0063 ITEMP3 ERASE
0143 REF 1 0063 RUPTSTOR EQUALS ITEMP3
0144 REF 2 LAST 95 0063 WAITADR EQUALS ITEMP3
0145 REF 3 LAST 95 0063 NEWPRIO EQUALS ITEMP3

0146 0064 0064 ITEMP4 ERASE
0147 REF 1 0064 LOCCTR EQUALS ITEMP4
0148 REF 2 LAST 95 0064 WAITTEMP EQUALS ITEMP4

0149 0065 0065 ITEMP5 ERASE
0150 REF 1 0065 NEWLOC EQUALS ITEMP5

0151 0066 0066 ITEMP6 ERASE
A0152 NEWLOC+1 EQUALS ITEMP6 DP ADDRESS.

0153 0067 0067 SETLOC 67
0154 0067 0067 NEWJOB ERASE MUST BE AT LOC 67 DUE TO WIRING.

0155 0070 0070 RUPTREG1 ERASE
0156 0071 0071 RUPTREG2 ERASE
0157 0072 0072 RUPTREG3 ERASE
0158 0073 0073 RUPTREG4 ERASE
0159 REF 1 0073 KEYTEMP1 EQUALS RUPTREG4
0160 REF 2 LAST 95 0073 DSRUPTEM EQUALS RUPTREG4

R0161 FLAGWORD RESERVATIONS. (160)

0163 0074 0113 STATE ERASE +150 FLAGWORD REGISTERS.
A0164

R0165 P25 RADAR STORAGE. (MAY BE UNSHARED IN E7) (TEMP OVERLAY) (20) OVERLAYS FLAGWORD 14 & 15

L ERASABLE ASSIGNMENTS

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0167 REF 15 LAST 87 0112 LASTYCMD EQUALS STATE +140 B(1)PRM THESE ARE CALLED BY T4RUPT
 0168 REF 1 0113 LASTXCMD EQUALS LASTYCMD +1 B(1)PRM THEY MUST BE CONTIGUOUS, Y FIRST
 A0169

R0170 EXEC TEMPORARIES WHICH MAY BE USED BETWEEN CCS NEWJOBS. (320) (INTBIT15+ THROUGH RUPTMXTH)
 0172 0114 0114 INTBIT15+ ERASE REFLECTS 15TH BIT OF INDEXABLE ADDRESSES
 0173 REF 1 0114 USEXIT = INTBIT15+ RETURN FOR DSPIN
 0174 REF 2 LAST 96 0114 EXITEM = INTBIT15+ RETURN FOR SCALE FACTOR ROUTINE SELECT
 0175 REF 3 LAST 96 0114 BLANKRET = INTBIT15+ RETURN FOR 2BLANK
 0176 0115 0115 INTBIT15 ERASE SIMILAR TO ABOVE.
 0177 REF 1 0115 WRDRET = INTBIT15 RETURN FOR 5BLANK
 0178 REF 2 LAST 96 0115 WDRET = INTBIT15 RETURN FOR DSPWD
 0179 REF 3 LAST 96 0115 DECRET = INTBIT15 RETURN FOR PUTCOM(DEC LOAD)
 0180 REF 4 LAST 96 0115 21/22REG = INTBIT15 TEMP FOR CHARIN

R0181 THE REGISTERS BETWEEN ADDRWD AND PRIORITY MUST STAY IN THE FOLLOWING ORDER FOR INTERPRETIVE TRACE.

0183 0116 0116 ADDRWD ERASE 12 BIT INTERPRETIVE OPERAND SUB-ADDRESS.
 0184 0117 0117 POLISH ERASE HOLDS CADR MADE FROM POLISH ADDRESS.
 0185 REF 1 0117 UPDATRET = POLISH RETURN FOR UPDATIN, UPDATVB
 0186 REF 2 LAST 96 0117 CHAR = POLISH TEMP FOR CHARIN
 0187 REF 3 LAST 96 0117 ERCT = POLISH COUNTER FOR ERROR LIGHT RESET
 0188 REF 4 LAST 96 0117 DECOUNT = POLISH COUNTER FOR SCALING AND DISPLAY (DEC)

0189 0120 0120 FIXLOC ERASE WORK AREA ADDRESS.
 0190 0121 0121 OVFINO ERASE SET NON-ZERO ON OVERFLOW.

0191 0122 0127 VBUF ERASE +5 TEMPORARY STORAGE USED FOR VECTORS.
 0192 REF 1 0122 SGNON = VBUF TEMP FOR +, - ON
 0193 REF 2 LAST 96 0122 NOUNTEM = VBUF COUNTER FOR MIXNOUN FETCH
 0194 REF 3 LAST 96 0122 DISTEM = VBUF COUNTER FOR OCTAL DISPLAY VERBS
 0195 REF 4 LAST 96 0122 DECTEM = VBUF COUNTER FOR FETCH (DEC DISPLAY VERBS)

0196 REF 5 LAST 96 0123 SGNOFF = VBUF +1 TEMP FOR +, - ON
 0197 REF 6 LAST 96 0123 NVTEMP = VBUF +1 TEMP FOR NVSUB
 0198 REF 7 LAST 96 0123 SFTENP1 = VBUF +1 STORAGE FOR SF CONST HI PART(=SFTENP2-1)
 0199 REF 8 LAST 96 0123 HITEMIN = VBUF +1 TEMP FOR LOAD OF HRS, MIN, SEC
 MUST = LOTEMIN-1.

A0200 0201 REF 9 LAST 96 0124 CODE = VBUF +2 FOR DSPIN
 0202 REF 10 LAST 96 0124 SFTENP2 = VBUF +2 STORAGE FOR SF CONST LO PART(=SFTENP1+1)
 0203 REF 11 LAST 96 0124 LOTEMIN = VBUF +2 TEMP FOR LOAD OF HRS, MIN, SEC
 MUST = HITEMIN+1.

A0204 0205 REF 12 LAST 96 0125 MIXTEMP = VBUF +3 FOR MIXNOUN DATA
 0206 REF 13 LAST 96 0125 SIGNRET = VBUF +3 RETURN FOR +, - ON

R0207 ALSO MIXTEMP+1 = VBUF+4. MIXTEMP+2 = VBUF+5.

0208 0130 0132 BUF ERASE +2 TEMPORARY SCALAR STORAGE.

L ERASABLE ASSIGNMENTS

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0209				0133	0134	BUF2	ERASE	+1	
0210	REF	1		0130		INDEXLOC	EQUALS	BUF	CONTAINS ADDRESS OF SPECIFIED INDEX.
0211	REF	2	LAST	97	0130	SWWORD	EQUALS	BUF	ADDRESS OF SWITCH WORD.
0212	REF	3	LAST	97	0131	SWBIT	EQUALS	BUF +1	SWITCH BIT WITHIN SWITCH WORD.
0213				0135	0135	MPTEMP	ERASE		TEMPORARY USED IN MULTIPLY AND SHIFT.
0214	REF	1		0135		DMPNTEMP	=	MPTEMP	DMPNTEMP TEMPORARY
0215				0136	0136	DOTINC	ERASE		COMPONENT INCREMENT FOR DOT SUBROUTINE.
0216	REF	1		0136		DVSIGN	EQUALS	DOTINC	DETERMINES SIGN OF DDV RESULT.
0217	REF	2	LAST	97	0136	ESCAPE	EQUALS	DOTINC	USED IN ARCSIN/ARCCOS.
0218	REF	3	LAST	97	0136	ENTRET	=	DOTINC	EXIT FROM ENTER
0219				0137	0137	DOTRET	ERASE		RETURN FROM DOT SUBROUTINE.
0220	REF	1		0137		DVNDRMCT	EQUALS	DOTRET	DIVIDEND NORMALIZATION COUNT IN DDV.
0221	REF	2	LAST	97	0137	ESCAPE2	EQUALS	DOTRET	ALTERNATE ARCSIN/ARCCOS SWITCH.
0222	REF	3	LAST	97	0137	WDCNT	=	DOTRET	CHAR COUNTER FOR DSPWD
0223	REF	4	LAST	97	0137	INREL	=	DOTRET	INPUT BUFFER SELECTOR (X,Y,Z, REG)
0224				0140	0140	MATINC	ERASE		VECTOR INCREMENT IN MXV AND VXM.
0225	REF	1		0140		MAXDVSW	EQUALS	MATINC	+0 IF DP QUOTIENT IS NEAR ONE - ELSE -1.
0226	REF	2	LAST	97	0140	POLYCNT	EQUALS	MATINC	POLYNOMIAL LOOP COUNTER
0227	REF	3	LAST	97	0140	DSPMTEM	=	MATINC	DSPCOUNT SAVE FOR DSPMM
0228	REF	4	LAST	97	0140	MIXBR	=	MATINC	INDICATOR FOR MIXED OR NORMAL NOUN
0229				0141	0141	TEM1	ERASE		EXEC TEMP
0230	REF	1		0141		POLYRET	=	TEM1	
0231	REF	2	LAST	97	0141	DSREL	=	TEM1	REL ADDRESS FOR DSPIN
0232				0142	0142	TEM2	ERASE		EXEC TEMP
0233	REF	1		0142		DSMAG	=	TEM2	MAGNITUDE STORE FOR DSPIN
0234	REF	2	LAST	97	0142	IDADDTEM	=	TEM2	MIXNOUN INDIRECT ADDRESS STORAGE
0235				0143	0143	TEM3	ERASE		EXEC TEMP
0236	REF	1		0143		COUNT	=	TEM3	FOR DSPIN
0237				0144	0144	TEM4	ERASE		EXEC TEMP
0238	REF	1		0144		LSTPTR	=	TEM4	LIST POINTER FOR GRABUSY
0239	REF	2	LAST	97	0144	RELRET	=	TEM4	RETURN FOR RELOSP
0240	REF	3	LAST	97	0144	FREERET	=	TEM4	RETURN FOR FREEDSP
0241	REF	4	LAST	97	0144	DSPWDRET	=	TEM4	RETURN FOR DSPSIGN
0242	REF	5	LAST	97	0144	SEPSECRET	=	TEM4	RETURN FOR SEPSEC
0243	REF	6	LAST	97	0144	SEPMNRET	=	TEM4	RETURN FOR SEPMIN
0244				0145	0145	TEM5	ERASE		EXEC TEMP
0245	REF	1		0145		NOUNADD	=	TEM5	TEMP STORAGE FOR NOUN ADDRESS
0246				0146	0146	NNADTEM	ERASE		TEMP FOR NOUN ADDRESS TABLE ENTRY
0247				0147	0147	NNTYPTM	ERASE		TEMP FOR NOUN TYPE TABLE ENTRY
0248				0150	0150	IDAD1TEM	ERASE		TEMP FOR INDIR ADDRESS TABLE ENTRY (MIXNN)
A0249									MUST = IDAD2TEM-1, = IDAD3TEM-2.
0250				0151	0151	IDAD2TEM	ERASE		TEMP FOR INDIR ADDRESS TABLE ENTRY (MIXNN)

L ERASABLE ASSIGNMENTS

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A0251
0252 0152 0152 IDAD3TEM-ERASE
A0253
0254 0153 0153 RUTHXTEM-ERASE

MUST = IDADITEM+1. = IDAD3TEM-1.
TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)
MUST = IDADITEM+2. = IDAD2TEM+1.
TEMP FOR SF POUT TABLE ENTRY(MIXNN ONLY)

P0255 AX*SR*T STORAGE.

(60)

0257	REF	3	LAST	97	0142	DEXDEX	EQUALS	TEM2	B(1)TMP
0258	REF	2	LAST	97	0143	DEX1	EQUALS	TEM3	B(1)TMP
0259	REF	7	LAST	97	0144	DEX2	EQUALS	TEM4	B(1)TMP
0260	REF	2	LAST	97	0145	RTNSAVER	EQUALS	TEM5	B(1)TMP
0261	REF	1			0157	TERM1TMP	EQUALS	MPAC +3	B(2)TMP
0262	REF	1			0143	DEX1	=	DEX1	

R0263 THE FOLLOWING 10 REGISTERS ARE USED FOR TEMPORARY STORAGE OF THE DERIVATIVE COEFFICIENT TABLE OF
R0265 SUBROUTINE ROOTPSRS. THEY MUST REMAIN WITHOUT INTERFERENCE WITH ITS SUBROUTINES WHICH ARE POWRSRS (POLY).
R0267 DMP SUB. DMPNSUB. SHORTMP. DDV/BDDV. ABS. AND USPRCADR.

0268	REF	2	LAST	98	0142	DERCOF-8 =	MPAC	-12	ROOTPSRS DER COF N-4 HI ORDER
0269	REF	3	LAST	98	0143	DERCOF-7 =	MPAC	-11	ROOTPSRS DER COF N-4 LO ORDER
0270	REF	4	LAST	98	0144	DERCOF-6 =	MPAC	-10	ROOTPSRS DER COF N-3 HI ORDER
0271	REF	5	LAST	98	0145	DERCOF-5 =	MPAC	-7	ROOTPSRS DER COF N-3 LO ORDER
0272	REF	6	LAST	98	0146	DERCOF-4 =	MPAC	-6	ROOTPSRS DER COF N-2 HI ORDER
0273	REF	7	LAST	98	0147	DERCOF-3 =	MPAC	-5	ROOTPSRS DER COF N-2 LO ORDER
0274	REF	8	LAST	98	0150	DERCOF-2 =	MPAC	-4	ROOTPSRS DER COF N-1 HI ORDER
0275	REF	9	LAST	98	0151	DERCOF-1 =	MPAC	-3	ROOTPSRS DER COF N-1 LO ORDER
0276	REF	10	LAST	98	0152	DERCOFN =	MPAC	-2	ROOTPSRS DER COF N HI ORDER
0277	REF	11	LAST	98	0153	DERCOF+1 =	MPAC	-1	ROOTPSRS DER COF N LO ORDER
0278	REF	5	LAST	96	0117	PWRPTR =	POLISH		ROOTPSRS POWER TABLE POINTER
0279	REF	14	LAST	96	0124	DXCRIT =	VBUF	+2	ROOTPSRS CRITERION FOR ENDING ITERS HI
0280	REF	15	LAST	98	0125	DXCRIT+1 =	VBUF	+3	ROOTPSRS CRITERION FOR ENDING ITERS LO
0281	REF	16	LAST	98	0126	ROOTPS =	VBUF	+4	ROOTPSRS ROOT HI ORDER
0282	REF	17	LAST	98	0127	ROOTPS+1 =	VBUF	+5	ROOTPSRS ROOT LO ORDER
0283	REF	4	LAST	97	0132	RETROOT =	BUF	+2	ROOTPSRS RETURN ADDRESS OF USER
0284	REF	5	LAST	97	0140	PWRCNT =	RATING		ROOTPSRS DER TABLE LOOP COUNTER
0285	REF	3	LAST	97	0141	DERPTR =	TEM1		ROOTPSRS DER TABLE POINTER

A0286

L ERASABLE ASSIGNMENTS

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P0287 DYNAMICALLY ALLOCATED CORE SETS FOR JOBS.

(840)

0289		0154	0162	MPAC	ERASE	+6	MULTI-PURPOSE ACCUMULATOR.
0290		0163	0163	MODE	ERASE		+1 FOR TP, +0 FOR DP, OR -1 FOR VECTOR.
0291		0164	0164	LDC	ERASE		LOCATION ASSOCIATED WITH JOB.
0292		0165	0165	BANKSET	ERASE		USUALLY CONTAINS BBANK SETTING.
0293		0166	0166	PUSHLOC	ERASE		WORD OF PACKED INTERPRETIVE PARAMETERS.
0294		0167	0167	PRIORITY	ERASE		PRIORITY OF PRESENT JOB AND WORK AREA.

0295		0170	0313		ERASE	+830	EIGHT SETS OF 12 REGISTERS EACH
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R0297 INCORP STORAGE: R22 (N29) (SHARES WITH FOLLOWING SECTION) (40)

0299	REF	1		0314		R22DISP	EQUALS	TIME2SAV	(14) N49 DISPLAY OF DELTA P AND DELTA V
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R0301 STANDBY VERO ERASABLES. REDUCTR BEFORE THETADS. (140)

0303				0314	0315	TIME2SAV	ERASE	+1	
0304				0316	0317	SCALSAVE	ERASE	+1	
0305				0320	0320	REDUCTR	ERASE		CONTAINS NUMBER OF RESTARTS
0306				0321	0323	THETAD	ERASE	+2	
0307	REF	1		0321		CPHI	=	THETAD	0 DESIRED GIMBAL ANGLES
0308	REF	2	LAST	99	0322	CTHETA	=	THETAD +1	1 FOR
0309	REF	3	LAST	99	0323	CPSI	=	THETAD +2	M MANEUVER.
0310				0324	0331	DELV	ERASE	+5	
0311	REF	1		0324		DELVX	=	DELV	
0312	REF	2	LAST	99	0326	DELVY	=	DELV +2	
0313	REF	3	LAST	99	0330	DELVZ	=	DELV +4	

R0315 DOWNLINK STORAGE. (280)

0317	REF	1		0332		DNLSTADR	EQUALS	DNLSTCOD	
0318				0332	0332	DNLSTCOD	ERASE		B(1)PRM DOWNLINK LIST CODE
0319				0333	0333	DUMPCNT	ERASE		B(1)
0320				0334	0365	LDATA1ST	ERASE	+250	(260)
0321	REF	1		0335		DNTMGOTD	EQUALS	LDATA1ST +1	B(1)
0322	REF	1		0336		THINDEX	EQUALS	DNTMGOTD +1	B(1)
0323	REF	1		0336		DUMFLOC	EQUALS	THINDEX	CONTAINS ECADR OF AGC DP WORD BEING DUMP
A0324									ED AND COUNT OF COMPLETE DUMPS ALREADY S-
A0325									ENT.
0326	REF	2	LAST	99	0337	DNQ	EQUALS	THINDEX +1	B(1)
0327	REF	1		0340		DNTMBUFF	EQUALS	DNQ +1	B(22)PRM DOWNLINK SNAPSHOT BUFFER

R0328 UNSWITCHED FOR DISPLAY INTERFACE ROUTINES. (100) FIVE MORE IN EBANK 2

L ERASABLE ASSIGNMENTS

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(11)PRM FOR DISPLAY RESTARTS

0330		0366	0366	RESTREG	ERASE	
0331		0367	0367	NVWORD	ERASE	
0332		0370	0370	MARKNV	ERASE	
0333		0371	0371	NVSAVE	ERASE	
R0334	(RETAIN THE ORDER OF CADRFLSH TO FAILREG +2 FOR DOWNLINK PURPOSES)					
0336		0372	0372	CADRFLSH	ERASE	
0337		0373	0373	CADRMARK	ERASE	
0338		0374	0374	TEMPFLSH	ERASE	
0339		0375	0377	FAILREG	ERASE	+2

(13)PRM 3 ALARM CODE REGISTERS

R0340 VAC AREAS. -BE CAREFUL OF PLACEMENT-

(220D)

0342		0400	0400	VAC1USE	ERASE	
0343		0401	0453	VAC1	ERASE	+42D
0344		0454	0454	VAC2USE	ERASE	
0345		0455	0527	VAC2	ERASE	+42D
0346		0530	0530	VAC3USE	ERASE	
0347		0531	0603	VAC3	ERASE	+42D
0348		0604	0604	VAC4USE	ERASE	
0349		0605	0657	VAC4	ERASE	+42D
0350		0660	0660	VAC5USE	ERASE	
0351		0661	0733	VAC5	ERASE	+42D

R0352 WAITLIST REPEAT FLAG.

(1D)

0354		0734	0734	RUPTAGN	ERASE	
0355	REF	1	0734	KEYTEMP2	=	RUPTAGN
A0356						TEMP FOR KEYRUPT. UPRUPT

R0357 STARALIGN ERASABLES.

(13D)

0359		0735	0735	STARCODE	ERASE	
0360	REF	1	0735	AOTCODE	=	STARCODE
0361			0736	STARALGN	ERASE	+11D
0362	REF	1	0736	SINCDU	=	STARALGN
0363	REF	2	0744	COSCDU	=	STARALGN +6
0364	REF	1	0742	SINCDUX	=	SINCDU +4
0365	REF	2	0736	SINCDUY	=	SINCDU
0366	REF	3	0740	SINCDUZ	=	SINCDU +2
0367	REF	1	0750	COSCDUX	=	COSCDU +4
0368	REF	2	0744	COSCDUY	=	COSCDU
0369	REF	3	0746	COSCDUZ	=	COSCDU +2

R0370 PHASE TABLE AND RESTART COUNTERS.

(12D)

0372		0752	0752	-PHASE1	ERASE	
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0373	0753	0753	PHASE1	ERASE
0374	0754	0754	-PHASE2	ERASE
0375	0755	0755	PHASE2	ERASE
0376	0756	0756	-PHASE3	ERASE
0377	0757	0757	PHASE3	ERASE
0378	0760	0760	-PHASE4	ERASE
0379	0761	0761	PHASE4	ERASE
0380	0762	0762	-PHASE5	ERASE
0381	0763	0763	PHASE5	ERASE
0382	0764	0764	-PHASE6	ERASE
0383	0765	0765	PHASE6	ERASE

R0384

-A**SR*T STORAGE.

(60)

0386	0766	0773	CDUSPOT	ERASE	+5	B(6)
0387	REF	1	0766	CDUSPOT	=	CDUSPOT
0388	REF	2	LAST 101	0770	CDUSPOT	= CDUSPOT +2
0389	REF	3	LAST 101	0772	CDUSPOT	= CDUSPOT +4

R0390

VERB 37 STORAGE.

(20)

0392	0774	0774	MINDEX	ERASE	B(1) TMP INDEX FOR MAJOR MODE
0393	0775	0775	MMNUMBER	ERASE	B(1) TMP MAJOR MODE REQUESTED BY V37

R0394

PINBALL INTERRUPT ACTION.

(10)

0396	0776	0776	DSPCNT	ERASE	B(1)PPH COUNTER FOR DSPCNT.
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R0397

PINBALL EXECUTIVE ACTION

(440)

0399	0777	0777	DSPCOUNT	ERASE	DISPLAY POSITION INDICATOR.	
0400	1000	1000	DECBRNCH	ERASE	+DEC, - DEC, OCT INDICATOR	
0401	1001	1001	VERBREG	ERASE	VERB CODE	
0402	1002	1002	NOUNREG	ERASE	NOUN CODE	
0403	1003	1003	XREG	ERASE	R1 INPUT BUFFER	
0404	1004	1004	YREG	ERASE	R2 INPUT BUFFER	
0405	1005	1005	ZREG	ERASE	R3 INPUT BUFFER	
0406	1006	1006	XREGLP	ERASE	LO PART OF XREG (FOR DEC CONV ONLY)	
0407	1007	1007	YREGLP	ERASE	LO PART OF YREG (FOR DEC CONV ONLY)	
0408	REF	1	1007	HITEMOUT =	TEMP FOR DISPLAY OF HRS, MIN, SEC	
A0409					MUST = LOTEMOUT-1.	
0410			1010	ZREGLP	ERASE	LO PART OF ZREG (FOR DEC CONV ONLY)
0411	REF	1	1010	LOTEMOUT =	ZREGLP	TEMP FOR DISPLAY OF HRS, MIN, SEC
A0412						MUST = HITEMOUT+1.
0413			1011	MODREG	ERASE	MODE CODE

L ERASABLE ASSIGNMENTS

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0414	1012	1012	DSPLCK	ERASE		KEYBOARD/SUBROUTINE CALL INTERLOCK
0415	1013	1013	REQRET	ERASE		RETURN REGISTER FOR LOAD
0416	1014	1014	LOADSTAT	ERASE		STATUS INDICATOR FOR LOADIST
0417	1015	1015	CLPASS	ERASE		PASS INDICATOR CLEAR
0418	1016	1016	NOUT	ERASE		ACTIVITY COUNTER FOR DSPTAB
0419	1017	1017	NOUNCADR	ERASE		MACHINE CADR FOR NOUN
0420	1020	1020	MONSAVE	ERASE		N/V CODE FOR MONITOR. (= MONSAVE-1)
0421	1021	1021	MONSAVE1	ERASE		NOUNCADR FOR MONITOR(MATBS) =MONSAVE +1
0422	1022	1022	MONSAVE2	ERASE		NVMONOPT OPTIONS
0423	1023	1036	DSPTAB	ERASE	+110	0=100, DISPLAY PANEL BUFF. 110, C/S LTS.
0424	1037	1037	NVQTEM	ERASE		NVSUB STORAGE FOR CALLING ADDRESS
A0425						MUST = NVBKNTEM-1
0426	1040	1040	NVBKNTEM	ERASE		NVSUB STORAGE FOR CALLING BANK
A0427						MUST = NVQTEM+1
0428	1041	1041	VERBSAVE	ERASE		NEEDED FOR RECYCLE
0429	1042	1042	CADRSTOR	ERASE		ENDIDLE STORAGE
0430	1043	1043	DSPLIST	ERASE		WAITING REG FOR DSP SYST INTERNAL USE
0431	1044	1044	EXTVBACT	ERASE		EXTENDED VERB ACTIVITY INTERLOCK
0432	1045	1047	DSPTM1	ERASE	+2	BUFFER STORAGE AREA 1 (MOSTLY FOR TIME)
0433	1050	1052	DSPTM2	ERASE	+2	BUFFER STORAGE AREA 2 (MOSTLY FOR DEG)

0434	REF 1	1051	DSPTMX	EQUALS DSPTM2	+1	8(2) S-S DISPLAY BUFFER FOR EXT. VERBS
0435	REF 1	1045	NORMTEM1	EQUALS DSPTM1		8(3) DSP NORMAL DISPLAY REGISTERS.
A0436						

R0437		DISPLAY FOR EXTENDED VERBS (V82, R04(V62), V41(N72)-)				(20)
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0439	REF 1	1051	OPTIONX	EQUALS DSPTMX		(2) EXTENDED VERB OPTION CODE
A0440						

R0441		TBASES AND PHSPRDT S.				(120)
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0443	1053	1053	TBASE1	ERASE	
0444	1054	1054	PHSPROT1	ERASE	
0445	1055	1055	TBASE2	ERASE	
0446	1056	1056	PHSPROT2	ERASE	
0447	1057	1057	TBASE3	ERASE	
0448	1060	1060	PHSPROT3	ERASE	
0449	1061	1061	TBASE4	ERASE	
0450	1062	1062	PHSPROT4	ERASE	
0451	1063	1063	TBASE5	ERASE	
0452	1064	1064	PHSPROT5	ERASE	
0453	1065	1065	TBASE6	ERASE	
0454	1066	1066	PHSPROT6	ERASE	

R0455		UNSWITCHED FOR DISPLAY INTERFACE ROUTINES.				(60)
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L ERASABLE ASSIGNMENTS

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0457		1067	1067	NVWORD1	ERASE	
0458		1070	1070	EBANKSAV	ERASE	
0459		1071	1071	MARKEDAN	ERASE	
0460		1072	1072	EBANKTEM	ERASE	
0461		1073	1073	MARK2PAC	ERASE	
0462		1074	1074	R1SAVE	ERASE	

B(1) PROBABLY FOR DISPLAY DURING SERVICE

R0463 IMU COMPENSATION UNSWITCHED ERASABLE.

(10)

0465		1075	1075	1/PIPADT	ERASE	
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R0467 SINGLE PRECISION SUBROUTINE TEMPORARIES.

(20)

0469		1076	1076	TEMK	ERASE	
0470		1077	1077	SQ	ERASE	

(1)

(1)

R0472 UNSWITCHED RADAR ERASABLE

(130)

0474		1100	1100	SAMPLIM	ERASE	
0475		1101	1104	SAMPLSUM	ERASE +3	
0476		1105	1106	TIMEHOLD	ERASE +1	
0477	REF	1	1101	RRTARGET	EQUALS SAMPLSUM	
0478			1107	TANG	ERASE +1	
0479	REF	1	1107	MODEA	EQUALS TANG	
0480			1111	MODEB	ERASE +1	
0481	REF	1	1111	NSAMP	EQUALS MODEB	
0482			1113	DESFET	ERASE	
0483	REF	1	1113	DLDATAGD	EQUALS DESFET	
0484			1114	DESCOUNT	ERASE	

HALF U IT VECTOR IN SH OR NB AXES.
DESIRE TRUNNION AND SHAFT ANGLES.

MODES LOBBERS TANG +2.

USED 1 DATA READING ROUTINES.

R0485 ***** P22 *****

(60)

0487	REF	1	1101	RSUBC	EQUALS RRTARGET	
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1(6)S-S CSM POSITION VECTOR

A0488

L ERASABLE ASSIGNMENTS

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P0489 UNSWITCHED FOR ORBIT INTEGRATION.

(210)

0491			1115	1141	TDEC	ERASE	+200	1(2)
0492	REF	1	1117		COLREG	EQUALS	TDEC +2	1(1)
0493	REF	1	1120		LAT	EQUALS	COLREG +1	1(2)
0494	REF	1	1127		LONG	EQUALS	LAT +2	1(2)
0495	REF	1	1124		ALT	EQUALS	LONG +2	1(2)
0496	REF	1	1126		YV	EQUALS	ALT +2	1(6)
0497	REF	1	1134		ZV	EQUALS	YV +6	1(6)

A0498

R0499 MISCELLANEOUS UNSWITCHED.

(200)

0501			1142	1142	P40/RET	ERASE		(WILL BE PUT IN 16 WHEN THERE IS ROOM)
0502			1143	1143	GENRET	ERASE		B(1) RET RETURN CODE.
0503			1144	1144	OPTION1	ERASE		B(1) NOUN 06 USES THIS
0504			1145	1145	OPTION2	ERASE		B(1) NOUN 06 USES THIS
0505			1146	1146	OPTION3	ERASE		B(1) NOUN 06 USES THIS
0506			1147	1150	LONGCADR	ERASE	+1	B(2) LONGCALL REGISTER
0507			1151	1152	LONGBASE	ERASE	+1	
0508			1153	1154	LONGTIME	ERASE	+1	B(2) LONGCALL REGISTER
0509			1155	1155	CDUTEMPX	ERASE		B(1)TMP
0510			1156	1156	CDUTEMPY	ERASE		B(1)TMP
0511			1157	1157	CDUTEMPZ	ERASE		B(1)TMP
0512			1160	1160	PIPATMPX	ERASE		B(1)TMP
0513			1161	1161	PIPATMPY	ERASE		B(1)TMP
0514			1162	1162	PIPATMPZ	ERASE		B(1)TMP
0515			1163	1163	DISPDEX	ERASE		B(1)
0516			1164	1164	TEMPR60	ERASE		B(1)
0517			1165	1165	PRIOTIME	ERASE		B(1)

R0518 P27 (UPDATE PROGRAM) STORAGE.

(260)

0520			1166	1166	UPVERBSV	ERASE		B(1) UPDATE VERB ATTEMPTED.
0521			1167	1217	UPTMP	ERASE	+240	B(1)TMP SCRATCH
0522	REF	1	1167		INTWAKIO	EQUALS	UPTMP	(BORROWS UPTMP REGISTERS)
R0523	RETAIN THE ORDER OF COMPNUMB THRU UPBUFF +190 FOR DOWNLINK PURPOSES.							
0524	REF	2	1170		COMPNUMB	EQUALS	UPTMP +1	B(1)TMP NUMBER OF ITEMS TO BE UPLINKED
0525	REF	1	1171		UPOLDMOD	EQUALS	COMPNUMB +1	B(1)TMP INTERRUPTED PROGRAM MN
0526	REF	1	1172		UPVERB	EQUALS	UPOLDMOD +1	B(1)TMP VERB NUMBER
0527	REF	1	1173		UPCOUNT	EQUALS	UPVERB +1	B(1)TMP UPBUFF INDEX
0528	REF	1	1174		UPBUFF	EQUALS	UPCOUNT +1	B(200)

A0529

R0530 SPECIAL DEFINITION FOR SYSTEM TEST ERASABLE PGMS.

(20)

0532	REF	3	1167		EBUF2	EQUALS	UPTMP	B(2) FOR EXCLUSIVE USE OF SYSTEM TEST
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A0533

L ERASABLE ASSIGNMENTS

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R0534 PERM STATE VECTORS FOR BOOST AND DOWNLINK-WHOLE MISSION- (140)

0536		1220	1225	RN	ERASE	+5	B(6)PRM
0537		1226	1233	VN	ERASE	+5	B(6)PRM
0538		1234	1235	PIPTIME	ERASE	+1	B(2)PRM (MUST BE FOLLOWED BY GDT/1)

R0539 SERVICER -MUST FOLLOW PIPTIME- (190)

0541		1236	1261	GDT/2	ERASE	+190	B(6)TMP (MUST FOLLOW PIPTIME)
0542	REF	1	1244	MASS	EQUALS GDT/2	+6	B(2)
0543	REF	1	1244	WEIGHT/G	=	MASS	
0544	REF	2	1246	ABDELV	EQUALS MASS	+2	ALCMANU STORAGE
0546	REF	1	1247	PGUIDE	EQUALS ABDELV	+1	(2)
0547	REF	1	1251	OVTHRUSH	EQUALS PGUIDE	+2	(1)
0548	REF	1	1252	AVEGEXIT	EQUALS OVTHRUSH	+1	(2)
0549	REF	1	1252	AVGEXIT	=	AVEGEXIT	
0550	REF	2	1254	TEMX	EQUALS AVEGEXIT	+2	(1)
0551	REF	1	1255	TEMY	EQUALS TEMX	+1	(2)
0552	REF	1	1256	TEMZ	EQUALS TEMY	+1	(1)
0553	REF	1	1257	PIPAGE	EQUALS TEMZ	+1	B(1)
0554	REF	1	1260	OUTROUTE	EQUALS PIPAGE	+1	B(1)

A0555

R0556 PERMANENT LM DAP STORAGE. (120)

0558		1262	1262	CH5MASK	ERASE		B(1)PRM
0559		1263	1263	CH6MASK	ERASE		B(1)PRM JET FAILURE MASK.
0560		1264	1271	DTHETASM	ERASE	+5	(6)
0561		1272	1272	SPNDX	ERASE		B(1)
0562		1273	1273	RCSFLAGS	ERASE		AUTOPILDT FLAG WORD
A0563							BIT ASSIGNMENTS:
A0564							1) ALTERYZ SWITCH (ZERDOR1)
A0565							2) NEEDLER SWITCH
A0566							3) NEEDLER SWITCH
A0567							4) NEEDLER SWITCH
A0568							5) NEEDLER SWITCH
A0569							9) JUST-IN-DETENT SWITCH
A0570							10) PBIT - MANUAL CONTROL SWITCH
A0571							11) ORBIT - MANUAL CONTROL SWITCH
A0572							12) PSKIP CONTROL (PJUMPAUR)
A0573							13) 1/ACCJOB CONTROL (ACCSET)
0574		1274	1275	TSADR	ERASE	+1	GENADR OF NEXT LM DAP TSURPT. = ZCADR
A0575							BBCON OF NEXT LM DAP TSURPT. ZCADR

R05751* ERASABLES FOR P64: OVERLAY OF DTHETASM. WHICH IS UNUSED (40)

05753*REF	1	1264	ZERLINA	EQUALS DTHETASM			B(1) P64
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L ERASABLE ASSIGNMENTS

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05754	*REF	1	1265		ELVIRA	EQUALS	ZERLINA	+1	B(1)	P64
05755	*REF	1	1266		AZINCR1	EQUALS	ELVIRA	+1	B(1)	P64
05756	*REF	1	1267		ELINCR1	EQUALS	AZINCR1	+1	B(1)	P64
A05757 *										
R0576	RCS FAILURE MONITOR STORAGE.								(1)	
0578			1276	1276	PVALVEST	ERASE			B(1)	PRM
R0579	KALCHANU/DAP INTERFACE.								(30)	
0581			1277	1277	DELPERDR	ERASE			B(1)	PRM COMMAND LAGS.
0582			1300	1300	DELOERDR	ERASE			B(1)	PRM
0583			1301	1301	DELREORR	ERASE			B(1)	PRM
R0584	MODE SWITCHING ERASABLE.								(90)	
R0586	RETAIN THE ORDER OF IMODES30 AND IMODES33 FOR DOWNLINK PURPOSES.									
0587			1302	1302	IMODES30	ERASE			B(1)	
0588			1303	1303	IMODES33	ERASE				
0589			1304	1306	MODECADR	ERASE	+2		B(3)	PRM
0590	REF	1	1304		IMUCADR	EQUALS	MODECADR			
0591	REF	2	LAST 106	1305	OPTCADR	EQUALS	MODECADR	+1		
0592	REF	3	LAST 106	1306	RADCADR	EQUALS	MODECADR	+2		
0593			1307	1311	ATTCADR	ERASE	+2		B(3)	PRM
0594	REF	1	1311		ATTPRIO	=	ATTCADR	+2		
0595			1312	1312	MARKSTAT	ERASE				
R0596	T4RUPT ERASABLE.								(20)	
0598			1313	1313	DSRUPTSW	ERASE				
0599			1314	1314	LGYRD	ERASE			(1)	
R0600	RENDEZVOUS RADAR TASK STORAGE								(30)	
0602			1315	1317	RRRET	ERASE	+20		B(1)	TMP P20'S, PERHAPS R29 & P22
0603	REF	1	1316		RDES	EQUALS	RRRET	+1	B(1)	TMP
0604	REF	1	1317		RRINDEX	EQUALS	RDES	+1	B(1)	TMP
A0605										
R0606	MEASING								(40)	
0608			1320	1320	WIXA	ERASE			B(1)	
0609			1321	1321	WIXB	ERASE			B(1)	
0610			1322	1322	ZIXA	ERASE			B(1)	
0611			1323	1323	ZIXB	ERASE			B(1)	

L ERASABLE ASSIGNMENTS

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R0612 AGS DUMMY ID WORD.

(10)

0614 ~~1324~~ ~~1324~~ AGSWORD ERASE

R0615 SOME MISCELLANEOUS UNSWITCHED.

(60)

0617		1325	1325	RATEINDX	ERASE	
0618		1326	1330	DELAYLOC	ERASE	+2
0619		1331	1331	LEMMASS	ERASE	
0620		1332	1332	CSMASS	ERASE	

(1) USED BY KALCMANU

KEEP CONTIGUOUS W. CSMASS (1) EACH

R0621 LESS IS MORE.

R0622 RENDEZVOUS AND LANDING RADAR DOWNLINK STORAGE.

(70)

R0624 (NORMALLY USED DURING P20, BUT MAY ALSO)

R0625 (BE REQUIRED FOR THE V62 SPURIOUS TEST.)

R0626 (PLEASE KEEP IN THIS ORDER)

0627		1333	1341	DNRRANCE	ERASE	+6	B(1) TMP
0628	REF	1	1334	DNRRDOT	EQUALS	DNRRANCE +1	B(1) TMP
0629	REF	1	1335	DNINDEX	EQUALS	DNRRDOT +1	B(1) TMP
0630	REF	1	1336	DNLRVELX	EQUALS	DNINDEX +1	B(1) TMP
0631	REF	1	1337	DNLRVELY	EQUALS	DNLRVELX +1	B(1) TMP
0632	REF	1	1340	DNLRVELZ	EQUALS	DNLRVELY +1	B(1) TMP
0633	REF	1	1341	DNLRALT	EQUALS	DNLRVELZ +1	B(1) TMP

R0634 INCORPORATION UNSWITCHED.

(20)

0636	REF	2	LAST 105	1257	W.IND	EQUALS	PIPAGE	B(1)
0637	REF	1		1260	W.IND1	EQUALS	W.IND +1	B(1)

R0638 SUBROUTINE BALLINGS OF R6C.

(10)

0640 1342 1342 BALLEXT ERASE B(1) SAVE LOCATION FOR BALLINGS SUBR EXIT

R0641 SOME LFM DAP STORAGE.

(40)

0643		1343	1343	DAPDATRI	ERASE		B(1) DSP DAP CONFIG.
0644		1344	1345	TEVENT	ERASE	+1	B(2) DSP
0645		1346	1346	DB	ERASE		B(1) TMP DEAD BAND.

A0646

R0647 NOUN 87

(20)

0649 1347 1350 AZ ERASE +10 B(1) AZ AND EL MUST BE CONTIGUOUS

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0650	REF	1	1350	EL	EQUALS AZ +10	B(1)
A0651						
R0652	P63, P64, P65, P66, AND P67.					(10)
0654			1351	1351	WCHPHASE ERASE	B(1)
A0655						
R06552	ERASABLES FOR THE R2 LUNAR POTENTIAL MODEL					(20)
06556			1352	1352	E3J22R2M ERASE	I(1)
06558			1353	1353	E32C31RM ERASE	I(1)
A06559						
065591*			1354	1355	RAOSKAL ERASE +1	LR ALT DOPPLER BIAS : 2T/LAMBDA SCALED
A065592*						AT 1/(2(7) M/CS)
065593*			1356	1356	SKALSKAL ERASE	LR ALT SCALE FACTOR RATIO : .2 NOM
0656			1357		END-UE EQUALS	NEXT UNUSED UE ADDRESS

R0657 SELF-CHECK ASSIGNMENTS.

(170)

R0659 (DO NOT MOVE, S-C IS ADDRESS SENSITIVE)

0660			1357	1377	SELFERRAS ERASE 1357 - 1377	*** MUST NOT BE MOVED ***
0661	REF	1	1357		SFATL EQUALS SELFERRAS	B(1)
0662	REF	1	1360		ERESTORE EQUALS SFATL +1	B(1)
0663	REF	1	1361		SELFRET EQUALS ERESTORE +1	B(1) RETURN
0664	REF	1	1362		SMDDE EQUALS SELFRET +1	B(1)
0665	REF	1	1363		ALMCADR EQUALS SMDDE +1	B(2) ALARM-ABORT USER'S 2CADR
0666	REF	1	1365		ERCOUNT EQUALS ALMCADR +2	B(1)
0667	REF	1	1366		SCOUNT EQUALS ERCOUNT +1	B(1)
0668	REF	1	1371		SKEEP1 EQUALS SCOUNT +3	B(1)
0669	REF	1	1372		SKEEP2 EQUALS SKEEP1 +1	B(1)
0670	REF	1	1373		SKEEP3 EQUALS SKEEP2 +1	B(1)
0671	REF	1	1374		SKEEP4 EQUALS SKEEP3 +1	B(1)
0672	REF	1	1375		SKEEP5 EQUALS SKEEP4 +1	B(1)
0673	REF	1	1376		SKEEP6 EQUALS SKEEP5 +1	B(1)
0674	REF	1	1377		SKEEP7 EQUALS SKEEP6 +1	B(1)

L ERASABLE ASSIGNMENTS

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P0675 EBANK-3 ASSIGNMENTS

0676 E3.1400 SETLOC 1400

R0677 WAITLIST TASK LISTS. (260)

0679	E3.1400	E3.1407	LST1	ERASE	+7	B(80)PRM DELTA T 5.
0680	E3.1410	E3.1431	LST2	ERASE	+170	B(160)PRM TASK ZCAUR ADDRESSES.

R0681 RESTART STORAGE. (20)

0682	E3.1432	E3.1433	RSBBQ	-ERASE	+1	B(2)PRM SAVE BB AND Q FOR RESTARTS.
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R0684 MORE LONGCALL STORAGE. (MUST BE IN LST1 S-BANK.) (20)

0686	E3.1434	E3.1435	LONGEXIT	ERASE	+1	B(2)TMP MAY BE SELDOM OVERLAYED.
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R0687 PHASE-CHANGE LISTS PART II. (120)

0689	E3.1436	E3.1436	PHSNAME1	ERASE		B(1)PRM
0690	E3.1437	E3.1437	PHSBB1	ERASE		B(1)PRM
0691	E3.1440	E3.1440	PHSNAME2	ERASE		B(1)PRM
0692	E3.1441	E3.1441	PHSBB2	ERASE		B(1)PRM
0693	E3.1442	E3.1442	PHSNAME3	ERASE		B(1)PRM
0694	E3.1443	E3.1443	PHSBB3	ERASE		B(1)PRM
0695	E3.1444	E3.1444	PHSNAME4	ERASE		B(1)PRM
0696	E3.1445	E3.1445	PHSBB4	ERASE		B(1)PRM
0697	E3.1446	E3.1446	PHSNAME5	ERASE		B(1)PRM
0698	E3.1447	E3.1447	PHSBB5	ERASE		B(1)PRM
0699	E3.1450	E3.1450	PHSNAME6	ERASE		B(1)PRM
0700	E3.1451	E3.1451	PHSBB6	ERASE		B(1)PRM

R0701 IMU COMPENSATION PARAMETERS. (220)

0703		E3.1452	E3.1452	PBIASX	ERASE		B(1) --PIPA-BIAS, PIPA SCALE FACTR TERMS
0704	REF	1	E3.1452	PIPABIAS	=	PBIASX	INTERMIXED.
0705		E3.1453	E3.1453	PIPASCFX	ERASE		
0706	REF	1	E3.1453	PIPASCF	=	PIPASCFX	
0707		E3.1454	E3.1454	PBIASZ	ERASE		
0708		E3.1455	E3.1455	PIPASCFY	ERASE		
0709		E3.1456	E3.1456	PBIASZ	ERASE		
0710		E3.1457	E3.1457	PIPASCFZ	ERASE		

0711		E3.1460	E3.1460	NBDX	ERASE		GYRO BIAS DRIFTS
0712		E3.1461	E3.1461	NBDY	ERASE		
0713		E3.1462	E3.1462	NBDZ	ERASE		

L ERASABLE ASSIGNMENTS

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0714			E3,1463	E3,1463	ADIA X	ERASE		ACCELERATION SENSITIVE DRIFT ALONG THE
0715			E3,1464	E3,1464	ADIA Y	ERASE		INPUT AXIS
0716			E3,1465	E3,1465	ADIA Z	ERASE		

0717			E3,1466	E3,1466	ADSHAX	ERASE		ACCELERATION SENSITIVE DRIFT ALONG THE
0718			E3,1467	E3,1467	ADSHAY	ERASE		SPIN REFERENCE AXIS
0719			E3,1470	E3,1470	ADSHAZ	ERASE		

0720			E3,1471	E3,1476	GCOMP	ERASE +5		CONTAINS COMPENSATING TORQUES
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0721	REF	1		E3,1471	COMMAND	EQUALS GCOMP		
0722	REF	2	LAST 110	E3,1474	COMIND	EQUALS GCOMP	+3	

0723			E3,1477	E3,1477	GCOMP SW	ERASE		
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R0725 STATE VECTORS FOR ORBIT INTEGRATION. (440)

R0727 (DIFEQNT THRU XKEP MUST BE IN SAME
 R0728 EBANK AS RRECTCSM, RRECTLEN ETC
 R0729 BECAUSE THE COPY-CYCLES (ATOPCSM,
 R0730 PTUACSM ETC) ARE EXECUTED IN BASIC.
 R0731 ALL OTHER REFERENCES TO THIS GROUP
 R0732 ARE BY INTERPRETIVE INSTRUCTIONS.)

0733			E3,1500	E3,1553	DIFEQNT	ERASE +430		B(1)
R0734					(UPSVFLAG...XKEP MUST BE KEPT IN ORDER)			

0735	REF	-1		E3,1501	UPSVFLAG	EQUALS DIFEQNT	+1	B(1)
0736	REF	-1		E3,1502	RRECT	EQUALS UPSVFLAG	+1	B(6)
0737	REF	-1		E3,1510	VRECT	EQUALS RRECT	+6	B(6)
0738	REF	-1		E3,1516	TET	EQUALS VRECT	+6	B(2)
0739	REF	-1		E3,1520	TDLTAV	EQUALS TET	+2	B(6)
0740	REF	-1		E3,1526	TMOV	EQUALS TDLTAV	+6	B(6)
0741	REF	-1		E3,1534	RCV	EQUALS TMOV	+6	B(6)
0742	REF	-1		E3,1542	VGV	EQUALS RCV	+6	B(6)
0743	REF	-1		E3,1550	TC	EQUALS VGV	+6	B(2)
0744	REF	-1		E3,1552	XKEP	EQUALS TC	+2	B(2)

R0745 PERMANENT STATE VECTORS AND TIMES. (990)

R0747 (DO NOT OVERLAY WITH ANYTHING AFTER BOOST)

R0748 (RRECTCSM ...XKEPCSM MUST BE KEPT IN THIS ORDER)

0749			E3,1554	E3,1561	RRECTCSM	ERASE +5		B(6)PRM CSM VARIABLES.
0750	REF	1		E3,1554	RRECTOTH	= RRECTCSM		
0751			E3,1562	E3,1567	VRECTCSM	ERASE +5		B(6)PRM

L ERASABLE ASSIGNMENTS

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0752		E3.1570	E3.1571	TETCSM	ERASE	+1	8(2)PRM
0753	REF	1	E3.1570	TETOTHER	=	TETCSM	
0754		E3.1572	E3.1577	DELTACSM	ERASE	+5	8(6)PRM
0755		E3.1600	E3.1605	NUVCSM	ERASE	+5	8(6)PRM
0756		E3.1606	E3.1613	RCVCSM	ERASE	+5	8(6)PRM
0757		E3.1614	E3.1621	VCVCSM	ERASE	+5	8(6)PRM
0758		E3.1622	E3.1623	TCCSM	ERASE	+1	8(2)PRM
0759		E3.1624	E3.1625	XKEPCSM	ERASE	+1	8(2)PRM

R0760 (RRECTLEM...XKEPLEM MUST BE KEPT IN THIS ORDER)

0761		E3.1626	E3.1633	RRECTLEM	ERASE	+5	8(6)PRM LEM VARIABLES
0762	REF	1	E3.1626	RRECTHIS	=	RRECTLEM	
0763		E3.1634	E3.1641	VRECTLEM	ERASE	+5	8(6)PRM
0764		E3.1642	E3.1643	TETLEM	ERASE	+1	8(2)PRM
0765	REF	1	E3.1642	TETTHIS	=	TETLEM	
0766		E3.1644	E3.1651	DELTALEM	ERASE	+5	8(6)PRM
0767		E3.1652	E3.1657	NUVLEM	ERASE	+5	8(6)PRM
0768		E3.1660	E3.1665	RCVLEM	ERASE	+5	8(6)PRM
0769		E3.1666	E3.1673	VCVLEM	ERASE	+5	8(6)PRM
0770		E3.1674	E3.1675	TCLLEM	ERASE	+1	8(2)PRM
0771		E3.1676	E3.1677	XKEPLEM	ERASE	+1	8(2)PRM
0772		E3.1700	E3.1705	X789	ERASE	+5	
0773		E3.1706	E3.1710	TEPHEN	ERASE	+2	
0774		E3.1711	E3.1712	AZD	ERASE	+1	
0775		E3.1713	E3.1714	-AYD	ERASE	+1	
0776		E3.1715	E3.1716	AXD	ERASE	+1	
A0777							

R0778 STATE VECTORS FOR DOWNLINK.

(12D)

0780		E3.1717	E3.1724	R-OTHER	ERASE	+5	8(6)PRM POS VECT (OTHER VECH) FOR DNLINK
0781		E3.1725	E3.1732	V-OTHER	ERASE	+5	8(6)PRM VEL VECT (OTHER VECH) FOR DNLINK
0782	REF	2	LAST 111	E3.1570	T-OTHER	=	TETCSM
							TIME (OTHER VECH) FOR DNLINK

R0783 REFSMMAT.

(18D)

0785		E3.1733	E3.1754	REFSMMAT	ERASE	+170	1(18D)PRM
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R0786 ACTIVE VEHICLE CENTANG. MUST BE DISPLAYED ANYTIME (ALMOST.) (2D)

0788		E3.1755	E3.1756	ACTCENT	ERASE	+1	1(2) S-S CENTRAL ANGLE BETWEEN ACTIVE
A0789							VEHICLE AT TPI TIG AND TARGET VECTOR.

R0790 ****-USED IN CONICSEX (PLAN INERT ORIENT) ****

L ERASABLE ASSIGNMENTS

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0791 REF 1 E3.1706 TINSUBD EQUALS TEPHEM CSEC 6-42 (TRIPLE PRECISION)
A0792

R0793 LPS20.1 STORAGE -ALL ARE PRM - (9B)

0795 E3.1757 E3.1757 LS21X ERASE 1(1)
0796 E3.1760 E3.1765 LOSVEL ERASE +5 1(6)
0797 E3.1766 E3.1767 MLOSVEL ERASE +1 1(2) MAGNITUDE OF LOS. METERS B-29
A0798

R0799 ***** P22 ***** (OVERLAYS LPS 20.1 STORAGE) (8B)
0801 REF 1 E3.1760 VSUBC EQUALS LOSVEL 1(6) S-S CSM VELOCITY VECTOR
A0802

R0803 PADLOADED ERASABLES FOR P20/P22 (5B)

0805 E3.1770 E3.1771 RANGEVAR ERASE +1 1(2) RR RANGE ERROR VARIANCE
0806 E3.1772 E3.1773 RATEVAR ERASE +1 1(2) RR RANGE-RATE ERROR VARIANCE
0807 E3.1774 E3.1774 RVARMIN ERASE 1(1) MINIMUM RANGE ERROR VARIANCE
0808 E3.1775 E3.1775 VVARMIN ERASE 1(1) MINIMUM RANGE-RATE ERROR VARIANCE
A0809

R0810 P32-P33 STORAGE (2B)

0812 E3.1776 E3.1777 TCDM ERASE +1 1(2) T2 CDH TIME IN CS. (ALSO DOWNLINKED)
A0813

0814 E3.1777 END-E3 EQUALS 1777 ** LAST LOCATION USED IN E3 **

L ERASABLE ASSIGNMENTS

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P0815 EBANK-4 ASSIGNMENTS

0816 E4.1400 SETLGC 2000

R0817 E4 IS. FOR THE MOST PART RESERVED FOR PAD LOADED AND UNSHARABLE ERASE.

0818 E4.1400 AMEMORY EQUALS

R0819 P20 STORAGE. -PAD LOADED- (60)

0821	E4.1400	E4.1400	WRENDPOS	ERASE	B(1)PL	KH*2(-7)
0822	E4.1401	E4.1401	WRENDVEL	ERASE	B(1)PL	KH(-1/2)*2(11)
0823	E4.1402	E4.1402	WSHAFT	ERASE	B(1)PL	KH*2(-7)
0824	E4.1403	E4.1403	WTRUN	ERASE	B(1)PL	KH*2(-7)
0825	E4.1404	E4.1404	RMAX	ERASE	B(1)PL	METERS*2(-19)
0826	E4.1405	E4.1405	VMAX	ERASE	B(1)PL	M/CSEC*2(-7)

R0827 LUNAR SURFACE NAVIGATION (20)

0829	E4.1406	E4.1406	WSURFPOS	ERASE	B(1)PL
0830	E4.1407	E4.1407	WSURFVEL	ERASE	B(1)PL

A0831

R0832 P22 STORAGE. -PAD LOADED- (20)

0834	E4.1410	E4.1410	SHAFTVAR	ERASE	B(1)PL	PAD SQ*2(12)
0835	E4.1411	E4.1411	TRUNVAR	ERASE	B(1)PL	PAD SQ*2(10)

R0836 CONISGX STORAGE. -PAD LOADED- (60)

0838	E4.1412	E4.1417	504LM	ERASE	+5	I(6)MOON LIBRATION VECTOR
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A0839

R0840 V47(R47) AGS INITIALIZATION STORAGE. -PAD LOADED- (20)

0842	E4.1420	E4.1421	AGSK	ERASE	+1
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R0843 LUNAR LANDING STORAGE. -PAD LOADED- (60)

0845	E4.1422	E4.1427	RLS	ERASE	+5	I(6) LANDING SITE VECTOR -MOON REF
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A0846

R0847 INTEGRATION STORAGE. (1020)

0849	E4.1430	E4.1575	PBODY	ERASE	+1010	I(1)
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L ERASABLE ASSIGNMENTS

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0850	REF	1		E4.1431	ALPHAV	EQUALS	PODDY	+1	I(6)	
0851	REF	1		E4.1437	BETAV	EQUALS	ALPHAV	+6	I(6)	
0852	REF	1		E4.1445	PHIV	EQUALS	BETAV	+6	I(6)	
0853	REF	1		E4.1453	PSIV	EQUALS	PHIV	+6	I(6)	
0854	REF	1		E4.1461	FV	EQUALS	PSIV	+6	I(6)	PERTURBING ACCELERATIONS
0855	REF	1		E4.1467	ALPHAM	EQUALS	FV	+6	I(2)	
0856	REF	1		E4.1471	BETAM	EQUALS	ALPHAM	+2	I(2)	
0857	REF	1		E4.1473	TAU.	EQUALS	BETAM	+2	I(2)	
0858	REF	1		E4.1475	DT/2	EQUALS	TAU.	+2	I(2)	
0859	REF	1		E4.1477	H	EQUALS	DT/2	+2	I(2)	
0860	REF	1		E4.1501	GMODE	EQUALS	H	+2	I(1)	
0861	REF	1		E4.1502	IRETURN	EQUALS	GMODE	+1	I(1)	
0862	REF	1		E4.1503	NORMGAM	EQUALS	IRETURN	+1	I(1)	
0863	REF	1		E4.1504	RPQV	EQUALS	NORMGAM	+1		
0864	REF	1		E4.1512	ORIGEX	EQUALS	RPQV	+6	I(1)	
0865	REF	1		E4.1512	KEPRTN	EQUALS	ORIGEX		I(1)	
0866	REF	2	LAST 114	E4.1513	RQVV	EQUALS	ORIGEX	+1	I(6)	
0867	REF	1		E4.1521	RPSV	EQUALS	RQVV	+6	I(6)	
0868	REF	1		E4.1527	XKEPNEW	EQUALS	RPSV	+6	I(2)	
0869	REF	1		E4.1531	VECTAB	EQUALS	XKEPNEW	+2	I(360)	
0870	REF	1		E4.1574	VECTABND	EQUALS	VECTAB	+350	END MARK	

A0871

R0872 THESE PROBABLY CAN SHARE MID-COURSE VARIABLES. (60)

0874	REF	2	LAST 114	E4.1537	VACX	EQUALS	VECTAB	+6	I(2)
0875	REF	1		E4.1541	VACY	EQUALS	VACX	+2	I(2)
0876	REF	1		E4.1543	VACZ	EQUALS	VACY	+2	I(2)

R0877 SERVICER STORAGE (USED BY ALL POWERED FLIGHT PROGS.) (180)

0879	REF	3	LAST 114	E4.1545	XNBPIP	EQUALS	VECTAB	+120	I(6)
0880	REF	1		E4.1553	YNBPIP	EQUALS	XNBPIP	+6	I(6)
0881	REF	1		E4.1561	ZNBPIP	EQUALS	YNBPIP	+6	I(6)

A0882

R0883 SOME VERB 82 STORAGE (40)

0885	REF	2	LAST 114	E4.1517	HAPDX	EQUALS	RQVV	+4	I(2)
0886	REF	1		E4.1521	HPERX	EQUALS	HAPDX	+2	I(2)

A0887

R0888 V82 STORAGE (60)

0890	REF	4	LAST 114	E4.1567	VDNE	EQUALS	VECTAB	+300	I(6)IMP	NORMAL VELOCITY VDNE /SQRT. MU
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A0891

R0892 R31(V83) STORAGE. -SHARES WITH INTEGRATION STORAGE- (280)

L ERASABLE ASSIGNMENTS

USER'S PAGE NO. 26 EO-S4

0894 REF 2 LAST 114 E4.1504 BASETHV EQUALS RQGV 1(6) BASE VEL VECTOR THIS VEH
A0895

0896 REF 3 LAST 114 E4.1513 BASETIME EQUALS RQVV 1(2) TIME ASSOC WITH BASE VEC
0897 REF 4 LAST 115 E4.1515 ORIG EQUALS RQVV +2 1(1) =0 FOR EARTH =2 FOR MOON
0898 REF 5 LAST 115 E4.1516 STATEXT EQUALS RQVV +3 1(1) STQ ADDRESS FOR STATEXT
0899 REF 6 LAST 115 E4.1517 BASEOTV EQUALS RQVV +4 1(6) BASE VEL VECTOR OTHER VEH
A0900

0901 REF 5 LAST 114 E4.1537 BASEOTP EQUALS VECTAB +6 1(6) BASE POS VECTOR OTHER VEH
A0902

0903 REF 6 LAST 115 E4.1567 BASETHP EQUALS VECTAB +300 1(6) BASE POS VECTOR THIS VEH
A0904

R0905 KEPLER STORAGE. (KEPLER IS CALLED BY PRECISION INTEGRATION AND (20)
R0907 CONICS)

0908 E4.1576 E4.1577 EPSILON T ERASE +1 1(2)
A0909

R0910 VERB 83 STORAGE. (180)

0912 E4.1600 E4.1621 RANGE LPASE +170 1(2) DSP NOUN 54 DISTANCE TO OPTICAL SUBJ
0913 REF 1 E4.1602 RRATE EQUALS RANGE +2 1(2) DSP NOUN 54 RATE OF APPROACH.
0914 REF 1 E4.1604 RTHETA EQUALS RRATE +2 1(2) DSP NOUN 54.
0915 REF 1 E4.1606 RONE EQUALS RTHETA +2 1(6) TMP VECTOR STORAGE. (SCRATCH)
0916 REF 1 E4.1614 VONE EQUALS RONE +6 1(6) TMP VECTOR STORAGE. (SCRATCH)

R09165 VERB 67 STORAGE

0917 REF 2 LAST 115 E4.1600 WWPOS = RANGE NOUN 99 (V67)
0918 REF 2 LAST 115 E4.1602 WWVEL = RRATE NOUN 99 (V67)
09185 REF 2 LAST 115 E4.1604 WWBIAS = RTHETA NOUN 99 (V67)
R0919 VB2 STORAGE. (CANNOT OVERLAY RONE OR VONE) (110) TWO SEPARATE LOCATIONS

0921 REF 7 LAST 115 E4.1537 VB2FLAGS EQUALS VECTAB +6 (1) FOR VB2 BITS.
0922 REF 1 E4.1540 TFF EQUALS VB2FLAGS +1 1(2)
0923 REF 1 E4.1542 TPER EQUALS TFF +2 1(2)
A0924

0925 REF 3 LAST 115 E4.1600 HPERMIN EQUALS RANGE 1(2) SET TO 300KFT OR 35KFT FOR SR30.1
0926 REF 1 E4.1602 RPAUTEM EQUALS HPERMIN +2 1(2) PAD OR LANDING RADIUS FOR SR30.1
0927 REF 1 E4.1604 TSTARTB2 EQUALS RPAUTEM +2 1(2) TEMP TIME STORAGE FOR VB2.
A0928

R0929 VARIOUS DISPLAY REGISTERS (60) NOUN 84; P76

L ERASABLE ASSIGNMENTS

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0931 E4.1622 E4.1627 DELVGV ERASE +5D (6)
A0932

R0933 ALIGNMENT-PLANETARY-INERTIAL TRANSFORMATION STORAGE. (180)

R0935 UNSHARED WHILE LM ON LUNAR SURFACE.

0936 E4.1630 E4.1651 GSAV ERASE +17D (16)
0937 REF 1 E4.1636 YNBSAV EQUALS GSAV +6 (16)
0938 REF 1 E4.1644 ZNBSAV EQUALS YNBSAV +6 (16)
A0939

R0940 KALCHANDU STORAGE. CAN OVERLAY GSAV. (180)

0942 REF 2 LAST 116 E4.1630 NFS EQUALS GSAV (18)
0943 REF 1 E4.1630 MFI EQUALS NFS I
0944 REF 2 LAST 116 E4.1630 KEL EQUALS NFS (18)
0945 REF 3 LAST 116 E4.1630 E01 EQUALS NFS (16)
0946 REF 1 E4.1636 E02 EQUALS E01 +6 (16)

R0947 LR VEL BEAM VECTORS. (260)

A0949
R0950 CAN OVERLAY GSAV WITH CARE. USED DURING POWERED DESCENT ONLY.

0951 REF 3 LAST 116 E4.1630 VZBEAMNB EQUALS GSAV (16) LR VELOCITY BEAMS IN NB COORDS.
0952 REF 1 E4.1636 VYBEAMNB EQUALS VZBEAMNB +6 (16)
0953 REF 1 E4.1644 VXBEAMNB EQUALS VYBEAMNB +6 (16) PRESERVE Z,Y,X ORDER.

0954 REF 1 E4.1652 LRVTIME = VXBEAMNB +6 B(2) LR
0955 REF 1 E4.1654 LRXCDU = LRVTIME +2 B(1) LR
0956 REF 1 E4.1655 LRYCDU = LRXCDU +1 B(1) LR
0957 REF 1 E4.1656 LRZCDU = LRYCDU +1 B(1) LR
0958 REF 1 E4.1657 PIPTEN = LRZCDU +1 B(1) LR
A0959

R0960 P32-P35, P72-P75 STORAGE. (400)

0962 E4.1652 E4.1653 T1TDT2 ERASE +1 (2) TIME FROM CSI TO CDH
0963 E4.1654 E4.1655 T2TDT3 ERASE +1 (2)
0964 E4.1656 E4.1657 ELEV ERASE +1 (2)
0965 E4.1660 E4.1665 UP1 ERASE +5 (6)
0966 E4.1666 E4.1673 DELVEET1 ERASE +5 (16) DV CSI IN REF
0967 E4.1674 E4.1701 DELVEET2 ERASE +5 (16) DV GSH IN REF
0968 E4.1702 E4.1707 RACT1 ERASE +5 (6) POS VEC OF ACTIVE AT CSI TIME
0969 E4.1710 E4.1715 RACT2 ERASE +5 (6) POS VEC OF ACTIVE AT CDH TIME

L -ERASABLE ASSIGNMENTS-

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0970		E4,1716	E4,1717	RTSR1/MU	ERASE	+1	(2)	SQ FOOT 1/MU STORAGE
0971		E4,1720	E4,1721	RTMU	ERASE	+1	(2)	MU STORAGE
R0972								

R0973 (THE FOLLOWING ERASABLES OVERLAY PORTIONS OF THE PREVIOUS SECTION)

0975	REF	1	E4,1652	+MGA	EQUALS TITUT2		(2)	S-S + MID GIM ANGLE TO DELVEET3
A0976								
0977	REF	1	E4,1660	UNRM	EQUALS UPI		(16)	S-S
A0978								
0979	REF	1	E4,1702	DVLOS	EQUALS RACT1		(16)	S-S DELTA VELOCITY LOS COORD-DISPLA
0980	REF	1	E4,1710	ULOS	EQUALS RACT2		(16)	S-S UNIT LINE OF SIGHT VECTOR
A0981								
0982	REF	1	E4,1716	NOMTPI	EQUALS RTSR1/MU		(2)	S-S NOMINAL TPI TIME FOR RECYCLE

R0983 SOME P30 STORAGE.

0985	REF	2	LAST 117	E4,1716	HAPD	EQUALS RTSR1/MU	(12)	
0986	REF	1		E4,1720	HPER	EQUALS HAPD	+2	(12)
A0987								

R0988 SOME P38-P39, P78-79 STORAGE.

0990	REF	1	E4,1702	DELTAR	EQUALS DVLOS		(12)	
0991	REF	1	E4,1704	DELTTIME	EQUALS DELTAR	+2	(12)	TIME REPRESENTATION OF DELTAR
0992	REF	1	E4,1706	TARGETIME	EQUALS DELTTIME	+2	(12)	TINT MINUS DELTTIME
A0993								
0994	REF	2	LAST 117	E4,1702	TINTSOI	EQUALS DELTAR		(12) TIME OF INTERCEPT FOR SDI PHASE
A0995								

R0996 THE FOLLOWING ARE ERASABLE LOADS DURING A PERFORMANCE TEST.

0997	REF	1	E4,1400	TRANSM1	=	WRENDPDS		E4,1400
0998	REF	1	E4,1422	ALFDBK	=	TRANSM1 +180		

R0999 ***** THE FOLLOWING SECTIONS OVERLAY V83 AND DISPLAY STORAGE *****

R1000 V47(P47)AGS INITIALIZATION PROGRAM STORAGE. (OVERLAYS V83) (140)

1002	REF	4	LAST 115	E4,1600	AGSBUFF	EQUALS RANGE		6(140)
1003	REF	1		E4,1615	AGSBUFFE	EQUALS AGBUFF	+130	ENDMARK

L ERASABLE ASSIGNMENTS

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R1004 R36 OUT-OF-PLANE RENDEZVOUS DISPLAY STORAGE. (OVERLAYS V83) (120)

1006	REF	2	LAST	115	E4.1606	RPASS36	EQUALS	R04E		1(6)	S-S
1007	REF	1			E4.1614	UNP36	EQUALS	RPASS36 +6		1(6)	S-S

R1008 S-BAND ANTENNA GIMBAL ANGLES. DISPLAYED BY P05(V64). (OVERLAYS V83) (100)

R1010 (OPERATES DURING P00 ONLY)

1011	REF	5	LAST	117	E4.1600	ALPHASB	EQUALS	RANGE		8(2)	DSP NOUN 51. PITCH ANGLE.
1012	REF	1			E4.1602	BETASB	EQUALS	ALPHASB +2		8(2)	DSP NOUN 51. YAW ANGLE.
1013	REF	1			E4.1604	ALN	EQUALS	BETASB +2		1(6)	S S/C POSITION VECTOR.

R1014 **** USED IN S-BAND ANTENNA FOR LM ****

1015	REF	2	LAST	118	E4.1602	YAWANG	EQUALS	BETASB			
1016	REF	2	LAST	118	E4.1600	PITCHANG	EQUALS	ALPHASB			

R1017 NOUN 56 DATA - COMPUTED AND DISPLAYED BY VERB 85.

(4)

1019	REF	1			E4.1600	RR-AZ	EQUALS	PITCHANG		1(2)	ANGLE BETWEEN LOS AND X-Z PLANE.
1020	REF	1			E4.1602	RR-ELEV	EQUALS	RR-AZ +2		1(2)	ANGLE BETWEEN LOS AND Y-Z PLANE.

R1021 R04(V62) RADAR TEST STORAGE.

R1023 R04 IS RESTRICTED TO P00.

(80)

1024	REF	6	LAST	118	E4.1600	RSTACK	EQUALS	RANGE		8(8)	BUFFER FOR R04 NOUNS.
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A1025

R1026 INITVEL STORAGE. ALSO USED BY P31,P34,P35,P74,P75,P10,P11,MIDGIM,S40.1 AND S40.9. (180)

R1028 (POSSIBLY RINIT & VINIT CAN OVERLAY DELVEET1 & 2 ABOVE)

1029					E4.1722	E4.1727	RINIT	ERASE	+5	1(6)	ACTIVE VEHICLE POSITION
1030					E4.1730	E4.1735	VINIT	ERASE	+5	1(6)	ACTIVE VEHICLE VELOCITY
1031					E4.1736	E4.1743	VIPRIME	ERASE	+5	1(6)	NEW VEL REQUIRED AT INITIAL RADIUS.

R1032 VARIOUS DISPLAY REGISTERS. BALLANGS (30)

1034					E4.1744	E4.1744	FDAIX	ERASE		1(1)	
1035					E4.1745	E4.1745	FDAIY	ERASE		1(1)	
1036					E4.1746	E4.1746	FDAIZ	ERASE		1(1)	

A1037

R1038 P34-P35 STORAGE. DOWNLINKED. (20)

1040					E4.1747	E4.1750	DELVTPE	ERASE	+1	1(2)	DELTA V FOR TPE
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A1041

R1042 SOME R04(V62)-R77 RADAR TEST STORAGE (60)

L ERASABLE ASSIGNMENTS

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1044			E4.1751	E4.1751	RTSTDEX	ERASE	(1)
1045			E4.1752	E4.1752	RTSTMAX	ERASE	(1)
1046			E4.1753	E4.1753	RTSTBASE	ERASE	(1)
1047			E4.1754	E4.1754	RTSTLOC	ERASE	(1)
1048	REF	1	E4.1754		RSTKLOC	= RTSTLOC	
1049			E4.1755	E4.1755	RSAMPDT	ERASE	(1)
1050			E4.1756	E4.1756	RFAILCNT	ERASE	(1)

R1051

R1052 LPS20.1 STORAGE (120)

1054	REF	1	E4.1751		LMPDS	EQUALS RTSTDEX	1(6) TEMP. STORAGE FOR LM POS. VECTOR.
1055	REF	1	E4.1757		LMVEL	EQUALS LMPDS +6	1(6) TEMP. STORAGE FOR LM VEL. VECTOR.

A1056
R1057 INITVEL STORAGE. ALSO USED BY P31,34,35,74,75,540.1 AND DOWNLINKED. (40)

1059	REF	1	E4.1765		DELVEET3	EQUALS LMVEL +6	1(6) DELTA V IN INERTIAL COORDINATES.
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A1060
1061 E4.1757 END-E4 EQUALS FIRST UNUSED LOCATION IN E4

R1062 SECOND OPS GUIDANCE (LUNAR LANDING) (OVERLAY P32-35,INITVEL) (140)

1064	REF	1	E4.1662		VHORIZ	EQUALS PIPTM +3	1(2) DISPLAY
1065	REF	1	E4.1664		ANGTERM	EQUALS VHORIZ +2	1(6) GUIDANCE
1066	REF	1	E4.1672		HBEAMNB	EQUALS ANGTERM +6	1(6) LANDING RADAR

A1067

R1068 R12 DOWNLINK QUANTITIES (50)

1070	REF	1	E4.1734		LRXCUDL	EQUALS /LAND/ +2	B(1) LANDING RADAR DOWNLINK
1071	REF	1	E4.1735		LRYCUDL	EQUALS LRXCUDL +1	B(1) LANDING RADAR DOWNLINK
1072	REF	1	E4.1736		LRZCUDL	EQUALS LRYCUDL +1	B(1) LANDING RADAR DOWNLINK
1073	REF	1	E4.1737		LRVTIMDL	EQUALS LRZCUDL +1	B(2) LANDING RADAR DOWNLINK

A1074

R1075 ASCENT GUIDANCE FOR LUNAR LANDING (540)

1077	REF	2	LAST 119	E4.1662	AT	EQUALS PIPTM +3	1(2)TMP ENGINE DATA -- THRUST ACC*2(9)
1078	REF	1		E4.1664	VE	EQUALS AT +2	1(2)TMP EXHAUST VELOCITY * 2(7)H/CS.
1079	REF	1		E4.1666	TTU	EQUALS VE +2	1(2)TMP TAHOFF TIME * 2(17)CS.
1080	REF	1		E4.1670	TBUP	EQUALS TTU +2	1(2)TMP (M/MDOT) * 2(17)CS.
1081	REF	1		E4.1672	RDDTD	EQUALS TBUP +2	1(2)TMP TARGET VELOCITY COMPONENTS
1082	REF	1		E4.1674	YDDTD	EQUALS RDDTD +2	1(2)TMP SCALING IS 2(7)H/CS.
1083	REF	1		E4.1676	ZDDTD	EQUALS YDDTD +2	1(2)TMP
1084	REF	1		E4.1700	/R/MAG	EQUALS ZDDTD +2	1(2)TMP
1085	REF	1		E4.1702	LAXIS	EQUALS /R/MAG +2	1(6)TMP

L ERASABLE ASSIGNMENTS

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1086	REF	1	E7.1725	ZAXIS1	=	UNZP	
1087	REF	1	E7.1473	RDOT	=	HOOTOISP	
1088	REF	1	E4.1710	YDOT	=	EAXIS	+6 I(2)TMP VEL. NORMAL TO REF. PLANE (21-7)
1089	REF	1	E4.1712	ZDOT	EQUALS	YDOT	+2 I(2)TMP DOWN RANGE VEL *21-7).
1090	REF	1	E4.1714	GEFF	EQUALS	ZDOT	+2 I(2)TMP EFFECTIVE GRAVITY

R1091 THESE TWO GROUPS OF ASCENT GUIDANCE ARE SPLIT BY THE ASCENT-DESCENT SERVICER SECTION FOLLOWING THIS SECTION

1093	REF	2	LAST 119	E4.1734	Y	EQUALS	ZLAND/	+2	I(2)TMP OUT-OF-PLANE DIST *212411
1094	REF	1		E4.1736	ORDOT	EQUALS	Y	+2	I(2)TMP RDOTD - RDOT
1095	REF	1		E4.1740	DYDOT	EQUALS	ORDOT	+2	I(2)TMP YDOTD - YDOT
1096	REF	1		E4.1742	OZDOT	EQUALS	DYDOT	+2	I(2)TMP ZDOTD - ZDOT
1097	REF	1		E4.1744	PCONS	EQUALS	OZDOT	+2	I(2)TMP CONSTANT IN ATR EQUATION
1098	REF	1		E4.1746	YCONS	EQUALS	PCONS	+2	I(2)TMP CONSTANT IN ATY EQUATION
1099	REF	1		E4.1750	PRATE	EQUALS	YCONS	+2	I(2)TMP RATE COEFF. IN ATR EQUATION
1100	REF	1		E4.1752	YRATE	EQUALS	PRATE	+2	I(2)TMP RATE COEFF. IN ATY EQUATION
1101	REF	1		E4.1754	ATY	EQUALS	YRATE	+2	I(2)TMP OUT-OF-PLANE THRUST COMP. *219)
1102	REF	1		E4.1756	ATR	EQUALS	ATY	+2	I(2)TMP RADIAL THRUST COMP. *219)
1103	REF	1		E4.1760	ATP	EQUALS	ATR	+2	I(2)TMP DOWN-RANGE THRUST COMP
1104	REF	1		E4.1762	YAW	EQUALS	ATP	+2	I(2)TMP
1105	REF	1		E4.1764	PITCH	EQUALS	YAW	+2	I(2)TMP

A1106

R1107 SERVICER FOR LUNAR ASCENT AND DESCENT

(140)

1109	REF	1	E4.1716	G(CSM)	EQUALS	GEFF	+2	I(6) FOR UPDATE OF COMMAND MODULE STATE
1110	REF	1	E3.1717	R(CSM)	EQUALS	R-OTHER		VECTORS BY LEM; ANALOGS OF GDT/2,
1111	REF	1	E3.1725	V(CSM)	EQUALS	V-OTHER		R. AND V. RESPECTIVELY OF THE CSM
1112	REF	1	E4.1724	WM	EQUALS	G(CSM)	+6	I(6) TMP - LUNAR ROTATION VECTOR (SM)
1113	REF	1	E4.1732	ZLAND/	EQUALS	WM	+6	R(2) LUNAR RADIUS AT LANDING SITE

A1114

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P1115 EBANK-5 ASSIGNMENTS

1116 E5.1400 SETLBC 2400

R1117 W-MATRIX. ESSENTIALLY UNSHARABLE. (1620)

1119		E5.1400	E5.1641	W	ERASE	+1610
1120	REF 1	E5.1642		ENDW	EQUALS W	+1620

A1121

R1122 ***** OVERLAY NUMBER 1 IN EBANK 5 *****

R1123 W-MATRIX PADLOADS (1280)

R1125 PLEASE RETAIN THE ORDER OF TLAND THRU JAPFG

1126	REF 2	LAST 121	E5.1400	TLAND	EQUALS W		I(2) NOMINAL TIME OF LANDING
1127	REF 1		E5.1402	KBRFG	EQUALS TLAND	+2	I(6) BRAKING
1128	REF 1		E5.1410	VBRFG	EQUALS KBRFG	+6	I(6) PHASE
1129	REF 1		E5.1416	ABRFG	EQUALS VBRFG	+6	I(6) TARGET
1130	REF 1		E5.1424	VBRFG*	EQUALS ABRFG	+6	I(2) PARAMETERS:
1131	REF 1		E5.1426	ABRFG*	EQUALS VBRFG*	+2	I(2) HIGH
1132	REF 1		E5.1430	JBRFG*	EQUALS ABRFG*	+2	I(2) GATE
11321	REF 1		E5.1432	GAINBRAK	EQUALS JBRFG*	+2	B(2)
1133	REF 1		E5.1434	TCGFBRK	EQUALS GAINBRAK	+2	B(1)
1134	REF 1		E5.1435	TCGIBRAK	EQUALS TCGFBRK	+1	B(1)
1135	REF 1		E5.1436	RAPFG	EQUALS TCGIBRAK	+1	I(6) APPROACH
1136	REF 1		E5.1444	VAPFG	EQUALS RAPFG	+6	I(6) PHASE
1137	REF 1		E5.1452	AAPFG	EQUALS VAPFG	+6	I(6) TARGET
1138	REF 1		E5.1460	VAPFG*	EQUALS AAPFG	+6	I(2) PARAMETERS:
1139	REF 1		E5.1462	AAPFG*	EQUALS VAPFG*	+2	I(2) LOW
1140	REF 1		E5.1464	JAPFG*	EQUALS AAPFG*	+2	I(2) GATE
11401	REF 1		E5.1466	GAINAPPR	EQUALS JAPFG*	+2	B(2)
1141	REF 1		E5.1470	TCGFAPPR	EQUALS GAINAPPR	+2	B(1)
1142	REF 1		E5.1471	TCGIAPPR	EQUALS TCGFAPPR	+1	B(1)
1143	REF 1		E5.1472	VIGN	EQUALS TCGIAPPR	+1	I(2) DESIRED SPEED FOR IGNITION
1144	REF 1		E5.1474	RIGNX	EQUALS VIGN	+2	I(2) DESIRED 'ALTITUDE' FOR IGNITION
1145	REF 1		E5.1476	RIGNZ	EQUALS RIGNX	+2	I(2) DESIRED GROUND RANGE FOR IGNITION
1146	REF 1		E5.1500	KIGNX/B4	EQUALS RIGNZ	+2	I(2)
1147	REF 1		E5.1502	KIGNY/B8	EQUALS KIGNX/B4	+2	I(2)
1148	REF 1		E5.1504	KIGNV/B4	EQUALS KIGNY/B8	+2	I(2)
1149	REF 1		E5.1506	LOWCRIT	EQUALS KIGNV/B4	+2	B(1) (HIGHCRIT MUST FOLLOW LOWCRIT)
1150	REF 1		E5.1507	HIGHCRIT	EQUALS LOWCRIT	+1	B(1)
1151	REF 1		E5.1510	VZFG	EQUALS HIGHCRIT	+1	I(6) DESIRED VELOCITY FOR P65.
1152	REF 1		E5.1516	TAUVERT	EQUALS VZFG	+6	I(2) TIME CONSTANT FOR P65 VEL. NULLING.
1153	REF 1		E5.1520	DELQFIX	EQUALS TAUVERT	+2	I(2) LR ALTITUDE DATA REASONABLE PARAM.
1154	REF 1		E5.1522	LRALPHA	EQUALS DELQFIX	+2	B(1) POS1 X ROTATION * MUST *

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1155	REF	1	E5.1523	LRBETA1	EQUALS	LRALPHA	+1	B(1)	POS1 Y ROTATION	* BE *
1156	REF	1	E5.1524	LRALPHA2	EQUALS	LRBETA1	+1	B(1)	POS2 X ROTATION	* IN *
1157	REF	1	E5.1525	LRBETA2	EQUALS	LRALPHA2	+1	B(1)	POS2 Y ROTATION	* ORDER *
11571	REF	1	E5.1526	LRVMAX	EQUALS	LRBETA2	+1	B(1)	LR VEL WEIGHTING FUNCTIONS	
11572	REF	1	E5.1527	LRVF	EQUALS	LRVMAX	+1	B(1)	LR VEL WEIGHTING FUNCTIONS	
11573	REF	1	E5.1530	LRWVZ	EQUALS	LRVF	+1	B(1)	LR VEL WEIGH ING FUNCTIONS	
11574	REF	1	E5.1531	LRWVY	EQUALS	LRWVZ	+1	B(1)	LR VEL WEIGH ING FUNCTIONS	
11575	REF	1	E5.1532	LRWVX	EQUALS	LRWVY	+1	B(1)	LR VEL WEIGH ING FUNCTIONS	
11576	REF	1	E5.1533	LRWVFZ	EQUALS	LRWVX	+1	B(1)	LR VEL WEIGH ING FUNCTIONS	
11577	REF	1	E5.1534	LRWVFY	EQUALS	LRWVFZ	+1	B(1)	LR VEL WEIC ING FUNC IONS	
11578	REF	1	E5.1535	LRWVFX	EQUALS	LRWVFY	+1	B(1)	LR VEL WEIG ING FUNC IONS	
11579	REF	1	E5.1536	LRWVFF	EQUALS	LRWVFX	+1	B(1)	LR VEL WEIG ING FUNC IONS	

115791	REF	5	LAST 98	0130	ABVEL*	EQUALS	BUF	B(1)	LR TEMP
115792	REF	6	LAST 122	0131	VSELECT*	EQUALS	BUF +1	B(1)	LR TEMP

1158	REF	1	E5.1537	RODSSCALE	EQUALS	LRWVFF	+1	I(1)	CLICK SCALE FACTOR FOR ROD
1159	REF	1	E5.1540	TAUROD	EQUALS	RODSSCALE	+1	I(2)	TIME CONSTANT FOR R.O.D.
11595	REF	1	E5.1542	LAG/TAU	EQUALS	TAUROD	+2	I(2)	LAG TIME DIVIDED BY TAUROD (P66)
11596	REF	1	E5.1544	MINFORCE	EQUALS	LAG/TAU	+2	I(2)	MINIMUM FORCE P66 WILL COMMAND.
11597	REF	1	E5.1546	MAXFORCE	EQUALS	MINFORCE	+2	I(2)	MAXIMUM FORCE P66 WILL COMMAND.
1160	REF	1	E5.1550	ABTCOF	EQUALS	MAXFORCE	+2	I(16)	COEFFICIENTS FOR ABORT TFI POLYS.
1161	REF	1	E5.1570	VMIN	EQUALS	ABTCOF	+160	I(2)	MINIMUM VELOCITY FOR ABORT INJ.
1162	REF	1	E5.1572	YLIM	EQUALS	VMIN	+2	I(2)	MAXIMUM CROSS-RANGE DIST IN ABORTS.
1163	REF	1	E5.1574	ABTRDOT	EQUALS	YLIM	+2	I(2)	DESIRED RADIAL VEL. FOR ABORTS.
1164	REF	1	E5.1576	COSTHET1	EQUALS	ABTRDOT	+2	I(2)	COS OF CONE 1 ANGLE FOR ABORTS
1165	REF	1	E5.1600	COSTHET2	EQUALS	COSTHET1	+2	I(2)	COS OF CONE 2 ANGLE FOR ABORTS.

A1166

R1167 SOME VARIABLES FOR SECOND OPS GUIDANCE (340)

1169	REF	1	E5.1602	CG	EQUALS	COSTHET2	+2	I(180)	GUIDANCE	
1170	REF	1	E5.1624	RANGEDSP	=	CG	+180	B(2)	DISPLAY	
1171	REF	1	E5.1626	OUTDFPLN	=	RANGEDSP	+2	B(2)	DISPLAY	
1172	REF	1	E5.1630	RGVSAVE	EQUALS	OUTDFPLN	+2	I(16)	TMP SAVES VALUE OF POINTVSH THEN R51	
1173	REF	1	E5.1636	RGU	EQUALS	RGVSAVE	+6	I(6)	UNSHARED FOR DOWNLINK	
1174	REF	2	LAST 122	E5.1630	VBIAS	EQUALS	RGVSAVE		I(6)	PIPA BIAS EQUIV. VELOCITY VECTOR.
1175	REF	7	LAST 122	0130	L*WCR*T	=	BUF			
1176	REF	8	LAST 122	0131	H*GHCR*T	=	BUF +1			

A1177

R1178 ALIGNMENT/SYSTEST/CALCSMSC COMMON STORAGE. (360)

1180	REF	1	E5.1642	XSM	EQUALS	ENDW		B(6)	
1181	REF	1	E5.1650	YSM	EQUALS	XSM	+6	B(6)	
1182	REF	1	E5.1656	ZSM	EQUALS	YSM	+6	B(6)	
1183	REF	1	E5.1664	XDC	EQUALS	ZSM	+6	B(6)	
1184	REF	1	E5.1672	YDC	EQUALS	XDC	+6	B(6)	
1185	REF	1	E5.1700	ZDC	EQUALS	YDC	+6	B(6)	

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1186	REF	2	LAST	122	E5.1664	XNB	=	XDC
1187	REF	2	LAST	122	E5.1672	YNB	=	YDC
1188	REF	1			E5.1700	ZNB	=	ZDC

R1189 OVERLAYS WITHIN ALIGNMENT/SYSTEST/CALCSMSC COMMON STORAGE. (40)

1191	REF	2	LAST	122	E5.1644	-COSB	EQUALS	XSM	+2	(2)TMP
1192	REF	1			E5.1646	SINB	EQUALS	-COSB	+2	(2)TMP

R1193 MORE OVERLAYS TO ALIGNMENT /SYSTEST (THESE ARE P52) (60)

1195	REF	1			E5.1706	LANDLAT	EQUALS	STARAD		(2) LATITUDE, LONGITUDE
1196	REF	1			E5.1710	LANDLONG	EQUALS	LANDLAT	+2	(2) AND ALTITUDE
1197	REF	1			E5.1712	LANDALT	EQUALS	LANDLONG	+2	(2) OF LANDING SITE

R1199 ALIGNMENT/SYSTEST COMMON STORAGE. (310)

1201	REF	2	LAST	123	E5.1708	STARAD	EQUALS	ZDC	+6	(180)TMP
1202	REF	2	LAST	123	E5.1730	STAR	EQUALS	STARAD	+180	(6)
1203	REF	1			E5.1736	GCTR	EQUALS	STAR	+6	B(1)
1204	REF	1			E5.1737	OGC	EQUALS	GCTR	+1	(2)
1205	REF	1			E5.1741	IGC	EQUALS	OGC	+2	(2)
1206	REF	1			E5.1743	MGC	EQUALS	IGC	+2	(2)

R1207 P57 ALIGNMENT (OVERLAY OF ALIGNMENT/SYSTEST COMMON STORAGE) (120)

1209	REF	3	LAST	123	E5.1706	GACC	=	STARAD		(6) SS
1210	REF	4	LAST	123	E5.1714	GOUT	=	STARAD	+6	(6) SS

R1212 OVERLAYS WITHIN ALIGNMENT/SYSTEST COMMON STORAGE (240)

1214	REF	5	LAST	123	E5.1706	VEARTH	EQUALS	STARAD		(6)TMP
1215	REF	1			E5.1714	VSUN	EQUALS	VEARTH	+6	(6)TMP
1216	REF	1			E5.1722	VMOON	EQUALS	VSUN	+6	(6)TMP
1217	REF	1			E5.1730	SAX	EQUALS	VMOON	+6	(6)TMP

R1218 P50'S, R50'S Q STORES. (20)

1220	REF	1			E5.1745	QMIN	EQUALS	MGC	+2	B(1)TMP
1221	REF	1			E5.1746	QMAJ	EQUALS	QMIN	+1	B(1)TMP

R1222

R1223					**** USED IN P50S **** (SCATTERED OVERLAYS)					
1224	REF	6	LAST	123	E5.1706	XSCI	EQUALS	STARAD		
1225	REF	1			E5.1714	YSCI	EQUALS	XSCI	+6	

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1226	REF	1		E5.1714	ZSCI	EQUALS VSCI	
1227	REF	2	LAST 123	E5.1706	CULTRIX	EQUALS VEARTH	VEARTH. VSUN. VMCON
1228	REF	7	LAST 123	E5.1722	VEC1	EQUALS STARAD +120	
1229	REF	2	LAST 123	E5.1730	VEC2	EQUALS STAR	

A1230

R1231

ALIGNMENT STORAGE.

(230)

1233	REF	1		E5.1747	OGCT	EQUALS OMAJ +1	1(6)
1234	REF	1		E5.1755	BESTI	EQUALS OGCT +6	1(1)
1235	REF	1		E5.1756	BESTJ	EQUALS BESTI +1	
1236	REF	1		E5.1757	STARIND	EQUALS BESTJ +1	
R1237	RETAIN THE ORDER OF STARS AV1 TO STARS AV2 +5 FOR DOWNLINK PURPOSES.						
1238	REF	1		E5.1760	STARS AV1	EQUALS STARIND +1	1(6)
1239	REF	1		E5.1766	STARS AV2	EQUALS STARS AV1 +6	1(6)
1240	REF	1		E5.1774	TALIGN	EQUALS STARS AV2 +6	8(2) TIME OF IMU ALIGNMENT (DOWNLINKED)

A1241

R1242

P32-35 + SERVICER

(20)

1244	REF	1		E5.1776	RTX1	EQUALS TALIGN +2	1(1) X1 -2 EARTH. -10 MOON
1245	REF	1		E5.1777	RTX2	EQUALS RTX1 +1	1(1) X2 0 EARTH, 2 MOON

A1246

1247		0026	ZPRIME	=	220
1248		0026	PDA	=	220
1249		0020	CDSTH	=	160
1250		0022	SINTH	=	180
1251		0024	THETA	=	200
1252		0040	STARIN	=	320

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P1253 ***** OVERLAY NUMBER 2 IN EBANK 5 *****

R1254 CONICS ROUTINE STORAGE.

(85D)

1256	REF	2	LAST 122	E5,1642	DELX	EQUALS	ENDW		I(2)TMP
1257	REF	1		E5,1644	DELT	EQUALS	DELX	+2	I(2)TMP
1258	REF	1		E5,1646	URRECT	EQUALS	DELT	+2	I(6)TMP
1259				0042	RCNORM	EQUALS	340		I(2)TMP
1260	REF	1		E3,1552	XPREV	EQUALS	XKEP		I(2)TMP
1261	REF	1		E5,1654	R1VEC	EQUALS	URRECT	+6	I(6)TMP
1262	REF	1		E5,1662	R2VEC	EQUALS	R1VEC	+6	I(6)TMP
1263	REF	1		E5,1670	TDESIRE	EQUALS	R2VEC	+6	I(2)TMP
1264	REF	1		E5,1672	GEOMSGN	EQUALS	TDESIRE	+2	I(1)TMP
1265	REF	1		E5,1673	UN	EQUALS	GEOMSGN	+1	I(6)TMP
1266	REF	1		E5,1701	VTARGET	EQUALS	UN	+6	I(1)TMP
1267	REF	1		E5,1702	VTARGET	EQUALS	VTARGET	+1	I(6)TMP
1268	REF	1		E5,1710	RTNLAMB	EQUALS	VTARGET	+6	I(1)TMP
1269	REF	1		E5,1711	U2	EQUALS	RTNLAMB	+1	I(6)TMP
1270	REF	1		E5,1717	MAGVEC2	EQUALS	U2	+6	I(2)TMP
1271	REF	1		E5,1721	UR1	EQUALS	MAGVEC2	+2	I(6)TMP
1272	REF	1		E5,1727	SNTH	EQUALS	UR1	+6	I(2)TMP
1273	REF	1		E5,1731	CSTH	EQUALS	SNTH	+2	I(2)TMP
1274	REF	1		E5,1733	1-CSTH	EQUALS	CSTH	+2	I(2)TMP
1275	REF	1		E5,1735	CSTH-RHO	EQUALS	1-CSTH	+2	I(2)TMP
1276	REF	1		E5,1737	P	EQUALS	CSTH-RHO	+2	I(2)TMP
1277	REF	1		E5,1741	R1A	EQUALS	P	+2	I(2)TMP
1278	REF	2	LAST 125	E5,1654	RVEC	EQUALS	R1VEC		I(6)TMP
1279	REF	1		E5,1743	VVEC	EQUALS	R1A	+2	I(6)TMP
1280	REF	2	LAST 125	E5,1710	RTNTT	EQUALS	RTNLAMB		I(1)TMP
1281	REF	1		E5,1751	ECC	EQUALS	VVEC	+6	I(2)TMP
1282	REF	3	LAST 125	E5,1710	RTNTR	EQUALS	RTNLAMB		I(1)TMP
1283	REF	4	LAST 125	E5,1710	RTNAPSE	EQUALS	RTNLAMB		I(1)TMP
1284	REF	2	LAST 125	E5,1717	R2	EQUALS	MAGVEC2		I(2)TMP
1285	REF	1		E5,1753	RTNPRM	EQUALS	ECC	+2	I(1)TMP
1286	REF	1		E5,1754	SGNROOT	EQUALS	RTNPRM	+1	I(1)TMP
1287	REF	1		E5,1755	RDESIRE	EQUALS	SGNROOT	+1	I(2)TMP
1288	REF	1		E5,1757	DELDEP	EQUALS	RDESIRE	+2	I(2)TMP
1289	REF	1		E5,1761	DEPREV	EQUALS	DELDEP	+2	I(2)TMP
1290	REF	2	LAST 125	E5,1757	TERRLAMB	EQUALS	DELDEP		I(2)TMP
1291	REF	1		E5,1761	TPREV	EQUALS	DEPREV		I(2)TMP
1292	REF	2	LAST 125	E5,1763	EPSILONL	EQUALS	DEPREV	+2	I(2)TMP
1293	REF	1		E5,1765	COGA	EQUALS	EPSILONL	+2	I(2)TMP
1294	REF	1		E5,1765	INDEP	EQUALS	COGA		I(2) COTAN OF INITIAL FLIGHT PATH ANGLE. USED BY SUBROUTINE ITERATOR.

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P1295 ***** OVERLAY NUMBER 5 IN EDANK 5 *****

R1296 INCORP STORAGE. (180)

1298 PEF 3 LAST 125 E5.1642 Z1 EQUALS ENDW I(18)TMP

R1299 INCORP/LSR22.3 STORAGE. (210)

1301 REF 1 E5.1664 DELTAX EQUALS Z1 +180 I(18)

1302 REF 1 E5.1706 VARIANCE EQUALS DELTAX +180 I(13)

R1303 MEASUREMENT INCORPORATION -R22- STORAGE. (430)

1305 REF 1 E5.1711 GRP2SVQ EQUALS VARIANCE +3 I(1)TMP QSAVE FOR RESTARTS

1306 REF 1 E5.1712 OMEGAM1 EQUALS GRP2SVQ +1 I(6)

1307 REF 1 E5.1720 OMEGAM2 EQUALS OMEGAM1 +6 I(6)

1308 REF 1 E5.1726 OMEGAM3 EQUALS OMEGAM2 +6 I(6)

1309 REF 1 E5.1734 HOLDW EQUALS OMEGAM3 +6 I(18)

1310 REF 1 E5.1756 TDPOS EQUALS HOLDW +180 I(6)

1311 REF 1 E5.1764 TDVEL EQUALS TDPOS +6 I(6)

A1312

1313 REF 2 LAST 126 E5.1664 TRIPA EQUALS DELTAX I(3)TMP

1314 REF 1 E5.1667 TEMPVAR EQUALS TRIPA +3 I(3)TMP

A1315

R1316 INCORPORATION/INTEGRATION Q STORAGE. (10)

1318 REF 1 E5.1772 EGRESS EQUALS TDVEL +6 I(1)

A1319

R1320 P30/P31 STORAGE. (10) AND ONE OVERLAY

1322 REF 1 E5.1773 PROEXIT EQUALS EGRESS +1 B(1)TMP

A1323

1324 REF 1 E5.1773 ORIGIN EQUALS PROEXIT I(1)TMP INDEX DURING INITVEL

A1325

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P1326 SYSTEM TEST ERASABLES. CAN OVERLAY W MATRIX.

(1270)

R1328 ***** OVERLAY NUMBER C IN EBANK 5 *****

1329	REF	3	LAST	121	E5.1400	AZIMUTH	EQUALS	W	2
1330	REF	1			E5.1402	LATITUDE	EQUALS	AZIMUTH +2	2
1331	REF	1			E5.1404	ERVECTOR	EQUALS	LATITUDE +2	6
1332	REF	1			E5.1412	LENGTHOT	EQUALS	ERVECTOR +6	1
1333	REF	1			E5.1413	LOSVEC	EQUALS	LENGTHOT +1	6
1334	REF	1			E5.1414	NDXCTR	EQUALS	LOSVEC +1	1
1335	REF	1			E5.1415	PIPINDEX	EQUALS	NDXCTR +1	1
1336	REF	1			E5.1416	POSITON	EQUALS	PIPINDEX +1	1
1337	REF	1			E5.1417	QPLACE	EQUALS	POSITON +1	1
1338	REF	1			E5.1420	QPLACES	EQUALS	QPLACE +1	1
1339	REF	1			E5.1421	SOUTHDR	EQUALS	QPLACES +1	7
1340	REF	1			E5.1430	TEMPTIME	EQUALS	SOUTHDR +7	2
1341	REF	1			E5.1432	THARK	EQUALS	TEMPTIME +2	2
1342	REF	1			E5.1434	GENPL	EQUALS	THARK +2	
1343	REF	1			E5.1434	CDUTIME1	=	GENPL	
1344	REF	2	LAST	127	E5.1436	CDUTIMEF	=	GENPL +2	
1345	REF	3	LAST	127	E5.1440	CDUDANG	=	GENPL +4	
1346	REF	4	LAST	127	E5.1441	CDUREADF	=	GENPL +5	
1347	REF	5	LAST	127	E5.1442	CDUREADI	=	GENPL +6	
1348	REF	6	LAST	127	E5.1443	CDULIMIT	=	GENPL +7	
1349	REF	7	LAST	127	E5.1440	TEMPADD	=	GENPL +4	
1350	REF	8	LAST	127	E5.1441	TEMP	=	GENPL +5	
1351	REF	9	LAST	127	E5.1442	NOBITS	=	GENPL +6	
1352	REF	10	LAST	127	E5.1443	CHAN	=	GENPL +7	
1353	REF	11	LAST	127	E5.1444	LOS1	=	GENPL +80	
1354	REF	12	LAST	127	E5.1452	LOS2	=	GENPL +140	
1355	REF	13	LAST	127	E5.1460	CALCDIR	EQUALS	GENPL +200	
1356	REF	14	LAST	127	E5.1461	COUFLAG	EQUALS	GENPL +210	
1357	REF	15	LAST	127	E5.1462	GYTOBETO	EQUALS	GENPL +220	
1358	REF	16	LAST	127	E5.1463	OPTNREG	EQUALS	GENPL +230	
1359	REF	17	LAST	127	E5.1464	SAVE	EQUALS	GENPL +240	THREE UNSEC LOC
1360	REF	18	LAST	127	E5.1467	SFLCONST1	EQUALS	GENPL +270	
1361	REF	19	LAST	127	E5.1470	TIMER	EQUALS	GENPL +280	
1362	REF	20	LAST	127	E5.1472	DATAPL	EQUALS	GENPL +300	
1363	REF	21	LAST	127	E5.1434	RDSP	EQUALS	GENPL	FIX LA ER POSSIBLY KEEP1
1364	REF	22	LAST	127	E5.1534	MASKREG	EQUALS	GENPL +640	
1365	REF	23	LAST	127	E5.1536	CDUNDX	EQUALS	GENPL +660	
1366	REF	24	LAST	127	E5.1537	RESULTCT	EQUALS	GENPL +670	
1367	REF	25	LAST	127	E5.1542	COUNTPL	EQUALS	GENPL +700	
1368	REF	26	LAST	127	E5.1543	CDUANG	EQUALS	GENPL +710	

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1369	REF	27	LAST	127	E5,1434	AINLA	=	GENPL	110 DE OR 156 OCT LOCATIONS
1370	REF	1			E5,1434	WANGD	EQUALS	AINLA	VERT E ATE
1371	REF	2	LAST	128	E5,1436	WANGI	EQUALS	AINLA +20	HORIZU TAL ERATE
1372	REF	3	LAST	128	E5,1440	WANGT	EQUALS	AINLA +40	T
1373	REF	1			E5,1440	TDRQNOX	=	WANGT	
1374	REF	4	LAST	128	E5,1442	DRIFTT	EQUALS	AINLA +60	
1375	REF	5	LAST	128	E5,1444	ALXIS	EQUALS	AINLA +80	
1376	REF	6	LAST	128	E5,1445	CMPX1	EQUALS	AINLA +90	IND
1377	REF	7	LAST	128	E5,1446	ALK	EQUALS	AINLA +100	GAINS
1378	REF	8	LAST	128	E5,1462	VLAUNS	EQUALS	AINLA +120	
1379	REF	9	LAST	128	E5,1464	WPLATO	EQUALS	AINLA +240	
1380	REF	10	LAST	128	E5,1470	INTY	EQUALS	AINLA +280	SOUTH IP INTE
1381	REF	11	LAST	128	E5,1472	ANGZ	EQUALS	AINLA +300	EAST A IS
1382	REF	12	LAST	128	E5,1474	INTZ	EQUALS	AINLA +320	EAST P P I
1383	REF	13	LAST	128	E5,1476	ANGY	EQUALS	AINLA +340	SOUTH
1384	REF	14	LAST	128	E5,1500	ANGX	EQUALS	AINLA +360	VE
1385	REF	15	LAST	128	E5,1502	DRIFTD	EQUALS	AINLA +380	VERT
1386	REF	16	LAST	128	E5,1504	DRIFTI	EQUALS	AINLA +400	SOU
1387	REF	17	LAST	128	E5,1510	VLAUN	EQUALS	AINLA +440	
1388	REF	18	LAST	128	E5,1512	ACCWD	EQUALS	AINLA +460	
1389	REF	19	LAST	128	E5,1520	PDSNV	EQUALS	AINLA +520	
1390	REF	20	LAST	128	E5,1522	DPIPAY	EQUALS	AINLA +540	SOUTH
1391	REF	21	LAST	128	E5,1526	DPIPAZ	EQUALS	AINLA +580	NORTH IP INCREMENT
1392	REF	22	LAST	128	E5,1530	ALTIM	EQUALS	AINLA +600	
1393	REF	23	LAST	128	E5,1531	ALTIMS	EQUALS	AINLA +610	INDEX
1394	REF	24	LAST	128	E5,1532	ALOK	EQUALS	AINLA +620	TIME ONSTAN
1395	REF	25	LAST	128	E5,1550	DELM	EQUALS	AINLA +760	
1396	REF	26	LAST	128	E5,1560	WPLATI	EQUALS	AINLA +840	
1397	REF	27	LAST	128	E5,1562	GEDCOMPS	EQUALS	AINLA +860	
1398	REF	28	LAST	128	E5,1563	ERCOMP	EQUALS	AINLA +870	
1399	REF	29	LAST	128	E5,1571	ZERONOX	EQUALS	AINLA +930	
1400	REF	1			E5,1452	THETAN	=	ALK +4	
1401	REF	1			E5,1460	FILDELV	EQUALS	THETAN +4	AGS ALIGNMENT STORAGE
1402	REF	1			E5,1462	INTVEC	EQUALS	FILDELV +2	
1403	REF	30	LAST	128	E5,1572	1SECXT	=	AINLA +940	
1404	REF	31	LAST	128	E5,1573	ASECXT	=	AINLA +950	
1405	REF	32	LAST	128	E5,1574	PERFDLAY	EQUALS	AINLA +960	8(2) DELAY TIME BEF. START DRIFT MEASURE
1406	REF	33	LAST	128	E5,1576	OVFLOWCK	EQUALS	AINLA +980	(1) SET MEANS OVERFLOW IN IMM PERF TEST AND CAUSES TERMINATION
1407									
1408									
1409	REF	2	LAST	124	E5,1774	END-ES	EQUALS	STARSAV2 +6	*** FIRST FREE LOCATION IN E5***

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P1410 EBANK-6 ASSIGNMENTS.

1411 E6.1400 SETLOC 5000

R1412 DAP PAD-LOADED DATA. (100)

R1414 ALL OF THE FOLLOWING EXCEPT PITTIME AND ROLLTIME ARE INITIALIZED IN FRESH START TO PERMIT IMMEDIATE USE OF DAP

1416	E6.1400	E6.1400	HIASCENT	ERASE	(1) MASS AFTER STAGING, SCALE AT 816 KG.
1417	E6.1401	E6.1401	POLLTIME	ERASE	(1) TIME TO TRIM Z GIMBAL IN ROD, CSEC.
1418	E6.1402	E6.1402	PITTIME	ERASE	(1) TIME TO TRIM Y GIMBAL IN ROD, CSEC.
1419	E6.1403	E6.1403	DKTRAP	ERASE	(1) DAP STATE (POSSIBLE 77001)
1420	E6.1404	E6.1404	DKOMEGAN	ERASE	(1) ESTIMATOR PARA- (VALUES 00012)
1421	E6.1405	E6.1405	DKKAOSN	ERASE	(1) METERS FOR THE 00074
1422	E6.1406	E6.1406	LMTRAP	ERASE	(1) DOCKED AND 77001
1423	E6.1407	E6.1407	LMOMEGAN	ERASE	(1) LEM-ALONE CASES 00000
1424	E6.1410	E6.1410	LMKAOSN	ERASE	(1) RESPECTIVELY 00074
1425	E6.1411	E6.1411	DKDB	ERASE	(1) WIDTH OF DEADBAND FOR DOCKED RCS
A1426					AUTOPILOT (DB=1.4DEG IN FRESH START)
A1427					DEADBAND = PI/DKDB RAD.

R1428 PADLOADS FOR INITIALIZATION OF DAP BIAS ACCELERATION (AT P12 IGNITION) (20)

1430	E6.1412	E6.1412	IGNADSO	ERASE	B(1)PL
1431	E6.1413	E6.1413	IGNADSR	ERASE	B(1)PL
A1432					

R1433 AXIS TRANSFORMATION MATRIX - GIMBAL TO PILOT AXES: (50)

1435	E6.1414	E6.1414	M11	ERASE	SCALED AT 1
1436	E6.1415	E6.1415	M21	ERASE	SCALED AT 1
1437	E6.1416	E6.1416	M31	ERASE	
1438	E6.1417	E6.1417	M22	ERASE	SCALED AT 1.
1439	E6.1420	E6.1420	M32	ERASE	SCALED AT 1.

R1440 ANGLE MEASUREMENTS. (310)

1442		E6.1421	E6.1425	OMEGAP	ERASE	+4	BODY-AXIS ROT. RATES SCALED AT PI/4 AND
1443	REF	-1		OMEGAQ	EQUALS	OMEGAP +1	BODY-AXIS ACCELERATIONS SCALED AT PI/8
1444	REF	-2	LAST 129	OMEGAR	EQUALS	OMEGAP +2	
R1445	RETAIN THE ORDER OF ALPHAQ AND ALPHAR FOR DOWNLINK PURPOSES.						
1446	REF	-3	LAST 129	ALPHAQ	EQUALS	OMEGAP +3	
1447	REF	-4	LAST 129	ALPHAR	EQUALS	OMEGAP +4	
1448		E6.1426	E6.1427	OMEGAU	ERASE	+1	
1449	REF	1		OMEGAV	=	OMEGAU +1	
1450		E6.1430	E6.1435	TRAPEDP	ERASE	+5	
1451	REF	1		TRAPEDQ	=	TRAPEDP +1	
1452	REF	2	LAST 129	TRAPEDR	=	TRAPEDP +2	
1453	REF	3	LAST 129	NPTRAPS	=	TRAPEDP +3	

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1454	REF	4	LAST	129	E6.1434	NQTRAPS	=	TRAPEDP	+4	
1455	REF	5	LAST	130	E6.1435	NRTRAPS	=	TRAPEDP	+5	
1456	REF	1			E6.1427	EDOTP	=	EDGT		
1457					E6.1436	EDOTQ	ERASE	+1		
1458	REF	1			E6.1437	EDOTR	=	EDOTQ	+1	MANY SHARING NAMES
1459	REF	2	LAST	130	E6.1436	QRATEDIF	EQUALS	EDOTQ		ALTERNATIVE NAMES:
1460	REF	1			E6.1437	RRATEDIF	EQUALS	EDOTR		DELETE WHEN NO. OF REFERENCES = 0
1461	REF	2	LAST	129	E6.1426	VRATEDIF	EQUALS	OMEGAU		
1462	REF	1			E6.1427	VRATEDIF	EQUALS	OMEGAV		
1463					E6.1440	OLDXFORP	ERASE	+2		STORED CDU READINGS FOR STATE
1464	REF	1			E6.1441	OLDYFORP	EQUALS	OLDXFORP	+1	DERIVATIONS: SCALED AT PI RADIANS (2'S)
1465	REF	2	LAST	130	E6.1442	OLDZFORP	EQUALS	OLDXFORP	+2	
R1466	RATE-COMMAND AND MINIMUM IMPULSE MODES									
1467					E6.1443	CH31TEMP	ERASE			
1468					E6.1444	STIKSENS	ERASE			
1469					E6.1445	TCP	ERASE			
1470					E6.1446	DXERROR	ERASE	+5		
1471	REF	1			E6.1450	DYERROR	EQUALS	DXERROR	+2	
1472	REF	2	LAST	130	E6.1452	DZERROR	EQUALS	DXERROR	+4	
1473					E6.1454	PLAST	ERASE			
1474					E6.1455	QLAST	ERASE			
1475					E6.1456	RLAST	ERASE			
1476					E6.1457	TCQR	ERASE			
R1477	OTHER VARIABLES. (50)									
1479					E6.1460	OLDPMIN	ERASE			THESE THREE USED IN MIN IMPULSE MODE.
1480					E6.1461	OLDQMIN	ERASE			
1481	REF	1			E6.1737	TEMP31	EQUALS	DAPTEMP1		
1482					E6.1462	SAVEHAND	ERASE	+1		
1483					E6.1464	PERROR	ERASE			
1484	REF	1			E6.1450	QERROR	EQUALS	DYERROR		
1485	REF	1			E6.1452	RERROR	EQUALS	DZERROR		
R1486	JET STATE CHANGE VARIABLES- TIME (TDFJTCNG), JET BITS WRITTEN NOW (100)									
R1488	(JTSOONOW), AND JET BITS WRITTEN AT T6 RUPT (JTSATCHG).									
1489					E6.1465	NXT6ADR	ERASE			
1490					E6.1466	T6NEXT	ERASE	+1		
1491					E6.1470	T6FURTHA	ERASE	+1		
1492					E6.1472	NEXTP	ERASE	+2		
1493	REF	1			E6.1473	NEXTU	=	NEXTP	+1	
1494	REF	2	LAST	130	E6.1474	NEXTV	=	NEXTP	+2	
1495					E6.1475	-2JETLIN	ERASE	+1		RATE COMMAND 4-JET RATE DIFFERENCE LIMIT
1496	REF	1			E6.1476	-RATEDB	EQUALS	-JETLIN	+1	AND RATE DEADBAND FOR ASCENT OR DESCENT
1497	REF	1			E6.1476	TARGETDB	EQUALS	-RATEDB		MAN. CONTROL TARGET DB COMPLEMENT.
R1498	*** Q,R AXIS ERASABLES *** (5)									

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1500	REF	13	LAST	87	4742	PBIT	EQUALS	BIT10	
1501	REF	13	LAST	87	4741	ORBIT	EQUALS	BIT11	
1502	REF	1			E6.1751	JERROR	EQUALS	DAPTREG5	U,V-AXES ATT ERROR FOR RCS CONTROL LAWS
1503	REF	1			E6.1752	VERROR	=	VERROR +1	
1504					E6.1477	RETJADR	ERASE		
1505	REF	1			E6.1742	TEMPNUM	EQUALS	DAPTEMP4	
1506	REF	1			E6.1743	NUMBERT	EQUALS	DAPTEMP5	
1507	REF	1			E6.1744	ROTINDEX	EQUALS	DAPTEMP6	
1508	REF	2	LAST	130	E6.1737	ROTEMP1	EQUALS	DAPTEMP1	
1509	REF	1			E6.1740	ROTEMP2	EQUALS	DAPTEMP2	
1511	REF	1			E6.1741	POLYTEMP	EQUALS	DAPTEMP3	
1512					E6.1500	SENSETYP	ERASE		
1513	REF	3	LAST	131	E6.1737	ABSTJ	EQUALS	DAPTEMP1	ABS VALUE OF JET-FIRING TIME
1514	REF	4	LAST	131	E6.1737	ABSEDOIP	EQUALS	DAPTEMP1	
1515	REF	1			E6.1750	DPSBURN	EQUALS	DAPTREG4	USED WITH SNUFFBIT. VERY TEMPORARY.

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P1516 TRIM GIMBAL CONTROL LAW ERASABLES:

(110)

1518	REF	5	LAST	131	E6.1737	GTSTEMPS	EQUALS	DAPTEMP1	GT5 IS PART OF THE JASK.
1519	REF	1			E6.1741	SHFTFLAG	EQUALS	GTSTEMPS +2	COUNT BITS FOR GTSORT SHIFTING.
1520	REF	2	LAST	132	E6.1744	ININDEX	EQUALS	GTSTEMPS +5	INDEX FOR SHIFT LOOP IN GTSORT.
1521	REF	1			E6.1505	SAVE5R	EQUALS	AXISCTR	CANNOT BE A DAPTEMP - GTS USES THEM ALL.
1522	REF	3	LAST	132	E6.1746	SCRATCH	EQUALS	GTSTEMPS +7	ROUTEYCL ERASABLE
1523	REF	4	LAST	132	E6.1747	HALFARG	EQUALS	GTSTEMPS +60	ROUTEYCL ERASABLE.
1524	REF	5	LAST	132	E6.1737	K2THETA	EQUALS	GTSTEMPS	D.P., K*ERROR, NEGOSUM
1525	REF	6	LAST	132	E6.1741	KCENTRAL	EQUALS	GTSTEMPS +2	S.P., K FROM KQ OR KRDAP, AT PI/2(2)
1526	REF	7	LAST	132	E6.1742	K2CENTRAL	EQUALS	GTSTEMPS +3	D.P., GTS SCRATCH CELLS.
1527	REF	8	LAST	132	E6.1743	WCENTRAL	EQUALS	GTSTEMPS +4	S.P., OMEGA, AT PI/4 RAD/SEC
1528	REF	9	LAST	132	E6.1744	ACENTRAL	EQUALS	GTSTEMPS +5	S.P., ALPHA, AT PI/4 RAD/SEC(2)
1529	REF	10	LAST	132	E6.1745	DEL	EQUALS	GTSTEMPS +6	S.P., SGN FUNCTION VALUE.
1530	REF	11	LAST	132	E6.1746	A2CENTRAL	EQUALS	GTSTEMPS +7	D.P., GTS SCRATCH CELLS.
1531	REF	12	LAST	132	E6.1750	QCENTR	EQUALS	GTSTEMPS +90	S.P., INDEX FOR GTS LOOP THROUGH Q,R AXES
1532	REF	13	LAST	132	E6.1751	FUNCTION	EQUALS	GTSTEMPS +100	D.P., ARGUMENT FOR GRSORT, SCRATCH FOR GTS
1534					E6.1501	E6.1503	NEGQ	ERASE +2	NEGATIVE OF Q-AXIS GIMBAL DRIVE
A1535							NEGQ	+1	DEFINED AND USED ELSEWHERE
1536	REF	1			E6.1503		NEGQ	EQUALS NEGQ +2	NEGATIVE OF R-AXIS GIMBAL DRIVE
1537					E6.1504	E6.1506	KQ	ERASE +2	S.P., JERK TERM FOR GTS, AT PI/2(6)
1538	REF	1			E6.1505		AXISCTR	EQUALS AG +1	
1540	REF	2	LAST	132	E6.1506		KRDAP	EQUALS KQ +2	.3 ACCDTR SCALED AT PI/2(6)
1541					E6.1507	E6.1512	ACCDTRQ	ERASE +3	Q-JERK SCALED AT PI/2(7) UNSIGNED
1542	REF	1			E6.1510		QACCDTR	EQUALS ACCDTRQ +1	Q-JERK SCALED AT PI/2(7) SIGNED
1543	REF	2	LAST	132	E6.1511		ACCDTR	EQUALS ACCDTRQ +2	R-JERK SCALED AT PI/2(7) UNSIGNED
1544	REF	3	LAST	132	E6.1512		RACCDTR	EQUALS ACCDTRQ +3	R-JERK SCALED AT PI/2(7) SIGNED
1545	REF	1			E6.1450		QDIFF	EQUALS QERROR	ATTITUDE ERRORS:
1546	REF	1			E6.1452		RDIFF	EQUALS RERROR	SCALED AT PI RADIANS

A1547

R1548 TORQUE VECTOR RECONSTRUCTION VARIABLES:

(160)

1550	REF	1			E6.1745	JETRATE	EQUALS	DAPTRG1	
1551	REF	1			E6.1746	JETRATED	EQUALS	JETRATE +1	THE LAST CONTROL SAMPLE PERIOD OF 100 MS
1552	REF	2	LAST	132	E6.1747	JETRATER	EQUALS	JETRATE +2	SCALED AT PI/4 RADIANS/SECOND
1553					E6.1513	E6.1520	DOWNTORK	ERASE +5	ACCUMULATED JET TORQUE COMMANDED ABOUT
1554	REF	1			E6.1513		POSTORKP	EQUALS DOWNTORK	+, -P, +, -U, +, -V RESPECTIVELY.
1555	REF	2	LAST	132	E6.1514		NEGOTKP	EQUALS DOWNTORK +1	EMPLOYED EXCLUSIVELY FOR DOWNLIST.
1556	REF	3	LAST	132	E6.1515		POSTORKU	EQUALS DOWNTORK +2	NOT INITIALIZED; PERMITTED TO OVERFLOW

L

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1557	REF	4	LAST	132	E6.1516	NEG TORKU	EQUALS	DOWNTORK	+3	SCALED AT 32 JET-SEC, OR ABOUT 2.0 JET- MSEC PER BIT.
1558	REF	5	LAST	133	E6.1517	POSTORKV	EQUALS	DOWNTORK	+4	
1559	REF	6	LAST	133	E6.1520	NEG TORKV	EQUALS	DOWNTORK	+5	
1560					E6.1521	E6.1523	NO. PJETS	ERASE	+2	
1561	REF	1			E6.1522		NO. UJETS	=	NO. PJETS +1	
1562	REF	1			E6.1523		NO. VJETS	=	NO. UJETS +1	
1563					E6.1524	E6.1526	TJP	ERASE	+2	
1564	REF	1			E6.1525		TJU	=	TJP +1	
1565	REF	2	LAST	133	E6.1526		TJV	=	TJP +2	
1566					E6.1527	E6.1527	L, PVT-CG	ERASE		
1567					E6.1530	E6.1534	1JACC	ERASE	+4	ACCELERATIONS DUE TO 1 JET TRODING
1568	REF	1			E6.1531		1JACCU	EQUALS	1JACC +1	SCALED AT PI/4 RADIANS/SECOND
1569	REF	2	LAST	133	E6.1532		1JACCR	EQUALS	1JACC +2	
1570	REF	3	LAST	133	E6.1533		1JACCU	EQUALS	1JACC +3	FOR U,V-AXES THE SCALE FACTOR IS DIFF:
1571	REF	4	LAST	133	E6.1534		1JACCV	EQUALS	1JACC +4	SCALED AT PI/2 RADIANS/SECOND (FOR ASC)

R1572 ASCENT VARIABLES:

(10D)

A1574

1575					E6.1535	E6.1536	SKIPU	ERASE	+1
1576	REF	1			E6.1536		SKIPV	=	SKIPU +1

R1577 THE FOLLOWING LM DAP ERASABLES ARE ZEROED IN THE STARTDAP SECTION OF THE DAPIDLER PROGRAM AND THE COASTASC
 R1579 SECTION OF THE AOSTASK. THE ORDER MUST BE PRESERVED FOR THE INDEXING METHODS WHICH ARE EMPLOYED IN THOSE
 R1581 SECTIONS AND ELSEWHERE.

1582					E6.1537	E6.1544	AUSQ	ERASE	+5	OFFSET ACC. ESTIMATES, UPDATED IN D.P.,
1583	REF	1			E6.1541		AUSR	EQUALS	AUSQ +2	AND SCALED AT PI/2.
1584	REF	2	LAST	133	E6.1543		AUSU	EQUALS	AUSQ +4	UV-AXES OFFSET ACC. FROMED BY VECTOR
1585	REF	3	LAST	133	E6.1544		AOSV	EQUALS	AUSQ +5	ADDITION OF Q,R. AT PI/2 RAD/SEC(2).
1586					E6.1545	E6.1546	AOSQTERM	ERASE	+1	(.1-.05K)AOS
1587	REF	1			E6.1546		AOSRTERM	EQUALS	AOSQTERM +1	SCALED AT PI/4 RADIANS/SECOND.

R1588 FOR TJET LAW SUBROUTINE:

(TEMPS ONLY)

A1590							NUMBERT	EQUALS	DAPTEMP5	DEFINED IN ORAXIS.
1591	REF	6	LAST	132	E6.1737		EDDT5Q	EQUALS	DAPTEMP1	
1592	REF	2	LAST	131	E6.1740		ROTSENSE	EQUALS	DAPTEMP2	
1593	REF	2	LAST	131	E6.1741		FIREFCT	EQUALS	DAPTEMP3	LOOKED AT BY PAXIS.
1594	REF	2	LAST	131	E6.1742		TYDAXIS	EQUALS	DAPTEMP4	
1595	REF	2	LAST	131	E6.1744		AORSDIF2	EQUALS	DAPTEMP6	
1596	REF	2	LAST	132	E6.1745		HOLDQ	EQUALS	DAPTREG1	
1597	REF	1			E6.1746		AORSDIF1	EQUALS	DAPTREG2	
1598	REF	1			E6.1747		HH	EQUALS	DAPTREG3	DOUBLE PRECISION
A1599							HH +1	EQUALS	DAPTREG4	
1600	REF	1			E6.1752		E	EQUALS	DAPTREG6	TIME SHARE WITH VERFOR
1601	REF	2	LAST	130	E6.1427		EDDT	EQUALS	OMEGAV	

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R1602 INPUT TO TJET LAW (PERMANENT ERASABLES).

(480)

1604	REF	1		E6.1525	TJETU	=	TJU	EQUATE NAMES. INDEXED BY -1, 0, +1.
1605				E6.1547	E6.1626	BLOCKTOP	ERASE +470	
1606	REF	1		E6.1567	1/ANET1	=	BLOCKTOP +160	THESE 8 PARAMETERS ARE SET UP BY 1/ACCS
1607	REF	1		E6.1570	1/ANET2	=	1/ANET1 +1	FOR MINIMUM JETS ABOUT THE U-AXIS WHEN
1608	REF	2	LAST	134	1/ACCOAST	=	1/ANET1 +4	EDOT IS POSITIVE. TJETLAW INDEXES BY
1609	REF	3	LAST	134	ACCFCT21	=	1/ANET1 +6	ADDRESS DIFF FROM THESE REGISTERS TO PICK UP
1610	REF	4	LAST	134	ACCFCT25	=	1/ANET1 +7	PARAMETERS FOR THE PROPER AXIS. NUMBER
1611	REF	5	LAST	134	FIREDB	=	1/ANET1 +100	OF JETS AND SIGN OF EDOT. THERE ARE 48
1612	REF	6	LAST	134	COASTDB	=	1/ANET1 +120	REGISTERS IN ALL IN THIS BLOCK.
1613	REF	7	LAST	134	AXISDIST	=	1/ANET1 +140	FOUR NOT REFERENCED (P-AXIS) ARE FILLED
A1614								IN BY THE FOLLOWING:
1615	REF	2	LAST	134	ACCSWU	=	BLOCKTOP	SET BY 1/ACCS TO SHOW WHETHER MAXIMUM
1616	REF	1			ACCSWV	=	ACCSWU +1	JETS ARE REQUIRED BECAUSE OF ACS.
1617	REF	3	LAST	134	FLAT	=	BLOCKTOP +6	WIDTH OF MINIMUM IMPULSE ZONE.
1618	REF	4	LAST	134	ZONEBLIM	=	BLOCKTOP +7	HEIGHT OF MINIMUM IMPULSE ZONE (AT 4 SEC)
-16181				E6.1627	E6.1630	COEFFQ	ERASE +1	COEFFQ AND COEFFR ARE USED IN ROT-TMOV
-16182	REF	1		E6.1630		COEFFR	EQUALS COEFFQ +1	TO RESOLVE Q,R COMPONENTS INTO U,V COMP.
A1619								

R1620 VARIABLES FOR GTS-ORAXIS CONTROL EXCHANGE.

(4)

1622	REF	2	LAST	132	E6.1502	ALLOWGTS	EQUALS REGUQ +1	INSERT INTO UNUSED LOCATION
1623					E6.1631	E6.1631	COTROLER	ERASE
1624					E6.1632	E6.1634	QGINTMR	ERASE +2
1625	REF	1			E6.1633		INGTS	EQUALS QGINTMR +1
1626	REF	2	LAST	134	E6.1634		RGINTMR	EQUALS QGINTMR +2

INDICATES WHICH CONTROL SYSTEM TO USE.
Q-GINGAL DRIVE TIMER, DECISECONDS.
INDICATOR OF CURRENT GTS CONTROL.
R-GINGAL DRIVE TIMER, DECISECONDS.

R1627 PLEASE RETAIN THE ORDER OF COUXD THRU COUZD FOR DOWNLINK PURPOSES.

R1628 KALCMANU:IDAP INTERFACE.

(90)

1630				E6.1635	E6.1637	COUXD	ERASE +2	COU DESIRED REGISTERS:
1631	REF	1			E6.1636	COUYD	EQUALS COUXD +1	SCALED AT PI RADIANS (180 DEGREES)
1632	REF	2	LAST	134	E6.1637	COUZD	EQUALS COUXD +2	(STORE IN 25 COMPLEMENT)
1633				E6.1640	E6.1642	DELCBUX	ERASE +2	NEGATIVE OF DESIRED 100MS COU INCREMENT:
1634	REF	1			E6.1641	DELCBUY	EQUALS DELCBUX +1	SCALED AT PI RADIANS (180 DEGREES)
1635	REF	2	LAST	134	E6.1642	DELCBUZ	EQUALS DELCBUX +2	(STORE IN 25 COMPLEMENT)

R1636 RETAIN THE ORDER OF OMEGAPD TO OMEGARD FOR DOWNLINK PURPOSES.

1637				E6.1643	E6.1645	OMEGAPD	ERASE +2	ATTITUDE MANEUVER DESIRED RATES:
1638	REF	1			E6.1644	OMEGAQD	EQUALS OMEGAPD +1	(NOT EXPLICITLY REFERENCED IN ITS CONTROL)
1639	REF	2	LAST	134	E6.1645	OMEGARD	EQUALS OMEGAPD +2	SCALED AT PI/4 RADIANS/SECOND

R1640 KALCMANU STORAGE.

(240)

1642				E6.1646	E6.1675	MIS	ERASE +230	1(180)
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1643 REF 1 E6.1670 CDF EQUALS MIS +180 I(6)

R1644 KALCMANU STORAGE. (330)

1646 E6.1670 E6.1734 BCDU ERASE +300 B(3)
 1647 REF 1 E6.1701 KSPNDX EQUALS BCDU +3 B(1)
 1648 REF 1 E6.1702 KDPNDX EQUALS KSPNDX +1 B(1)

1649 REF 1 E6.1703 TMIS EQUALS KDPNDX +1 I(18) MUST BE IN SAME BANK AS RCS DAP
 1650 REF 1 E6.1725 COFSKEW EQUALS TMIS +180 I(6) MUST BE IN SAME BANK AS RCS DAP
 1651 REF 1 E6.1733 CAM EQUALS COFSKEW +6 I(2) MUST BE IN SAME BANK AS RCS DAP

1652 E6.1735 E6.1736 AM ERASE +1 I(2) THIS WAS ONCE IN ES OVERLAYING GSC
 A1653

R1654 FIRST-ORDER OVERLAYS IN KALCMANU (250)

1656 REF 2 LAST 135 E6.1703 KV1 EQUALS TMIS I(6)
 1657 REF 3 LAST 135 E6.1703 MFISYM EQUALS TMIS I
 1658 REF 4 LAST 135 E6.1703 TMFI EQUALS TMIS I
 1659 REF 5 LAST 135 E6.1703 NCDU EQUALS TMIS B
 1660 REF 6 LAST 135 E6.1706 NEXTIME EQUALS TMIS +3 B
 1661 REF 7 LAST 135 E6.1707 TTEMP EQUALS TMIS +4 B
 1662 REF 8 LAST 135 E6.1711 KV2 EQUALS TMIS +6 I(6)
 1663 REF 9 LAST 135 E6.1711 BIASTEMP EQUALS TMIS +6 B
 1664 REF 10 LAST 135 E6.1717 KV3 EQUALS TMIS +120 I(6)
 1665 REF 11 LAST 135 E6.1717 OGF EQUALS TMIS +120 I

1666 REF 2 LAST 135 E6.1725 BRATE EQUALS COFSKEW B
 1667 REF 3 LAST 135 E6.1725 IG EQUALS COFSKEW I

1668 REF 1 E6.1733 TM EQUALS CAM B

R1669 SECOND-ORDER OVERLAYS IN KALCMANU (240)

1671 REF 1 E6.1703 K1 = KV1
 1672 REF 1 E6.1711 K2 = KV2
 1673 REF 1 E6.1717 K3 = KV3
 1674 REF 2 LAST 135 E6.1703 P21 EQUALS KV1 I(2)
 1675 REF 3 LAST 135 E6.1705 D21 EQUALS KV1 +2 I(2)
 1676 REF 4 LAST 135 E6.1707 G21 EQUALS KV1 +4 I(2)
 1677 REF 2 LAST 135 E6.1711 C2SOP EQUALS KV2 I(2)
 1678 REF 3 LAST 135 E6.1713 C2SQM EQUALS KV2 +2 I(2)
 1679 REF 4 LAST 135 E6.1715 C2PP EQUALS KV2 +4 I(2)
 1680 REF 2 LAST 135 E6.1717 C2MP EQUALS KV3 I(2)
 1681 REF 3 LAST 135 E6.1721 C1PP EQUALS KV3 +2 I(2)
 1682 REF 4 LAST 135 E6.1723 C1MP EQUALS KV3 +4 I(2)

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1683	REF	4	LAST	135	E6.1725	VECQTEMP =	GDFSKEW
1684	REF	3	LAST	134	E6.1635	DCDU =	CDUAD
1685	REF	3	LAST	134	E6.1640	DELDCDU =	DELCDUX
1686	REF	1			E6.1641	DELDCDU1 =	DELCDUY
1687	REF	1			E6.1642	DELDCDU2 =	DELCDUZ

R1688 * * * * *

R1689 STORAGE FOR FINDCDUW

R1690 OVERLAYING KALEMANU STORAGE: (26D)

1692	REF	2	LAST	135	E6.1646	ECDUW	EQUALS	MIS	
1693	REF	1			E6.1646	ECDUWUSR	EQUALS	ECDUW	B(1)TMP
1694	REF	1			E6.1647	DCDUWUSR	EQUALS	ECDUWUSR +1	I(1)TMP
1695	REF	1			E6.1650	NDXCDUW	EQUALS	DCDUWUSR +1	B(1)TMP
1696	REF	1			E6.1651	FLAGOODW	EQUALS	NDXCDUW +1	B(1)TMP
1697	REF	1			E6.1652	FLPAUTND	EQUALS	FLAGOODW +1	B(1)TMP
1698	REF	1			E6.1653	UNFC/2	EQUALS	FLPAUTND +1	I(6)IN
1699	REF	1			E6.1661	UNWC/2	EQUALS	UNFC/2 +6	I(6)IN
1700	REF	1			E6.1667	UNFV/2	EQUALS	UNWC/2 +6	I(6)S-S
1701	REF	1			E6.1667	UNFVX/2	=	UNFV/2	
1702	REF	2	LAST	136	E6.1671	UNFVY/2	=	UNFV/2 +2	
1703	REF	3	LAST	136	E6.1673	UNFVZ/2	=	UNFV/2 +4	
1704	REF	4	LAST	136	E6.1675	-DELGNB	EQUALS	UNFV/2 +6	B(3)TMP

R1705
R1706 DEFINED IN THE WORK AREA: (16D)

1708		0000	UNX/2	=	0
1709		0006	UNY/2	=	6
1710		0014	UNZ/2	=	14

R1711
R1712 END OF FINDCDUW ERASABLES

R1713 * * * * *

R1714 THE FOLLOWING ARE THE DAP REPLACEMENTS FOR THE ITEMS AND RPTREGS, NEEDED BECAUSE DAP IS NOW A JOB, JAB, TACK.
R1716 ...ANYWAY, THE DAP CAN NOW BE INTERRUPTED. (18D)

1718		E6.1737	E6.1760	DAPTEMP1	ERASE	+17D
1719	REF	7	LAST	133	E6.1740	DAPTEMP2 EQUALS DAPTEMP1 +1
1720	REF	8	LAST	136	E6.1741	DAPTEMP3 EQUALS DAPTEMP1 +2
1721	REF	9	LAST	136	E6.1742	DAPTEMP4 EQUALS DAPTEMP1 +3
1722	REF	10	LAST	136	E6.1743	DAPTEMP5 EQUALS DAPTEMP1 +4
1723	REF	11	LAST	136	E6.1744	DAPTEMP6 EQUALS DAPTEMP1 +5
1724	REF	12	LAST	136	E6.1745	DAPTREG1 EQUALS DAPTEMP1 +6
1725	REF	13	LAST	136	E6.1746	DAPTREG2 EQUALS DAPTEMP1 +7
1726	REF	14	LAST	136	E6.1747	DAPTREG3 EQUALS DAPTEMP1 +8D

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1727	REF	15	LAST	136	E6,1750	DAPTREG4	EQUALS	DAPTEMP1	+90
1728	REF	16	LAST	137	E6,1751	DAPTREG5	EQUALS	DAPTEMP1	+100
1729	REF	17	LAST	137	E6,1752	DAPTREG6	EQUALS	DAPTEMP1	+110
1730	REF	18	LAST	137	E6,1753	DAPARUPT	EQUALS	DAPTEMP1	+120
1731	REF	1			E6,1754	DAPLRUPT	EQUALS	DAPARUPT	+1
1732	REF	2	LAST	137	E6,1755	DAPBORPT	EQUALS	DAPARUPT	+2
1733	REF	3	LAST	137	E6,1757	DAPZRUPT	EQUALS	DAPARUPT	+4

A1734

A1735

(DAPZRUPT IS ALSO JASK-IN-PROGRESS FLAG)

R1736 NEEDLER(ATTITUDE ERROR EIGHT-BALL DISPLAY) STORAGE.

(60)

1738	REF	3	LAST	95	0061	TEMP	EQUALS	ITEMP1
1739	REF	4	LAST	95	0063	DINDX	EQUALS	ITEMP3
1740					E6,1761	AK	ERASE	+2
1741	REF	1			E6,1762	AK1	EQUALS	AK +1
1742	REF	2	LAST	137	E6,1763	AK2	EQUALS	AK +2
1743					E6,1764	EDRIVEX	ERASE	+2
1744	REF	1			E6,1765	EDRIVEY	EQUALS	EDRIVEX +1
1745	REF	2	LAST	137	E6,1766	EDRIVEZ	EQUALS	EDRIVEX +2

NEEDLER ATTITUDE INPUTS, SCALED AT 180 DEGREES. P,Q,R-AXES IN AK,AK1,AK2.

NEEDLER DISPLAY REGS AT 1800 DEGREES. SO THAT 384 BITS REPRESENT 42 3/16 DEG.

R1746 DOCKED JET INHIBITION COUNTERS

(30)

17462					E6,1767	PJETCTR	ERASE	+2
17463	REF	1			E6,1770	UJETCTR	EQUALS	PJETCTR +1
17464	REF	2	LAST	137	E6,1771	VJETCTR	EQUALS	PJETCTR +2
17465	REF	1			E6,1771	END-E6	EQUALS	VJETCTR

L -ERASABLE ASSIGNMENTS-

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P1747 -EBANK-7 ASSIGNMENTS

1748 E7,1400 SETLGD 3400

R1749 P35 CONSTANTS. -PAD LOADED- (40)

1751	E7,1400	E7,1401	ATIGINC	ERASE	+1	B(2)PL	MUST BE AT 1400 FOR SYSTEMSTEST
1752	E7,1402	E7,1403	PTIGINC	ERASE	+1	B(2)PL	

R1753 ADTMARK STORAGE. -PAD LOADED- (120)

1755	E7,1404	E7,1411	ADTAZ	ERASE	+5	B(6)PL
1756	E7,1412	E7,1417	ADTEL	ERASE	+5	B(6)PL

R1757 LANDING RADAR. -PAD LOADED- (20)

1759	E7,1420	E7,1420	LRHMAX	ERASE		B(1)
1761	E7,1421	E7,1421	LRWH	ERASE		B(1)
A1765						

R1766 THROTTLE STORAGE. -PAD LOADED- (10)

1768 E7,1422 E7,1422 ZODHTIME ERASE B(1)PL TIME OF DPS THROTTLE-UP COMMAND

R1769 -P63 AND P64 CONSTANTS. -PAD LOADED- (40)

1771	E7,1423	E7,1423	TENDBRAK	ERASE		B(1)	LANDING PHASE SWITCHING CRITERION
1772	E7,1424	E7,1424	TENDAPPR	ERASE		B(1)	LANDING PHASE SWITCHING CRITERION
1773	E7,1425	E7,1425	DELTTFAP	ERASE		B(1)	INCREMENT ADDED TO TTF/8 WHEN
A1774							SWITCHING FROM P63 TO P64
1775	E7,1426	E7,1426	LEADTIME	ERASE		B(1)	TIME INCREMENT SPECIFYING HOW MUCH
A1776							GUIDANCE IS PROJECTED FORWARD.
A1777							

R1778 LANDING RADAR -PAD LOADED- (20)

1780	E7,1427	E7,1427	RPCRTIME	ERASE		B(1)	REPOSITIONING CRITERION (TIME)
1781	E7,1430	E7,1430	RPCRTQSW	ERASE		B(1)	REPOSITIONING CRITERION (ANGLE)
A1782							

R178201 ASTEER -PAD LOADED- (20)

178203	E7,1431	E7,1432	TNEWA	ERASE	+1	B(2)PL	LAMBERT CYCLE PERIOD
A178204							

R178205 P22 STORAGE - OVERLAYS LANDING PADLOADS - (50)

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178215 REF 1	E7.1423	REPOSTM EQUALS TENDBRK	B(1)TMP	COUNTS NUMBER OF PASSES THROUGH REPOSITION ROUTINE.
A17822				
178225 REF 1	E7.1424	REPOSTM EQUALS REPOSTM +1	I(2)TMP	PRESENT TIME PLUS INCREMENTS OF TEN SECONDS.
A17823				
178235 REF 1	E7.1426	DELTATH EQUALS REPOSTM +2	I(2)TMP	TIME INTERVAL FOR RUNNING DESIGNATE TASK.
A17824				
A178245				

P1783 *** RETAIN THE ORDER OF DELVSLV, TIG, RTARG, DELLT4 FOR UPDATE. ***

R1784 P32-35 P72-75 STORAGE. (60)

1786	E7.1433	E7.1440	DELVLVC	ERASE	+5	I(6) DELTA VELOCITY - LOCAL VERTICAL COO
1787 REF 1	E7.1433		DELVSLV			(TEMP STORAGE OF SAME VECTOR) -ORDINATE
A1788						

R1789 P30-P40 INTERFACE UNSHARED. (20)

1791	E7.1441	E7.1442	TIG	ERASE	+1	B(2)
A1792						

R1793 INITVEL STORAGE. ALSO USED BY P34,35,74,75,10,11 OTHERS (80)

1795	E7.1443	E7.1450	RTARG	ERASE	+5	I(6) TARGET VECTOR
1796	E7.1451	E7.1452	DELLT4	ERASE	+1	I(2) TIME DIFFERENCE
A1797						

R1798 P30-P40 INTERFACE UNSHARED. (30)

1800	E7.1453	E7.1454	TTDGD	ERASE	+1	B(2)
1801 REF 1	E7.1453		TFI	EQUALS TTDGD		
1802	E7.1455	E7.1455	WHICH	ERASE		B(1)
A1803						

R1804 *** R21 *** (10)

1806	E7.1456	E7.1456	LDSCOUNT	ERASE		B(1)
A1807						

R1808 LSP22.3 (RENDEZVOUS NAVIGATION) STORAGE. (40)

R1810 RETAIN THE ORDER OF AIG TO TRKMKCNT FOR DOWNLINK PURPOSES.

1811	E7.1457	E7.1457	AIG	ERASE		B(1)OUT GINGAL ANGLES
1812	E7.1460	E7.1460	AMG	ERASE		B(1)OUT (MUST BE
1813	E7.1461	E7.1461	AUG	ERASE		B(1)OUT CONSECUTIVE)

1814	E7.1462	E7.1462	TRKMKCNT	ERASE		B(1)TMP TEMPORARY MARK STORAGE.
1815 REF 1	E7.1462		MARKCTR			TRKMKCNT

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R1816 P32-P35, P72-P75 STORAGE. -PERMANENT-

(6)

1818	E7,1463	E7,1463	NORMEX	ERASE		B(1) PRM SAVE FOR Q
1819	E7,1464	E7,1464	QSAVED	ERASE		B(1) PRM SAVE FOR Q
1820	E7,1465	E7,1465	KTRN	ERASE		B(1) PRM SAVE FOR Q
1821	E7,1466	E7,1467	NN	ERASE	+1	B(2)
1822	E7,1470	E7,1470	SUBEXIT	ERASE		B(1) PRM SAVE Q

18221	E7,1471	E7OVERLA	EQUALS			START OF E7 OVERLAYS.
18222 REF 1	E7,1471	WHOCARES	EQUALS	F7OVERLA		DUMMY FOR EBANK INSENSITIVE ZCADES

R1823 LUNAR LANDING OVERLAYS

(60)

18242 REF 1	E7,1463	/AFC/	EQUALS	NORMEX		B(2)TMP	THROTTLE
18243 REF 1	E7,1465	FCDD	EQUALS	/AFC/	+2	B(2)TMP	THROTTLE
18244 REF 1	E7,1467	FR	EQUALS	FCDD	+2	B(2)TMP	THROTTLE
A18245							

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P1825 ***** OVERLAY NUMBER 0 IN EBANK 7 *****
 A1826

R1827 RENDEZVOUS GUIDANCE STORAGE -P32....P35-

(B9D)

1829	REF	1		E7.1611	TSTRT	EQUALS	DELOV	MIDCOURSE START TIME	
1830	REF	1		E7.1573	TDEC2	EQUALS	DELVCSI	TEMP STORAGE FOR INTEGRATION TIME INPUT	
1831	REF	1		E7.1575	KT	EQUALS	DELVTPI	TEMP STORAGE FOR MIDCOURSE DELTA TIME	
1832				E7.1471	E7.1476	VACT1	ERASE	+50	VELOCITY VECTOR OF ACTIVE AT CSI TIME
1833				E7.1477	E7.1504	RPASS1	ERASE	+50	POSITION VECTOR OF PASSIVE AT CSI TIME
1834				E7.1505	E7.1512	VPASS1	ERASE	+50	VELOCITY VECTOR OF PASSIVE AT CSI TIME
1835				E7.1513	E7.1520	VACT2	ERASE	+50	VELOCITY VECTOR OF ACTIVE AT CDH TIME
1836				E7.1521	E7.1526	RPASS2	ERASE	+50	POSITION VECTOR OF PASSIVE AT CDH TIME
1837				E7.1527	E7.1534	VPASS2	ERASE	+50	VELOCITY VECTOR OF PASSIVE AT CDH TIME
1838				E7.1535	E7.1542	RACT3	ERASE	+50	POSITION VECTOR OF ACTIVE AT TPI TIME
1839				E7.1543	E7.1550	VACT3	ERASE	+50	VELOCITY VECTOR OF ACTIVE AT TPI TIME
1840				E7.1551	E7.1556	RPASS3	ERASE	+50	POSITION VECTOR OF PASSIVE AT TPI TIME
1841				E7.1557	E7.1564	VPASS3	ERASE	+50	VELOCITY VECTOR OF PASSIVE AT TPI TIME
1842				E7.1565	E7.1572	VACT4	ERASE	+50	VELOCITY VECTOR OF ACTIVE AT INTERCEPT
1843	REF	1		E7.1543		UNVEC	EQUALS	VACT3	CDHVR UNIT VECTOR TEMP STORAGE.
1844				E7.1573	E7.1574	DELVCSI	ERASE	+10	THRUST VALUE AT CSI
1845				E7.1575	E7.1576	DELVTPI	ERASE	+10	THRUST VALUE AT TPI OR MID
1846	REF	2	LAST 141	E7.1575		DELMID	EQUALS	DELVTPI	
1847				E7.1577	E7.1600	DIFFALT	ERASE	+10	ALT DIFFERENCE AT CDH
1848				E7.1601	E7.1602	POSTCSI	ERASE	+1	PERIGEE ALTITUDE AFTER CSI MANEUVER
1849				E7.1603	E7.1604	POSTCDH	ERASE	+1	PERIGEE ALTITUDE AFTER CDH MANEUVER
1850				E7.1605	E7.1606	POSTTPI	ERASE	+1	PERIGEE ALTITUDE AFTER TPI MANEUVER
1851	REF	1		E7.1605		LOUPLT	EQUALS	POSTTPI	CSI NEWTON ITERATION COUNTER
1852	REF	1		E7.1603		HAFPA1	EQUALS	POSTCDH	HALF PERIOD
1853				E7.1607	E7.1610	GAMPREV	ERASE	+1	PREVIOUS GAMMA
1854	REF	3	LAST 141	E7.1575		DVPREV	EQUALS	DELVTPI	PREVIOUS DELVCSI
1855				E7.1611	E7.1612	DELOV	ERASE	+10	
1856				E7.1613	E7.1614	CSIALRM	ERASE	+1	FIRST SOLUTION ALARM
1857				E7.1615	E7.1615	VERBNOUN	ERASE		
1858	REF	1		E7.1613		TITER	EQUALS	CSIALRM	ITERATION COUNTER
1859				E7.1616	E7.1617	RDOIV	ERASE	+1	
1860	REF	1		E7.1505		VAPREC	EQUALS	VPASS1	I(6) S-S PREC VEC FOR NOM TPI TIME(ACT V
1861	REF	1		E7.1477		RAPREC	EQUALS	RPASS1	I(6) S-S PREC VEC FOR NOM TPI TIME(ACT V
1862	REF	1		E7.1527		VPPREC	EQUALS	VPASS2	I(6) S-S PREC VEC FOR NOM TPI TIME(PASS
1863	REF	1		E7.1521		RPPREC	EQUALS	RPASS2	I(6) S-S PREC VEC FOR NOM TPI TIME(PASS
1864	REF	4	LAST 141	E7.1575		DELEL	EQUALS	DELVTPI	I(2) S-S
1865	REF	2	LAST 141	E7.1611		DELTEE	EQUALS	DELOV	I(2) S-S
1866	REF	2	LAST 141	E7.1573		SECHAX	EQUALS	DELVCSI	I(2) S-S MAX STOP SIZE FOR ROUTINE
1867	REF	2	LAST 141	E7.1605		DELTEED	EQUALS	POSTTPI	I(2) S-S BACK VALUES OF DELTA TIME
1868				E7.1620	E7.1621	CENTANG	ERASE	+1	I(2) S-S CENTRAL ANGLE COVERED(TPI-TPF)

A1869

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R1870 SOME P47 STORAGE (60)

1872 E7.1622 E7.1627 DELVIMU ERASE +5 I(6)DSF NOUN 83 FOR P47 DELTA V (IMU)

A1873

R1874 P30-P40 COMMON STORAGE. (30)

1876 E7.1630 E7.1631 TPASS4 ERASE +1 INTERCEPT TIME

1877 E7.1632 E7.1632 QTEMP ERASE I(1)TMP COMMON RETURN SAVE REGISTER.

A1878

R1879 P32,33,34 STORAGE. (60)

1881 E7.1633 E7.1634 TCST ERASE +1 I(2) TMP CSI TIME IN CENTISECONDS

1882 E7.1635 E7.1636 TTP1 ERASE +1 I(2) TMP TPI TIME IN CENTISECONDS

1883 E7.1637 E7.1640 TTPIG ERASE +1 I(2) TMP TPI STORAGE FOR RECYCLE

R1884 P30,P40 INTERFACE. (210)

1886 E7.1641 E7.1664 RTIG ERASE +190 I(6)TMP

1887 REF 1 E7.1647 VTIG EQUALS RTIG +6 I(6)TMP

1888 REF 1 E7.1655 DELVSIN EQUALS VTIG +6 I(6)TMP

1889 REF 1 E7.1663 DELVSAB EQUALS DELVSIN +6 I(2)TMP

1890 REF 1 E7.1663 VGDISP = DELVSAB

1891 E7.1665 E7.1665 QTEMP1 ERASE I(1)TMP HOLDS RETURN.

1892 REF 1 E7.1665 RGEXIT EQUALS QTEMP1 SAVE Q

1893 REF 2 LAST 142 E7.1665 SAVQR52 EQUALS QTEMP1

R1894 INITVEL STORAGE. (IN OVERLAY 0 AND OVERLAY 1. (20)

R1896 (CALLS LAMBERT, CONIC SUBROUTINES)

1897 REF 1 E7.1565 VTPRIME EQUALS VACT4 TOTAL VELOCITY AT DESIRED RADIUS

1898 REF 1 E7.1616 ITCTR EQUALS RDOTV ITERATION COUNTER

1899 E7.1666 E7.1667 COZY4 ERASE +1 COS OF ANGLE WHEN ROTATION STARTS

1900 REF 3 LAST 141 E7.1611 XIINPUT EQUALS DELLY XI TEMP STORAGE

1901 REF 1 E7.1607 INTIME EQUALS GANPREV TIME OF RINIT

A1902

R1903 PERIAPD STORAGE. (20) (20)

1905 E7.1670 E7.1671 XXXALT ERASE +1 RADIUS TO LAUNCH PAD OR LANDING SIGHT

1906 REF 1 E7.1672 END-IN/M EQUALS XXXALT +2 NEXT AVAIL ERASABLE AFTER INITVEL/MIOSIN

L ERASABLE ASSIGNMENTS

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R1907

540.1 STORAGE.

(120)

1910			E7.1672	E7.1705	UT	ERASE	+110	I(6)	THRUST DIRECTION
1911	REF	1	E7.1700		VGTIG	EQUALS UT	+6	I(6)	OUT
1912	REF	1	E7.1700		VGPREV	• VGTIG			

R1913 ASTEER STORAGE.

(220)

1915			E7.1706	E7.1733	VG	ERASE	+210	I(6)	
1916	REF	1	E7.1714		RMAG	EQUALS VG	+6	I(2)	
1917	REF	1	E7.1716		MUASTEER	EQUALS RMAG	+2	I(2)	
19171	REF	1	E7.1720		MU/A	EQUALS MUASTEER	+2	I(2)	
19172	REF	1	E7.1722		RTMAG	EQUALS MU/A	+2	I(2)	
19173	REF	1	E7.1724		RIC	EQUALS RTMAG	+2	I(6)	
19174	REF	1	E7.1732		SS	EQUALS RIC	+6	I(2)	

19175	REF	2	LAST 142	E7.1655	IC	•	DELVSIN		
19176	REF	1		E7.1762	TIGSAVE	•	P2ITIME		
19177	REF	1		E7.1764	TIGSAVEP	•	SCAXIS		
19178	REF	2	LAST 143	E7.1766	MUSCALE	•	SCAXIS	+2	

R1918

R1919

P40 STORAGE.

(60)

R1921 F, MDOT, AND TDECAY MUST BE CONTIGUOUS FOR VLOAD.

1922			E7.1734	E7.1741	F	ERASE	+5	I(2)	TMP 540.1 GENERATES THIS FOR 540.3
1923	REF	1	E7.1736		MDOT	EQUALS F	+2	I(2)	TMP MASS CHNG RATE, KG/CS AT 2**3.
1924	REF	1	E7.1740		TDECAY	EQUALS MDOT	+2	I(2)	IN DELTA-T TAILOFF, (2**28)LS.
1925			E7.1742	E7.1743	VEX	ERASE	+1	I(2)	EXHAUST VELOCITY FOR TGO COMPUTAT'N

A1926

R1927

MIDTOAV1(2) STORAGE. (CALLED BY P40.P41.P42)

(10)

1929			E7.1744	E7.1744	IRETURN1	ERASE		B(1)	RETURN FROM MIDTOAV1 AND 2
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A1930

L -ERASABLE ASSIGNMENTS

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P1931 ***** OVERLAY NUMBER 1 IN EBANK 7 *****
 A1932

R1933 INITVEL (CALLED BY P34,35,38,39,10,11, S40.9, S40.1) (50)

1935 REF 1 E7.1471 RTARG1 EQUALS VACT1 (16)S TEMP STORAGE OF RTARG
 A1936

R1937 P35-P40 INTERFACE. (60)

1939 REF 2 LAST 141 E7.1505 VPASS4 EQUALS VPASS1 (16)TMP VELOCITY OF PASSIVE AT INTERCEPT

R1940 INITVEL OVERLAYS RENDESVOUS GUIDANCE (LISTED IN OVERLAY 0)

R1941 SOME P38-39, P78-79 STORAGE. (20)

1943 REF 1 E7.1630 TINT EQUALS TPASS4 (12) TIME OF INTERCEPT
 A1944

R1945 LAT - LONG TEMPORARIES. CAN OVERLAY WITH S40.1 (30)

1947 REF 2 LAST 143 E7.1672 ERADM EQUALS UT (12)
 1948 REF 1 E7.1674 INCORPEX EQUALS ERADM +2 (11)

R1949 LRS24.1 STORAGE. (CAN SHARE WITH P30'S) (400)

1951 REF 1 E7.1675 RLMSRCH EQUALS INCORPEX +1 (16) TMP LM POSITION VECTOR
 1952 REF 1 E7.1703 VXRCM EQUALS RLMSRCH +6 (16) CM V X R VECTOR
 1953 REF 1 E7.1711 LOSDESRO EQUALS VXRCM +6 (16) DESIRED LOS VECTOR
 1954 REF 1 E7.1717 UXVECT EQUALS LOSDESRO +6 (16) X-AXIS SRCH PATTERN COORDS
 1955 REF 1 E7.1725 UYVECT EQUALS UXVECT +6 (16) Y-AXIS SRCH PATTERN COORDS
 1956 REF 1 E7.1733 DATAGOOD EQUALS UYVECT +6 (1)DSP FOR R1 - ALL 1-S WHEN LOCKON
 1957 REF 1 E7.1734 OMEGDISP EQUALS DATAGOOD +1 (2) ANGLE OMEGA DISPLAYED IN R2
 1958 REF 1 E7.1734 OMEGAD = OMEGDISP PINBALL DEFINITION.
 1959 REF 2 LAST 144 E7.1736 NSRCHPNT EQUALS OMEGDISP +2 (1)TMP SEARCH PATTERN POINT COUNTER.
 1960 REF 1 E7.1737 SAVLEMV EQUALS NSRCHPNT +1 (16) S-S SAVES LOSVEL

A1961

L --ERASABLE ASSIGNMENTS

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P1962 ***** OVERLAY NUMBER 2 IN EBANK 7 *****
 A1963

R1964 INCORP STORAGE IN E7. (47D)

1966	REF	2	LAST 140	E7.1471	TX789	EQUALS E7OVERLA	I(6)
1967	REF	1		E7.1477	GAMMA	EQUALS TX789 +6	I(3)
1968	REF	1		E7.1502	OMEGA	EQUALS GAMMA +3	I(18)
1969	REF	1		E7.1524	BVECTOR	EQUALS OMEGA +180	I(18)
1970	REF	1		E7.1546	DELTAQ	EQUALS BVECTOR +180	I(2)
R1971			ADTMARK STORAGE				(3D)

1973	REF	1		E7.1550	MARKCNTR	EQUALS DELTAQ +2	I(1)
1974	REF	1		E7.1551	XYMARK	EQUALS MARKCNTR +1	B(1)
1975	REF	1		E7.1552	MKDEX	EQUALS XYMARK +1	B(1) TMP INDEX FOR ADTMARK

A1976

R1977 PLANET STORAGE. (8D)

1979	REF	1		E7.1553	PLANVEC	EQUALS MKDEX +1	(6) REFER VECTOR OF PLANET
1980	REF	1		E7.1561	TSIGHT	EQUALS PLANVEC +6	(2) TIME OF MARK OR EST TIME OF MARK

A1981

R1982 LRS22.3 STORAGE. (CAN SHARE WITH P30'S AND OVERLAY LRS24.1 (30D).

1984	REF	2	LAST 144	E7.1675	LGRET	EQUALS RLMSRCH	I(1) TMP
1985	REF	1		E7.1675	RDRET	EQUALS LGRET	B(1) TEMP RETURN.
1986	REF	2	LAST 145	E7.1675	IGRET	EQUALS LGRET	B(1) TEMP RETURN.
1987	REF	1		E7.1676	MX	EQUALS RDRET +1	I(6)
1988	REF	1		E7.1704	MY	EQUALS MX +6	I(6)
1989	REF	1		E7.1712	MZ	EQUALS MY +6	I(6)
1990	REF	2	LAST 145	E7.1676	E0	EQUALS MX	I(2)
1991	REF	3	LAST 145	E7.1700	E1	EQUALS MX +2	I(2)
1992	REF	4	LAST 145	E7.1702	E2	EQUALS MX +4	I(2)
1993	REF	1		E7.1704	E3	EQUALS E2 +2	I(2)
1994	REF	1		E7.1720	SCALSHFT	EQUALS MZ +6	B(1) SCALE SHIFT FOR EARTH/MOON
1995	REF	1		E7.1721	FXZ	EQUALS SCALSHFT +1	I(2)
1996	REF	1		E7.1723	ULC	EQUALS FXZ +2	I(6)
1997	REF	1		E7.1731	SINTHETA	EQUALS ULC +6	I(2)

R1998 ***** IN OVERLAY ONE *****

1999	REF	1		E7.1746	M49FLAG	EQUALS E0THSAV	B(1)S FLAG INDICATING VOY49 RESPONSE
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A2000

R2001 LRS22.1 STORAGE. (MUST NOT SHARE WITH P30'S) (13D)

R2003 (OUTPUTS ARE TO LRS22.3)

L ERASABLE ASSIGNMENTS

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P2034 ***** OVERLAY NUMBER 3 IN EBANK 7 *****

A2035

R2036

SERVICER STORAGE

(60)

2038	REF	3	LAST	145	E7,1471	ABVEL	EQUALS	E7OVERLA	B(2)	DISPLAY
2039	REF	1			E7,1473	HDDTDISP	EQUALS	ABVEL +2	B(2)	DISPLAY
2040	REF	2	LAST	120	E7,1475	TTFDISP	EQUALS	HDDTDISP +2	B(2)	DISPLAY

A2041

R2042

BURN-PROG STORAGE.

(20)

2044	REF	1			E7,1477	SAVET-30	EQUALS	TTFDISP +2	B(2)TMP	TIG-30	PESTART
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A2045

R2046

SERVICER STORAGE.

(690)

2048	REF	1			E7,1501	VGBODY	EQUALS	SAVET-30 +2	B(6)OUT	SET BY S41.1	VG LEM. SC. LOOPS
2049	REF	1			E7,1501	DELVC-TL	=	VGBODY			
2050	REF	2	LAST	147	E7,1507	DVTOTAL	EQUALS	VGBODY +6	B(2)	DISPLAY	NOON
2051	REF	1			E7,1511	GOBLTIME	EQUALS	DVTOTAL +2	B(2)	NOMINAL	TIG FDR CALC. OF GOBLATE.
2052	REF	1			E7,1513	ABDVCONV	EQUALS	GOBLTIME +2	I(2)		
2053	REF	1			E7,1515	DVCNTR	EQUALS	ABDVCONV +2	B(1)		
2054	REF	1			E7,1516	TGD	EQUALS	DVCNTR +1	B(2)		
2055	REF	1			E7,1520	R	EQUALS	TGD +2	I(6)		
2056	REF	1			E7,1520	UNITGOBL	EQUALS	R	I(6)		
2057	REF	2	LAST	147	E7,1526	V	EQUALS	R +6	I(6)		
2058	REF	1			E7,1526	DELVREF	EQUALS	V	B(2)	LR	
2059	REF	1			E7,1534	HCALC	EQUALS	DELVREF +6	I(6)		
2060	REF	1			E7,1536	UNIT/R/	EQUALS	HCALC +2	I(6)		

R2061 (THE FOLLOWING SERVICER ERASABLES CAN BE SHARED WITH SECOND DPS GUIDANCE STORAGE)

2063	REF	1			E7,1544	RNI	EQUALS	UNIT/R/ +6	B(6)		
2064	REF	1			E7,1552	VNI	EQUALS	RNI +6	I(6)		(IN ORDER)
2065	REF	1			E7,1560	PIPTIME1	EQUALS	VNI +6	B(2)		(FOR)
2066	REF	1			E7,1562	GDT1/2	EQUALS	PIPTIME1 +2	I(6)		(COPY)
2067	REF	1			E7,1570	MASSI	EQUALS	GDT1/2 +6	I(2)		(CYCLE)
2068	REF	1			E7,1572	RIS	EQUALS	MASSI +2	I(6)		
2069	REF	1			E7,1600	VIS	EQUALS	RIS +6	I(6)		

R2070

ALIGNMENT/540.2.3 COMMON STORAGE.

(180)

2072	REF	1			E7,1600	XSMO	EQUALS	VIS +6	I(6)		
2073	REF	1			E7,1614	YSMD	EQUALS	XSMO +6	I(6)		
2074	REF	1			E7,1622	ZSMO	EQUALS	YSMD +6	I(6)		
2075	REF	2	LAST	147	E7,1606	XSCREF	=	XSMO			
2076	REF	2	LAST	147	E7,1614	YSCREF	=	YSMD			

L ERASABLE ASSIGNMENTS

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2077 REF 1 E7.1622 ZSCREF = ZSMD

2078 REF 2 LAST 148 E7.1630 END-ALIG EQUALS ZSMD +6

NEXT AVAIL ERASABLE AFTER ALIGN/AS40.2.3

R2079 ***** P22 *****

(240)

2081	REF	1	E7.1630	RSUBL	EQUALS	END-ALIG	I(6)S-S	LM POSITION VECTOR
2082	REF	1	E7.1636	UCSM	EQUALS	RSUBL +6	I(6)S-S	VECTOR U
2083	REF	1	E7.1644	NEWVEL	EQUALS	UCSM +6	I(6)S-S	TERMINAL VELOCITY VECTOR
2084	REF	1	E7.1652	NEWPOS	EQUALS	NEWVEL +6	I(6)S-S	TERMINAL POSITION VECTOR
2085	REF	1	E7.1660	LNCHTM	EQUALS	NEWPOS +6	I(2)S-S	EST. LAUNCH TIME FOR LM
2086	REF	1	E7.1662	TRANSTM	EQUALS	LNCHTM +2	I(2)S-S	TRANSFER TIME
2087	REF	1	E7.1664	NCSMVEL	EQUALS	TRANSTM +2	I(6)S-S	NEW CSM VELOCITY

A2088

R208805 ***** P21 *****

(180)

208815	REF	1	1163	P21ORIG	=	DISPDEX		
20882	REF	3	E7.1675	P21BASER	EQUALS	RLMSRCH	I(6)TMP	
208825	REF	1	E7.1703	P21BASEV	EQUALS	P21BASER +6	I(6)TMP	
20883	REF	1	E7.1711	P21VEL	EQUALS	P21BASEV +6	I(2)TMP	*** NOUN 91 ***
208835	REF	1	E7.1713	P21GAM	EQUALS	P21VEL +2	I(2)TMP	*** NOUN 91 ***
20884	REF	1	E7.1715	P21ALT	EQUALS	P21GAM +2	I(2)TMP	*** NOUN 91 ***

A208845

L ERASABLE ASSIGNMENTS

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P2089 ***** OVERLAY NUMBER 4 IN EBANK 7 *****
A2090

R2097 VARIABLES FOR SECOND OPS GUIDANCE (THE LUNAR LANDING) (400)

R2099 THESE ERASABLES MAY BE SHARED WITH CARE

Address	Ref	Count	Last	Address	Variable	Value	Variable	Value	Overlay	Description
2100	REF	2	LAST 147	E7,1544	DURTEMPS	=	RNI		OVERLAY	LAST PART OF SERVICE
2101	REF	1		E7,1544	LANDTEMP	=	DURTEMPS		B(6)	GUIDANCE
2102	REF	1		E7,1552	TTF/8TMP	=	LANDTEMP	+6	B(2)	GUIDANCE
2103	REF	1		E7,1554	ELINCR	=	TTF/8TMP	+2	B(2)	GUIDANCE
2104	REF	1		E7,1556	AZINCR	=	ELINCR	+2	B(2)	GUIDANCE
2105	REF	1		E7,1560	KEEP-2	=	AZINCR	+2	B(2)	TO PREVENT PIPELINE OVERLAY
2106	REF	1		E7,1562	TABLTTF	=	KEEP-2	+2	B(2)	GUIDANCE
2107	REF	1		E7,1573	TRIPOLD	=	TABLTTF	+90	B(2)	GUIDANCE
2113	REF	1		E7,1621	E2DPS	=	EQUALS DURPERMS			

R2115 THESE ERASABLES MUST NOT OVERLAY GOBLTIME OR SERVICER

Address	Ref	Count	Last	Address	Variable	Value	Variable	Value	Overlay	Description
2116	REF	3	LAST 147	E7,1606	PIFSET	=	ASMO		B(1)	THROTTLE
2117	REF	1		E7,1607	RTNHOLD	=	PIFSET	+1	B(1)	THROTTLE
2118	REF	1		E7,1610	FWEIGHT	=	RTNHOLD	+1	B(2)	THROTTLE
2119	REF	1		E7,1612	PIF	=	FWEIGHT	+2	B(2)	THROTTLE
2120	REF	1		E7,1614	PSEUDU55	=	PIF	+2	B(1)	THROTTLE DOWNLINE
2121	REF	1		E7,1615	FC	=	PSEUDU55	+1	B(2)	THROTTLE
2122	REF	1		E7,1617	TTHROT	=	FC	+2	B(1)	THROTTLE
2123	REF	1		E7,1620	FCOLD	=	TTHROT	+1	B(1)	THROTTLE

R2125 THESE ERASABLES SHOULD NOT BE SHARED DURING P63, P64, P65, P66, P67

Address	Ref	Count	Last	Address	Variable	Value	Variable	Value	Overlay	Description
2126	REF	1		E7,1621	DURPERMS	=	FCOLD	+1	MUSTN'T OVERLAY DURTEMPS OR SERVICE	
2127	REF	2	LAST 149	E7,1621	WCHPHOLD	=	DURPERMS		B(1)	GUIDANCE
2128	REF	1		E7,1622	FILLER	=	WCHPHOLD	+1		
2129	REF	1		E7,1623	FLPASSO	=	FILLER	+1	B(1)	GUIDANCE
2130	REF	1		E7,1624	TRIP	=	FLPASSO	+1	B(2)	
2131	REF	1		E7,1626	VGU	=	TRIP	+2	B(6)	GUIDANCE
2132	REF	1		E7,1634	LAND	=	VGU	+6	B(6)	GUIDANCE CONTIGUOUS
2133	REF	1		E7,1642	TTF/8	=	LAND	+6	B(2)	GUIDANCE CONTIGUOUS
2134	*REF	1		E7,1644	ELIDUMMY	=	TTF/8	+2	(1)	DUMMY FOR ELINCR
2135	*REF	1		E7,1645	AZIDUMMY	=	ELIDUMMY	+1	(1)	DUMMY FOR AZINCR
2136	*REF	1		E7,1646	ZERDUMMY	=	AZIDUMMY	+1	(1)	DUMMY FOR ZEPLINA
2137	*REF	1		E7,1647	ELVDUMMY	=	ZERDUMMY	+1	(1)	DUMMY FOR ELVIRA
2138	*REF	1		E7,1650	LRADRET	=	ELVDUMMY	+1	B(1)	LR
2139	REF	1		E7,1651	VSELECT	=	LRADRET	+1	B(1)	LR
2140	REF	1		E7,1652	VMEAS	=	VSELECT	+1	B(2)	LR
2141	REF	1		E7,1654	HMEAS	=	VMEAS	+2	B(2)	LR
2142	REF	1		E7,1656	VN2	=	HMEAS	+2	B(6)	LR

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2143	REF	1		E7.1656	GNUR	=	VN2	B(6)	LR	
2144	REF	2	LAST 150	E7.1656	GNUV	=	VN2	B(6)	LR	
2145	REF	3	LAST 150	E7.1656	LRADRET1	=	VN2	B(1)	LR	
2146	REF	4	LAST 150	E7.1664	DELTAH	=	VN2 +6	B(2)	DISPLAY	
2147	REF	1		E7.1666	FUNNYDSP	=	DELTAH +2	B(2)	DISPLAY	
2148	REF	1		E7.1670	EDURPERM	EQUALS	FUNNYDSP +2	NEXT AVAILABLE ERASABLE AFTER DUBPERM		
R2149										

R2150 (ERASABLES WHICH OVERLAY THE ABOVE BLOCK)

2151	*REF	2	LAST 149	E7.1644	VDGVERT	=	ELIDUMMY	B(2)	P65,P66	
2152	*REF	2	LAST 149	E7.1646	NIGNLOOP	=	ZERDUMMY	B(1)	IGNALC	
2153	*REF	2	LAST 149	E7.1647	NGUIDSUB	=	ELVDUMMY	B(1)	IGNALC	
2155	*REF	3	LAST 150	E7.1647	WCHVERT	=	ELVDUMMY	B(1)	P65,P66,P67	
2156	REF	2	LAST 150	E7.1666	FUELNEED	=	FUNNYDSP	B(1)	DISPLAY	
2157	REF	3	LAST 150	E7.1666	TREDES	=	FUNNYDSP	B(1)	DISPLAY	
2158	REF	4	LAST 150	E7.1667	LOOKANGL	=	FUNNYDSP +1	B(1)	DISPLAY	
A2159										

R2160 ERASABLES CONVENIENTLY DEFINABLE IN THE WORK AREA

2161				0022	PROJ	=	180	I(2)	GUIDANCE	
2162				0024	UNLRB/2	=	200	I(6)	GUIDANCE (DURING P64 ONLY)	
2163				0024	UNLR/2	=	200	I(6)	GUIDANCE	
R2164										

R2165 THE END OF THE LUNAR LANDING ERASABLES

A2166

R2167 R12 (FOR LUNAR LANDING) (60)

2169	REF	-1		E7.1670	LRLCTR	EQUALS	EDURPERM	B(1)	LR DATA TEST	
2170	REF	-1		E7.1671	LRLCTR	EQUALS	LRLCTR +1	B(1)		
2171	REF	-1		E7.1672	LRLCTR	EQUALS	LRLCTR +1	B(1)		
2172	REF	-1		E7.1673	LRSCTR	EQUALS	LRLCTR +1	B(1)		
2173	REF	-1		E7.1674	STILBADH	EQUALS	LRSCTR +1	B(1)		
2174	REF	-1		E7.1675	STILBADV	EQUALS	STILBADH +1	B(1)		
A2175										

R2176 LANDING ANALOGS DISPLAY STOPAGE. (400)

2178	REF	1		E7.1676	LATVMETR	EQUALS	STILBADV +1	B(1)PRM	LATVEL MONITOR METER (AN ORDER)
2179	REF	-1		E7.1677	FORVMETR	EQUALS	LATVMETR +1	B(1)PRM	FORVEL MONITOR METER (-ED PAIR)
2180	REF	1		E7.1700	LATVEL	EQUALS	FORVMETR +1	B(1)PRM	LATERAL VELOCITY (AN ORDER)
2181	REF	1		E7.1701	FORVEL	EQUALS	LATVEL +1	B(1)PRM	FORWARD VELOCITY (-ED PAIR)
2182	REF	1		E7.1702	TRAKLATV	EQUALS	FORVEL +1	B(1)PRM	MONITOR FLG 4 LATVEL (AN ORDER)
2183	REF	1		E7.1703	TRAKFWDV	EQUALS	TRAKLATV +1	B(1)PRM	MONIT. FLAG FOR FORVEL (ED PAIR)
2184	REF	1		E7.1704	VHY	EQUALS	TRAKFWDV +1	B(1)PRM	VHY=VMP.UHYP (AN ORDER)

ERASABLE ASSIGNMENTS

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2185	REF	-1	E7.1705	VHZ	EQUALS VHY	+1	B(1)PRM VHZ=VMP.UHYP (-ED PAIR)
2186	REF	-1	E7.1706	VVELT	EQUALS VHZ	+1	B(3)PRM UPDATED S.P. VELOCITY VECTOR
2187	REF	-1	E7.1711	ALTRATE	EQUALS VVECT	+3	B(1)PRM ALTITUDE RATE IN BIT UNITS
2188	REF	-1	E7.1712	ALTSAVE	EQUALS ALTRATE	+1	B(2)PRM ALTITUDE IN BIT UNITS
2189	REF	-1	E7.1714	LADQSAVE	EQUALS ALTSAVE	+2	B(1)PRM SAVE Q IN LANDISP
2190	PEF	-1	E7.1715	DT	EQUALS LADQSAVE	+1	B(1)PRM TIME 1 MINUS (PIPTIME +1)
2191	REF	-1	E7.1716	DALTRATE	EQUALS DT	+1	B(1)PRM ALTITUDE RATE ERROR CORRECTED
2192	REF	-1	E7.1717	UHYP	EQUALS DALTRATE	+1	B(6)PRM SH UNIT VECTOR
2193	REF	-1	E7.1717	QAXIS	= UHYP		
2194	REF	-2 LAST 151	E7.1725	UHYP	EQUALS UHYP	+6	B(6)PRM SH UNIT VECTOR
2195	REF	-2 LAST 120	E7.1733	DELVS	EQUALS UHYP	+6	B(6)PRM DELVS = WMXR
2196	REF	-1	E7.1741	ALTBITS	EQUALS DELVS	+6	B(2)PRM ALTITUDE IN BIT UNITS, 2-4FT/ST
2197	REF	1	E7.1743	RUNIT	EQUALS ALTBITS	+2	B(3)PRM SH HALF-UNIT R VECTOR
2198	REF	-1	E7.1745	LASTLADW	EQUALS RUNIT	+2	ONLY A TAG TO SIGNIFY LAST L.A.D. WORD
A2199							

R21991 P66 ERASABLES (R.O.D.)

(10)

21993 REF 2 LAST 151 E7.1740 RODCOUNT EQUALS RUNIT +3
A21994

R2200 P66 ERASABLES (P.C.D.)

(140)

2202	REF	2	LAST	146	E7,1756	RDDSCAL1 EQUALS FR	B(1)
2203	REF	1			E7,1757	LASTTPIP EQUALS RDDSCAL1 +1	I(2)
2204	REF	1			E7,1761	THISTPIP EQUALS LASTTPIP +2	B(2)
2206	REF	1			E7,1763	GLDPIPAZ EQUALS THISTPIP +2	B(1)
2207	REF	1			E7,1764	GLDPIPAY EQUALS GLDPIPAZ +1	B(1)
2208	REF	1			E7,1765	GLDPIPAZ EQUALS GLDPIPAY +1	B(1)
22095	REF	1			E7,1766	DELVRD EQUALS GLDPIPAZ +1	X(G)
A2209							

P2210 NORTH 63 COMPONENT

— (20) —

2212	REF	1	E7.1774	HCALC1	EQUALS DELVPOD	+6	1(2)
A2213							

L ERASABLE ASSIGNMENTS

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P2214 ***** OVERLAY NUMBER 5 IN EBANK 7 *****
 A2215

R2216 ASCENT GUIDANCE ERASABLES.

(210)

2218	REF	2	LAST 148	E7.1630	RCD	EQUALS	END-ALIG		I(2)TMP	TARGET RADIUS AND OUT-OF-PLANE
2219	REF	1		E7.1632	YCD	EQUALS	RCD +2		I(2)TMP	DISTANCE, SCALED AT 21.41.
2220	REF	1		E7.1634	1/DV1	EQUALS	YCD +2		B(2)TMP	ATMAG
2221	REF	1		E7.1636	1/DV2	EQUALS	1/DV1 +2		B(2)TMP	ATMAG
2222	REF	1		E7.1640	1/DV3	EQUALS	1/DV2 +2		B(2)TMP	ATMAG
2223	REF	1		E7.1642	XRANGE	EQUALS	1/DV3 +2		B(2)TMP	
2224	REF	1		E7.1644	ENGDFDT	EQUALS	XRANGE +2		B(1)TMP	
2225	REF	1		E7.1645	VGVECT	EQUALS	ENGDFDT +1		I(6)OUT	VELOCITY-TO-BE-GAINED
2226	REF	1		E7.1653	TXO	EQUALS	VGVECT +6		I(2)TMP	TIME AT WHICH X-AXIS OVERRIDE IS ALLOWED.

A2227

R2228 END OF THE ASCENT GUIDANCE ERASABLES.

R2229 THE FOLLOWING CARDS KEEP THE ASSEMBLER HAPPY UNTIL THE SYMBOLS ARE DELETED FROM THE PINBALL NOON TABLES.

2231	REF	1		E7.1745	END-E7.0	EQUALS	IRETURN1 +1			FIRST UNUSED LOCATION IN E7 OVERLAY 0
2232	REF	1		E7.1747	END-E7.1	EQUALS	N49FLAG +1			FIRST UNUSED LOCATION IN E7 OVERLAY 1
2233	REF	1		4000	END-E7.2	EQUALS	POINTVSM +6			FIRST UNUSED LOCATION IN E7 OVERLAY 2
2234	REF	3	LAST 152	E7.1630	END-E7.3	EQUALS	END-ALIG			FIRST UNUSED LOCATION IN E7 OVERLAY 3
2235				E7.1777	END-E7.4	EQUALS	3777			** LAST LOCATION USED IN E7 OVERLAY 4 **
2236	REF	1		E7.1655	END-E7.5	EQUALS	TXO +2			FIRST UNUSED LOCATION IN E7 OVERLAY 5
2237				E7.1777	END-E7	EQUALS	3777			**LAST LOCATION USED IN E7 **

A2238

*** END OF LUMERASE.120 ***

L INTERRUPT LEAD INS

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0001	4000	SETLOC 4000
00015 REF 1	4000 0 0004 0	COUNT* 55/RUPTS
0002	4001 3 4054 1	INHINT
0003 REF 1	4002 56 006 1	CAF GGBB
0004 REF 1	4003 1 2667 0	XCH BBANK
0005 REF 1		TCF GDRUG
0006 REF 1	4004 52 011 0	DXCH ARUPT
0007	4005 0 0006 1	EXTEND
0008 REF 1	4006 3 4056 0	DCA T6ADR
0009	4007 52 006 0	DTCB
0010 REF 2 LAST 153	4010 52 011 0	DXCH ARUPT
0011	4011 0 0006 1	EXTEND
0012 REF 1	4012 3 1275 0	DCA T5ADR
0013	4013 52 006 0	DTCB
0014 REF 3 LAST 153	4014 52 011 0	DXCH ARUPT
0015 REF 1	4015 3 4057 1	CAF T3RPTBB
0016 REF 2 LAST 153	4016 56 006 1	XCH BBANK
0017 REF 1	4017 1 3407 0	TCF T3RUPT
0018 REF 4 LAST 153	4020 52 011 0	DXCH ARUPT
0019 REF 1	4021 3 4064 1	CAF T4RPTBB
00195 REF 3 LAST 153	4022 56 006 1	XCH BBANK
0020 REF 1	4023 1 2000 1	TCF T4RUPT
0023 REF 5 LAST 153	4024 52 011 0	DXCH ARUPT
0024 REF 1	4025 3 4060 0	CAF KEYRPTBB
0025 REF 4 LAST 153	4026 56 006 1	XCH BBANK
0026 REF 1	4027 1 3274 1	TCF KEYRUPT1
0027 REF 6 LAST 153	4030 52 011 0	DXCH ARUPT
0028 REF 1	4031 3 4061 1	CAF MKRUPTBB
0029 REF 5 LAST 153	4032 56 006 1	XCH BBANK
0030 REF 1	4033 1 2332 0	TCF MARKRUPT
0031 REF 7 LAST 153	4034 52 011 0	DXCH ARUPT
0032 REF 1	4035 3 4060 0	CAF UPRPTBB
0033 REF 6 LAST 153	4036 56 006 1	XCH BBANK
0034 REF 1	4037 1 3317 0	TCF UPRUPT
0035 REF 8 LAST 153	4040 52 011 0	DXCH ARUPT
0036 REF 1	4041 3 4062 1	CAF DNRPTBB
0037 REF 7 LAST 153	4042 56 006 1	XCH BBANK
0038 REF 1	4043 1 3506 0	TCF DDDWNTA
0039 REF 9 LAST 153	4044 52 011 0	DXCH ARUPT
0040 REF 1	4045 3 4063 0	CAF RDRPTBB

L INTERRUPT LEAD INS

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0041 REF 8 LAST 153 4046 56 006 1
 0042 REF 1 4047 1 3150 1

XCH BBANK
 TCF RADAREAD

0043 REF 10 LAST 153 4050 52 011 0
 0044 REF 1 4051 3 4065 0
 0045 REF 9 LAST 154 4052 56 006 1
 0046 REF 1 4053 1 2275 1

DXCH ARUPT
 CA RUPT10BB
 XCH BBANK
 TCF PITFALL

RUPT10 IS USED ONLY BY LANDING GUIDANCE

0047 REF 1 E3,1400
 0048 REF 2 LAST 153 4054 12103 0 GOBB

EBANK= LST1
 BBCON GDBRDB

RESTART USES EO, E3

0049 REF 1 E6,1464
 0050 REF 1 4055 02065 0 T6ADR
 0050 REF 1 4056 36106 0

EBANK= PERKOR
 ZCADR DOT6RUPT

0051 REF 2 LAST 154 E3,1400
 0052 REF 2 LAST 153 4057 02103 1 T3RPTBB

EBANK= LST1
 BBCON T3RUPT

0053 REF 1 0073
 0054 REF 2 LAST 153 4060 10100 1 KEYRPTBB

EBANK= KEYTEMP1
 BBCON KEYRUPT1

0055 REF 1 E7,1404
 0056 REF 2 LAST 153 4061 16107 0 MKRUPTBB

EBANK= ADTAZ
 BBCON MARKRUPT

0057 REF 2 LAST 153 4060 UPRPTBB = KEYRPTBB

0058 REF 1 0340
 0059 REF 2 LAST 153 4062 12100 0 DWRPTBB

EBANK= DNTNBUFF
 BBCON DDDOWNTR

0060 REF 1 0110
 0061 REF 2 LAST 154 4063 52100 1 RDRPTBB

EBANK= RADMODES
 BBCON RADAREAD

0062 REF 1 E6,1414
 0063 REF 2 LAST 153 4064 14106 0 T4RPTBB

EBANK= H11
 BBCON T4RUPT

00631 REF 2 LAST 106 1265
 00632 REF 2 LAST 154 4065 22102 1 RUPT10BB

EBANK= ELVIRA
 BBCON PITFALL

L T4RUPT PROGRAM

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0001			12,2000		BANK 12	
000101	REF	1	06,2000		SETLOC T4RUP	
000102			06,2000		BANK	
0002	REF	2	LAST 154	E6,1414	EBANK M11	
00025	REF	1			COUNT* 11/T4RPT	
0003	REF	1	06,2000	54 016 1	T4RUPT	TS BANKRUPT
0004			06,2001	0 0006 1	EXTEND	
0005	REF	1	06,2002	22 012 1	QXCH	QRIPT
0007	REF	1	06,2003	11 313 0	CCS	DSRUPTSW
0008	REF	1	06,2004	1 2010 0	TCF	NORMT4 +1
0009	REF	2	LAST 155	06,2005	1 2007 0	TCF NORMT4
0010	REF	1	06,2006	1 2134 1	TCF	QUIKDSP
0015	REF	1	06,2007	3 4757 0	NORMT4	CAF SEVEN
0016	REF	1	06,2010	54 070 1	TS	RUPTRG1
0017	REF	2	LAST 155	06,2011	55 313 0	TS DSRUPTSW
0019			4066		BLOCK 02	
001901	REF	1	4000		SETLOC FFTAG10	
001902			4066		BANK	
001904	REF	1			COUNT* 11/T4RPT	
0020	REF	1	7727		100MRUPT	DEC 17766 (DEC 16374)
R0023	RELTAB IS A PACKED TABLE. RELAYWORD CODE IN UPPER 4 BITS. RELAY CODE					
R0024	IN LOWER 5 BITS.					

0025	4066	04025 1	RELTAB	0CT	04025
0026	4067	10003 0		0CT	10003
0027	4070	14031 0		0CT	14031
0028	4071	20033 0		0CT	20033
0029	4072	24017 1		0CT	24017
0030	4073	30036 1		0CT	30036
0031	4074	34034 1		0CT	34034
0032	4075	40023 1		0CT	40023
0033	4076	44035 1		0CT	44035
0034	4077	50037 0		0CT	50037
0035	4100	54000 0		0CT	54000
0036	4101	60000 1	RELTAB11	0CT	60000

L T4RUPT PROGRAM

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P0037 SWITCHED-BANK PORTION.

0038				12,2000				BANK	12
003801	REF	2	LAST	155	06,2000			SETLOC	T4RUP
003802					06,2012			BANK	
0039	REF	2	LAST	155	TO 155:	10	10*	COUNT*	11/T4RPT
0042	REF	1			06,2012	11'036	1	CCS	DSPTAB +11D
0043	REF	1			06,2013	0 2063	0	TC	DSPOUT
0044	REF	2	LAST	156	06,2014	0 2063	0	TC	DSPOUT
0045	REF	2	LAST	156	06,2015	57'036	0	XCH	DSPTAB +11D
0046	REF	1			06,2016	7 4356	1	MASK	LOW11
0047	REF	3	LAST	156	06,2017	55'036	1	TS	DSPTAB +11D
0048	REF	1			06,2020	6 4101	0	AD	RELTAB11
0049					06,2021	0 0006	1	EXTEND	
00491	REF	1			06,2022	01 010	1	WRITE	OUTC
00492	REF	1			06,2023	0 2071	0	TC	HANG20

L T4RUPT PROGRAM

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P0050 DSPOUT PROGRAM. PUTS OUT DISPLAYS.

0055	REF	1		06,2024	55'016 0	DSPOUTSB	TS	NOUT	
0056	REF	1		06,2025	4 4755 0		CS	ZERO	
0057	REF	1		06,2026	54 073 1		TS	DSRUPTEN	SET TO -0 FOR 1ST PASS THRU DSPTAB
0058	REF	1		06,2027	56 776 1		XCH	DSPCNT	
0059	REF	1		06,2030	6 4754 0		AD	REGO	TO PREVENT +0
0060	REF	2	LAST 157	06,2031	54 776 0		TS	DSPCNT	
0061	REF	3	LAST 157	06,2032	56 776 1	DSPSCAN	INDEX	DSPCNT	
0062	REF	4	LAST 156	06,2033	11'023 0		CCS	DSPTAB	
0063	REF	4	LAST 157	06,2034	10 776 0		CCS	DSPCNT	IF DSPTAB ENTRY +, SKIP
0064	REF	1		06,2035	1 2030 1		TCF	DSPSCAN -2	IF DSPCNT +, TRY AGAIN
0065	REF	1		06,2036	1 2047 1		TCF	DISPLAY	IF DSPTAB ENTRY -, DISPLAY
0066				06,2037	00012 1	TABLNT	UCT	12	DEC 10 - LENGTH OF DSPTAB
0067	REF	2	LAST 157	06,2040	10 073 1		CCS	DSRUPTEN	IF DSRUPTEN=-0, 2ND PASS THRU DSPTAB
0068				06,2041	37764 0	120MRUPT	DEC	16372	(DSPCNT = 0). +0 INTO NOUT.
0069	REF	2	LAST 157	06,2042	55'016 0		TS	NOUT	
0070	REF	2	LAST 93	06,2043	0 0002 0		TC	0	
0071	REF	3	LAST 157	06,2044	54 073 1		TS	DSRUPTEN	IF DSRUPTEN=-0, 1ST PASS THRU DSPTAB
0072	REF	1		06,2045	3 2037 1		CAF	TABLNT	(DSPCNT=0). +0 INTO DSRUPTEN. PASS AGAIN.
0073	REF	2	LAST 157	06,2046	1 2031 0		TCF	DSPSCAN -1	
0074	REF	1		06,2047	6 4753 1	DSPLAY	AD	ONE	
0075	REF	5	LAST 157	06,2050	50 776 1		INDEX	DSPCNT	
0076	REF	5	LAST 157	06,2051	55'023 0		TS	DSPTAB	REPLACE POSITIVELY
0077	REF	2	LAST 156	06,2052	7 4356 1		MASK	LOW11	REMOVE BITS 12 TO 15
0078	REF	4	LAST 157	06,2053	54 073 1		TS	DSRUPTEN	
0079	REF	1		06,2054	3 4350 0		CAF	HIS	
0080	REF	6	LAST 157	06,2055	50 776 1		INDEX	DSPCNT	
0081	REF	1		06,2056	7 4066 1		MASK	RELTAB	PICK UP BITS 12 TO 15 OF RELTAB ENTRY
0082	REF	5	LAST 157	06,2057	6 0073 0		AD	DSRUPTEN	
0083				06,2060	0 0006 1		EXTEND		
0084	REF	2	LAST 156	06,2061	01 010 1		WRITE	OUTG	
00841	REF	1		06,2062	1 6737 0		TCF	0+1	
00842	REF	1		06,2063	10 101 0	DSPOUT	CCS	FLAGWRD5	IS DSKY FLAG ON
00843	REF	2	LAST 157	06,2064	3 4755 1		CAF	ZERO	NO
00844	REF	1		06,2065	1 2130 0		TCF	NODSPOUT	NO
00845	REF	3	LAST 157	06,2066	11'016 0		CCS	NOUT	YES
00846	REF	1		06,2067	0 2024 0		TC	DSPOUTSB	
00847	REF	2	LAST 157	06,2070	1 2130 0		TCF	NODSPOUT	NO DISPLAY REQUESTS
0085	REF	1		06,2071	4 2171 0	HANG2G	CS	14,11,9	
0086	REF	3	LAST 155	06,2072	27'313 0		ADS	DSRUPTSW	
0087	REF	1		06,2073	3 7731 0		CAF	20MRUPT	
0088	REF	1		06,2074	54 027 0	SETTIME4	TS	TIME4	

T4RUPT PROGRAM

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P00881 THE STATUS OF THE PROCEED PUSHBUTTON IS MONITORED EVERY 120 MILLISECONDS VIA THE CHANNEL 32 BIT 14 INBIT.
 R008812 THE STATE OF THIS INBIT IS COMPARED WITH ITS STATE DURING THE PREVIOUS T4RUPT AND IS PROCESSED AS FOLLOWS.

R008814 IF PREV ON AND NOW ON - BYPASS
 R008815 IF PREV ON AND NOW OFF - UPDATE IMODES33
 R008816 IF PREV OFF AND NOW ON - UPDATE IMODES33 AND PROCESS VIA PINBALL
 R008817 IF PREV OFF AND NOW OFF - BYPASS

R008818 THE LOGIC EMPLOYED REQUIRES ONLY 9 MCT (APPROX. 108 MICROSECONDS) OF COMPUTER TIME WHEN NO CHANGES OCCUR.

ADDRESS	REF	LAST	158	06,2075	3 1303 0	PROCEED	CA	IMODES33	MONITOR FOR PROCEED BUTTON
008821				06,2076	0 0006 1		EXTEND		
008822	REF 1			06,2077	06 032 0		RXOR	CHAN32	
008823	REF 12	LAST	87	06,2100	7 4736 0		MASK	BIT14	
008824				06,2101	0 0006 1		EXTEND		
008825	REF 1			06,2102	1 2116 1		BZF	T4JUMP	NO CHANGE
008826	REF 2	LAST	158	06,2103	23 303 0		LXCH	IMODES33	
008827				06,2104	0 0006 1		EXTEND		
008828	REF 1			06,2105	06 001 0		RXOR	CHAN	
008829	REF 3	LAST	158	06,2106	55 303 1		TS	IMODES33	UPDATE IMODES33
008830	REF 13	LAST	158	06,2107	7 4736 0		MASK	BIT14	
008831	REF 1			06,2110	10 000 0		CCS	A	
008832	REF 2	LAST	158	06,2111	1 2116 1		TCF	T4JUMP	WAS ON - NOW OFF
008833	REF 1			06,2112	3 4355 0		CAF	CHRPID	WAS OFF - NOW ON
008834	REF 1			06,2113	0 5072 1		TC	NOVAC	
008835	REF 1			0777			BRANK=	DSPLCUNT	
008836	REF 1			06,2114	03452 1		ZCADR	PRCKEY	
008836	REF 1			06,2115	60101 1				

L T4RUPT PROGRAM

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P0089 JUMP TO APPROPRIATE ONCE-PER-SECOND (1.96-SEC-ACTUALLY) ACTIVITY

0090	REF	2	LAST	155	06.2116	50 070 0	T4JUMP	INDEX	RUPTREG1
0091					06.2117	1 2120 1		TCF	+1

0092	REF	1			06.2120	0 3156 0		TC	RCSMONIT
0093	REF	1			06.2121	1 3006 0		TCF	RPAUTCHK
0094	REF	1			06.2122	1 2172 0		TCF	IMMON
0095	REF	1			06.2123	1 3132 0		TCF	DAPT4S
0096	REF	2	LAST	159	06.2124	0 3156 0		TC	RCSMONIT
0097	REF	2	LAST	159	06.2125	1 3006 0		TCF	RPAUTCHK
0098	REF	2	LAST	159	06.2126	1 2172 0		TCF	IMMON
0099	REF	2	LAST	159	06.2127	1 3132 0		TCF	DAPT4S

0102	REF	1			7731		ZOMRUPT	=	00T37776	(DEC 16382)
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L T4RUPT PROGRAM

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PO150 ADDITIONAL ROUTINES FOR ZOMS. KEYBOARD ACTIVITY

0151				06,2130	0 0006 1	NODSPY	EXTEND	
0152	REF	3	LAST 157	06,2131	01 010 1		WRITE	OUTO
0153	REF	1		06,2132	3 2041 0	CAF	120MRUPT	SET FOR NEXT CORIVE
0154	REF	1		06,2133	1 2074 1	TCF	SETTIME4	
0155	REF	14	LAST 158	06,2134	3 4736 1	QUIKUSP	CAF	BIT14
01551	REF	4	LAST 157	06,2135	7 1313 0		MASK	DSRUPTSW
01552				06,2136	0 0006 1		EXTEND	
01553	REF	1		06,2137	1 2165 0	BZF	QUIKOFF	WROTE LAST TIME, NOW TURN OFF RELAYS.
01555	REF	4	LAST 157	06,2140	11 016 0	CCS	NOUT	
0156	REF	2	LAST 157	06,2141	0 2024 0	TC	DSPLUTSB	
0157	REF	1		06,2142	1 2152 1	TCF	NODSPY	NOUT=0 OR BAD RETURN FROM DSPLUTSB
01575	REF	15	LAST 160	06,2143	4 4736 0	CS	BIT14	GOOD RETURN (WE DISPLAYED SOMETHING)
01577	REF	5	LAST 160	06,2144	27 313 0	QUIKRUPT	ADS	DSRUPTSW
0158	REF	2	LAST 157	06,2145	3 7731 0	CAF	20MRUPT	
0159	REF	2	LAST 157	06,2146	54 027 0	TS	TIME4	
0160	REF	13	LAST 87	06,2147	3 4743 0	CAF	BIT9	
0161	REF	6	LAST 160	06,2150	27 313 0	ADS	DSRUPTSW	
0162	REF	1		06,2151	0 5270 1	TC	RESUME	
0163				06,2152	0 0006 1	NODSPY	EXTEND	
0164	REF	4	LAST 160	06,2153	01 010 1		WRITE	OUTO
0165	REF	3	LAST 160	06,2154	3 7731 0	SYNCT4	CAF	20MRUPT
0166	REF	3	LAST 160	06,2155	26 027 0		ADS	TIME4
0167	REF	14	LAST 160	06,2156	3 4743 0	CAF	BIT9	
0168	REF	7	LAST 160	06,2157	27 313 0	ADS	DSRUPTSW	
0169	REF	8	LAST 160	06,2160	11 313 0	CCS	DSRUPTSW	
0170	REF	2	LAST 160	06,2161	0 5270 1	TC	RESUME	
0171				06,2162	37737 0	DCT37737	DCT	37737
0172	REF	1		06,2163	0 2154 0	TC	SYNCT4	
0173	REF	3	LAST 160	06,2164	0 5270 1	TC	RESUME	
0174				06,2165	0 0006 1	QUIKOFF	EXTEND	
0175	REF	5	LAST 160	06,2166	01 010 1		WRITE	OUTO
0176	REF	16	LAST 160	06,2167	3 4736 1	CAF	BIT14	RESET DSRUPTSW TO SEND DISPLAY NEXT PASS
0177	REF	1		06,2170	1 2144 0	TCF	QUIKRUPT	
0179				06,2171	22400 0	14,11,9	DCT	22400

L T4RUPT PROGRAM

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P0300 PROGRAM NAME: IMUMON

R0301 FUNCTIONAL DESCRIPTION: THIS PROGRAM IS ENTERED EVERY 480 MS. IT DETECTS CHANGES OF THE IMU STATUS BITS IN
 R0303 CHANNEL 30 AND CALLS THE APPROPRIATE SUBROUTINES. THE BITS PROCESSED AND THEIR RELEVANT SUBROUTINES ARE:

FUNCTION	BIT	SUBROUTINE CALLED
TEMP IN LIMITS	15	TLIM
ISS TURN-ON REQUEST	14	ITURNON
IMU FAIL	13	IMUFAIL (SETISSW)
IMU CDU FAIL	12	ICDUFAIL (SETISSW)
IMU CAGE	11	IMUCAGE
IMU OPERATE	9	IMUDP

R0313 THE LAST SAMPLED STATE OF THESE BITS IS LEFT IN IMODES30. ALSO, EACH SUBROUTINE CALLED FINDS THE NEW
 R0315 VALUE OF THE BIT IN A, WITH Q SET TO THE PROPER RETURN LOCATION, NEXTIFAIL.

R0317 CALLING SEQUENCE: T4RUPT EVERY 480 MILLISECONDS.

R0318 JOBS OR TASKS INITIATED: NONE.

R0319 SUBROUTINES CALLED: TLIM, ITURNON, SETISSW, IMUCAGE, IMUDP.

R0320 ERASABLE INITIALIZATION:

R0321 FRESH START OR RESTART WITH NO GROUPS ACTIVE: C(IMODES30) = OCT 37411.

R0323 RESTART WITH ACTIVE GROUPS: C(IMODES30) = (B(IMODES30) AND (OCT 00935)) PLUS (CT 37400).

R0325 THIS LEAVES IMU FAIL BITS INTACT.

R0326 ALARMS: NONE.

R0327 EXIT: TMONTEST.

R0328 OUTPUT: UPDATED IMODES30 WITH CHANGES PROCESSED BY APPROPRIATE SUBROUTINE.

0330	REF	1		06,2172	3 1302 1	IMUMON	CA	IMODES30	SEE IF THERE HAS BEEN A CHANGE IN THE
0331				06,2173	0 0006 1		EXTEND		RELEVANT BITS OF CHAN 30.
0332	REF	1		06,2174	06 030 1		RXOR	CHAN30	
0333	REF	1		06,2175	7 2761 1		MASK	3ORDMSK	
0334				06,2176	0 0006 1		EXTEND		
0335	REF	1		06,2177	1 2227 0		BZF	TMONTEST	NO CHANGE IN STATUS.
0336	REF	3	LAST 159	06,2200	54 070 1		TS	RUPTRREG1	SAVE BITS WHICH HAVE CHANGED.
0337	REF	2	LAST 161	06,2201	23 302 1		LXCH	IMODES30	UPDATE IMODES30.
0338				06,2202	0 0006 1		EXTEND		
0339	REF	2	LAST 158	06,2203	06 001 0		RXOR	LCHAN	
0340	REF	3	LAST 161	06,2204	55 302 0		TS	IMODES30	
0341	REF	2	LAST 157	06,2205	4 4753 0		CS	ONE	
0342	REF	4	LAST 161	06,2206	56 070 0		XCH	RUPTRREG1	
0343				06,2207	0 0006 1		EXTEND		

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0344	REF	1		06,2210	6 2514 0		BZMF	TLIM	CHANGE IN IMU TEMP.	
0345	REF	1		06,2211	1 2213 1		TCF	NXTIFBIT	BEGIN BIT SCAN.	
0346	REF	3	LAST	161	06,2212	6 4753 1	-1	AD	ONE	(RE-ENTERS HERE FROM NXTIFAIL.)
0347	REF	5	LAST	161	06,2213	24 070 0	NXTIFBIT	INCR	RUPTRREG1	ADVANCE BIT POSITION NUMBER.
0348					06,2214	6 0000 1	+1	DOUBLE		
0349	REF	2	LAST	158	06,2215	54 000 0		TS	A	SKIP IF OVERFLOW.
0350	REF	2	LAST	162	06,2216	1 2213 1		TCF	NXTIFBIT	LOOK FOR BIT.
0351	REF	1			06,2217	56 071 1		XCH	RUPTRREG2	SAVE OVERFLOW-CORRECTED DATA.
0352	REF	6	LAST	162	06,2220	50 070 0		INDEX	RUPTRREG1	SELECT NEW VALUE OF THIS BIT.
0353	REF	17	LAST	160	06,2221	3 4736 1		CAF	BIT14	
0354	REF	4	LAST	161	06,2222	7 1302 0		MASK	IMODES30	
0355	REF	7	LAST	162	06,2223	50 070 0		INDEX	RUPTRREG1	
0356	REF	1			06,2224	0 2755 1		TC	IFAILJMP	
0357	REF	2	LAST	162	06,2225	10 071 0	NXTIFAIL	CCS	RUPTRREG2	PROCESS ANY ADDITIONAL CHANGES.
0358	REF	3	LAST	162	06,2226	1 2212 0		TCF	NXTIFBIT -1	

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P0359 PROGRAM NAME: TNONTEST.

R0360 FUNCTIONAL DESCRIPTION: THIS PROGRAM HONORS REQUESTS FOR ISS INITIALIZATION. ISS TURN-ON (CHANNEL 30 BIT 14)
 R0362 AND ISS OPERATE (CHANNEL 30 BIT 9) REQUESTS ARE TREATED AS A PAIR AND PROCESSING TAKES PLACE .480 SECONDS
 R0364 AFTER EITHER ONE APPEARS. THIS INITIALIZATION TAKES ON ONE OF THE FOLLOWING THREE FORMS:

R0366 1) ISS TURN-ON: IN THIS SITUATION THE COMPUTER IS OPERATING WHEN THE ISS IS TURNED ON. NOMINALLY,
 R0368 BOTH ISS TURN-ON AND ISS OPERATE APPEAR. THE PLATFORM IS CAGED FOR 90 SECONDS AND THE ICDU'S ZEROED
 R0370 SO THAT AT THE END OF THE PROCESS THE GIMBAL LOCK MONITOR WILL FUNCTION PROPERLY.

R0372 2) ICDU INITIALIZATION: IN THIS CASE THE COMPUTER WAS PROBABLY TURNED ON WITH THE ISS IN OPERATE OR
 R0374 A FRESH START WAS DONE WITH THE ISS IN OPERATE. IN THIS CASE ONLY ISS OPERATE IS ON. THE ICDU'S ARE
 R0376 ZEROED SO THE GIMBAL LOCK MONITOR WILL FUNCTION. AN EXCEPTION IS IF THE ISS IS IN GIMBAL LOCK AFTER
 R0378 A RESTART. THE ICDU'S WILL NOT BE ZEROED.

R0379 3) RESTART WITH RESTARTABLE PROGRAM USING THE IMU: IN THIS CASE, NO INITIALIZATION TAKES PLACE SINCE
 R0381 IT IS ASSUMED THAT THE USING PROGRAM DID THE INITIALIZATION AND THEREFORE T4RUPT SHOULD NOT INTERFERE.

R0383 IMODES30 BIT 7 IS SET = 1 BY THE FIRST BIT (CHANNEL 30 BIT 14 OR 9) WHICH ARRIVES. FOLLOWING THIS, TNONTEST IS
 R0385 ENTERED. FINDS BIT 7 = 1 BUT BIT 8 = 0, SO IT SETS BIT 8 = 1 AND EXITS. THE NEXT TIME IT FINDS BIT 8 = 1 AND
 R0387 PROCEEDS. SETTING BITS 8 AND 7 = 0. AT PROCTNON. IF ISS TURN-ON REQUEST IS PRESENT, THE ISS IS CAGED (ZERO +
 R0389 COARSE). IF ISS OPERATE IS NOT PRESENT PROGRAM ALARM 00213 IS ISSUED. AT THE END OF A 90 SECOND CAGE, BIT 7
 R0391 OF IMODES30 IS TESTED. IF IT IS = 1, ISS TURN-ON WAS NOT PRESENT FOR THE ENTIRE 90 SECONDS. IN THAT CASE, IF
 R0393 THE ISS TURN-ON REQUEST IS PRESENT THE 90 SECOND WAIT IS REPEATED, OTHERWISE NO ACTION OCCURS UNLESS A PROGRAM
 R0395 WAS WAITING FOR THE INITIALIZATION IN WHICH CASE THE PROGRAM IS GIVEN AN IMUSTALL ERROR RETURN. IF THE DELAY
 R0397 WENT PROPERLY, THE ISS DELAY OUTBIT IS SENT AND THE ICDU'S ZEROED. A TASK IS INITIATED TO REMOVE THE PIPA FAIL
 R0399 INHIBIT BIT IN 10.24 SECONDS. IF A MISSION PROGRAM WAS WAITING IT IS INFORMED VIA ENDIMU.

R0401 AT PROCTNON. IF ONLY ISS OPERATE IS PRESENT (OPONLY), THE CDU'S ARE ZEROED UNLESS THE PLATFORM IS IN COARSE
 R0403 ALIGN (= GIMBAL LOCK HERE) OR A MISSION PROGRAM IS USING THE IMU (IMUSEFLG = 1).

R0405 CALLING SEQUENCE: T4RUPT EVERY 480 MILLISECONDS AFTER IMUMON.

R0406 JOBS OR TASKS INITIATED: 1) ENDTNON, 90 SECONDS AFTER CAGING STARTED. 2) ISSUP, 4 SECONDS AFTER CAGING DONE.
 R0408 3) PFAILOK, 10.24 SECONDS AFTER INITIALIZATION COMPLETED. 4) UNZ2, 320 MILLISECONDS AFTER ZEROING
 R0410 STARTED.

R0411 SUBROUTINES CALLED: CAGESUB, CAGESUB2, ZEROICDU, ENDIMU, IMUPAD, NOATTDF, SETISSW, VAPDELAY.

R0413 ERASABLE INITIALIZATION: SEE IMUMON.

R0414 ALARMS: PROGRAM ALARM 00213 IF ISS TURN-ON REQUESTED WITHOUT ISS OPERATE.

R0416 EXIT: ENDTNON EXITS TO CBSTEST. TASKS HAVING TO DO WITH INITIALIZATION EXIT AS FOLLOWS: MISSION PROGRAM
 R0418 WAITING AND INITIALIZATION COMPLETE, EXIT TO ENDIMU. MISSION PROGRAM WAITING AND INITIALIZATION FAILED, EXIT TO
 R0420 IMUPAD, IMU NOT IN USE, EXIT TO TASKOVER.

R0421 OUTPUT: ISS INITIALIZED.

0422 REF 5 LAST 162 06.2227 4 1302 0 TNONTEST CS IMODES30 AFTER PROCESSING ALL CHANGES. SEE IF IT

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0423	REF	15	LAST	87	06,2230	7 4745 1	MASK	BIT7	IS TIME TO ACT ON A TURN-ON SEQUENCE.
0424	REF	3	LAST	162	06,2231	10 000 0	CCS	A	
0425	REF	1			06,2232	1 2374 1	TCF	C33TEST	NO - EXAMINE CHANNEL 31.
0426	REF	13	LAST	87	06,2233	3 4744 1	CAF	BIT8	SEE IF FIRST SAMPLE OR SECOND.
0427	REF	6	LAST	163	06,2234	7 1302 0	MASK	IMODES30	
0428	REF	4	LAST	164	06,2235	10 000 0	CCS	A	
0429	REF	1			06,2236	1 2242 0	TCF	PROCTNDH	REACT AFTER SECOND SAMPLE.
0430	REF	14	LAST	164	06,2237	3 4744 1	CAF	BIT8	IF FIRST SAMPLE, SET BIT TO REACT NEXT
0431	REF	7	LAST	164	06,2240	27 1302 0	ADS	IMODES30	TIME.
0432	REF	2	LAST	164	06,2241	1 2374 1	TCF	C33TEST	

R0433 PROCESS IMU TURN-ON REQUESTS AFTER WAITING 1 SAMPLE FOR ALL SIGNALS TO ARRIVE.

0435	REF	1			06,2242	4 2777 0	PROCTNDH	CS	BIT8	
0436	REF	8	LAST	164	06,2243	7 1302 0	MASK	IMODES30		
0437	REF	9	LAST	164	06,2244	55 1302 0	TS	IMODES30		
0438	REF	18	LAST	162	06,2245	7 4736 0	MASK	BIT14	SEE IF TURN-ON REQUEST.	
0439	REF	5	LAST	164	06,2246	10 000 0	CCS	A		
0440	REF	1			06,2247	1 2347 1	TCF	OPONLY	OPERATE ON ONLY.	
0441	REF	10	LAST	164	06,2250	4 1302 0	CS	IMODES30	IF TURN-ON REQUEST, WE SHOULD HAVE IMU	
0442	REF	15	LAST	160	06,2251	7 4743 1	MASK	BIT9	OPERATE.	
0443	REF	6	LAST	164	06,2252	10 000 0	CCS	A		
0444					06,2253	1 2256 0	TCF	+3		
0445	REF	1			06,2254	0 5567 0	TC	ALARM	ALARM IF NOT.	
0446					06,2255	00213 1	DCT	213		
0447	REF	1			06,2256	0 2735 1	TC	CAGESUB		
0448	REF	1			06,2257	3 3005 1	CAF	90SECS		
0449	REF	1			06,2260	0 5203 0	TC	WAITLIST		
0450	REF	3	LAST	155	06,1414		EDANK	M11		
0451	REF	1			06,2261	02266 1	2CADR	ENDTNDH		
0451	REF	1			06,2262	14106 0				
0452	REF	3	LAST	164	06,2263	1 2374 1	TCF	C33TEST		
0453	REF	2	LAST	164	06,2264	3 3005 1	RETNON	CAF	90SECS	
0454	REF	1			06,2265	0 5224 0	TC	VARDELAY		
0455	REF	13	LAST	88	06,2266	4 4752 1	ENDTNDH	CS	BIT2	RESET TURN-ON REQUEST FAIL BIT.
0456	REF	11	LAST	164	06,2267	7 1302 0	MASK	IMODES30		
0457	REF	12	LAST	164	06,2270	57 1302 1	XCH	IMODES30		
0458	REF	14	LAST	164	06,2271	7 4752 1	MASK	BIT2	IF IT WAS OFF, SEND ISS DELAY COMPLETE.	
0459					06,2272	0 0006 1	EXTEND			
0460	REF	1			06,2273	1 2306 1	BZF	ENDTNDH2		
0461	REF	19	LAST	164	06,2274	3 4736 1	CAF	BIT14	IF IT WAS ON AND TURN-ON REQUEST NOW	

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0462	REF	13	LAST	164	06,2275	7 1302 0		MASK	IMODES30	PRESENT, RE-ENTER 90 SEC DELAY IN WL.
0463					06,2276	0 0006 1		EXTEND		
0464	REF	1			06,2277	1 2264 1		BZF	RETHOR	
0465	REF	1			06,2300	4 0074 0		CS	FLAGWRD0	IF IT IS NOT ON NOW, SEE IF A PROG WAS
0466	REF	1			06,2301	7 4744 0		MASK	IMUSEBIT	WAITING.
0467	REF	7	LAST	164	06,2302	10 000 0		CCS	A	
0468	REF	2			06,2303	1 5261 0		TCF	TASKOVER	
0469	REF	1			06,2304	0 4635 0		TC	POSTJUMP	
0470	REF	1			06,2305	17637 0		CADR	IMUBAD	UNSUCCESSFUL TURN-ON.
0471	REF	11	LAST	87	06,2306	3 4735 1	ENDTNRNZ	CAF	BIT15	SEND ISS DELAY COMPLETE.
0472					06,2307	0 0006 1		EXTEND		
0473	REF	1			06,2310	05 012 1		WOR	CHAN12	
0474	REF	1			06,2311	0 4674 0		TC	IBNKEALL	TURN OFF NO ATT LAMP.
0475	REF	1			06,2312	17266 0		CADR	NOATT OFF	
0476	REF	1			06,2313	0 5457 1	UNZ2	TC	ZERDILDD	
0477	REF	1			06,2314	4 4763 0		CS	BITS465	REMOVE ZERO AND COARSE.
0478					06,2315	0 0006 1		EXTEND		
0479	REF	2	LAST	165	06,2316	03 012 1		WAND	CHAN12	
0480	REF	14	LAST	131	06,2317	3 4741 1		CAF	BIT11	WAIT 10 SECS FOR CTRS TO FIND GIMBALS
0481	REF	2	LAST	164	06,2320	0 5224 0		TC	VARDELAY	
0482	REF	1			06,2321	4 2774 0	ISSUP	CS	UCT54	REMOVE CAGING, IMU FAIL INHIBIT, AND
0483	REF	14	LAST	165	06,2322	7 1302 3		MASK	IMODES30	ICOUFAIL INHIBIT FLAGS.
0484	REF	15	LAST	165	06,2323	55 302 0		TS	IMODES30	
0485	REF	14	LAST	88	06,2324	4 4746 1		CS	BIT6	ENABLE DAP
0486	REF	4	LAST	158	06,2325	7 1303 1		MASK	IMODES33	
0487	REF	5	LAST	165	06,2326	55 303 1		TS	IMODES33	
04871	REF	1			06,2327	4 0076 1		CS	FLAGWRD2	TEST DRIFTFLG: IF ON, DO NOTHING BECAUSE
04872	REF	1			06,2330	7 4735 0		MASK	DRFTBIT	IMUCOMP SHOULD BE ALL SET-UP (RESTART
04873					06,2331	0 0006 1		EXTEND		WITH IMUSE DOWN). IF OFF, SET DRIFTFLG
04874					06,2332	1 2336 1		BZF	++	AND 1/PIPADT TO GET FREEFALL IMUCOMP
04875	REF	2	LAST	165	06,2333	26 076 1		ADS	FLAGWRD2	GOING (FRESH START OR ISS TURN-ON).
04876	REF	1			06,2334	3 0025 0		CA	TIME1	
04877	REF	1			06,2335	57 075 1		XCH	1/PIPADT	CANNOT GET HERE IF RESTART WITH IMUSE UP
0488	REF	1			06,2336	0 2703 1		TC	SFTISSW	ISS WARNING MIGHT HAVE BEEN INHIBITED.
0489	REF	12	LAST	165	06,2337	4 4735 0		CS	BIT15	REMOVE IMU-DELAY COMPLETE DISCRETE.
0490					06,2340	0 0006 1		EXTEND		
0491	REF	3	LAST	165	06,2341	03 012 1		WAND	CHAN12	
0492	REF	1			06,2342	3 5003 1		CAF	4SECS	DONT ENABLE PROG ALARM ON PIP FAIL FOR

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0493 REF 2 LAST 164 06,2343 0 5203 0
 0494 REF 1 E3,1474
 0495 REF 1 06,2344 03254 1
 0495 REF 1 06,2345 16103 1

TC WAITLIST
 EBANK= CDJND
 2CADR PFALLOK

ANOTHER 4 SECS.

0499 REF 2 LAST 165 06,2346 1 5261 0

TCF TASKOVER

0502 REF 11 LAST 88 06,2347 3 4750 1 OPONLY

CAF BIT4

IF OPERATE ON ONLY, AND WE ARE IN COARSE

0503 REF 11 LAST 88 06,2350 0 0006 1

EXTEND

ALIGN, DONT ZERO THE CDUS BECAUSE WE

0504 REF 4 LAST 165 06,2351 02 012 0

RAND CHAN12

MIGHT BE IN CIRBAL LOCK

0505 REF 8 LAST 165 06,2352 10 000 0

CCS A

0506 REF 4 LAST 164 06,2353 1 2374 1

TCF C33TEST

0507 REF 2 LAST 165 06,2354 3 4744 1

CAF IMUSEBIT

OTHERWISE, ZERO THE COUNTERS.

0508 REF 2 LAST 165 06,2355 7 0074 0

MASK FLAGWDO

UNLESS SOMEONE IS USING THE IMU.

0509 REF 9 LAST 166 06,2356 10 000 0

CCS A

0510 REF 5 LAST 166 06,2357 1 2374 1

TCF C33TEST

0511 REF 1 06,2360 0 2746 0

TC CAGESUB2

SET TURNON FLAGS.

05115 REF 2 LAST 165 06,2361 0 4674 0 ISSZERO

TC IBNKCALL

TURN OFF NO ATT LAMP

05116 REF 2 LAST 165 06,2362 17266 0

CADR NOATTGFF

IMU LAGE OFF ENTRY

0512 REF 12 LAST 88 06,2363 3 4747 1

CAF BITS

ISS CDU ZERO

0513 REF 12 LAST 88 06,2364 0 0006 1

EXTEND

0514 REF 5 LAST 166 06,2365 05 012 1

WDH CHAN12

05141 REF 2 LAST 165 06,2366 0 5457 1

TC ZEROICDU

0515 REF 15 LAST 165 06,2367 3 4746 0

CAF BITS

WAIT 300 MS FOR AGS TO RECEIVE SIGNAL.

0516 REF 3 LAST 166 06,2370 0 5203 0

TC WAITLIST

0517 REF 4 LAST 164 E6,1414

EBANK= M11

0518 REF 1 06,2371 02313 1

2CADR UNZ2

0518 REF 1 06,2372 14106 0

0519 REF 6 LAST 166 06,2373 1 2374 1

TCF C33TEST

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P0520 PROGRAM NAME: C33TEST

R0521 FUNCTIONAL DESCRIPTION: THIS PROGRAM MONITORS THREE FLIP-FLOP INBITS OF CHANNEL 33 AND CALLS THE APPROPRIATE
 R0523 SUBROUTINE TO PROCESS A CHANGE. IT IS ANALOGOUS TO INUMON, WHICH MONITORS CHANNEL 30, EXCEPT THAT IT READS
 R0525 CHANNEL 33 WITH A WAND INSTRUCTION BECAUSE A 'WRITE' PULSE IS REQUIRED TO RESET THE FLIP-FLOPS. THE BITS
 R0527 PROCESSED AND THE SUBROUTINES CALLED ARE:

R0528	BIT	FUNCTION	SUBROUTINE
R0529	---	-----	-----
R0530	13	PIPA FAIL	PIPFALL
R0531	12	DOWNLINK TOO FAST	DNTMFAST
R0532	11	UPLINK TOO FAST	UPTMFAST

R0533 UPON ENTRY TO THE SUBROUTINE, THE NEW BIT STATE IS IN A.

R0534 CALLING SEQUENCE: EVERY 480 MILLISECONDS AFTER INUMONTEST.

R0535 JOBS OR TASKS INITIATED: NONE.

R0536 SUBROUTINES CALLED: PIPFALL, DNTMFAST AND UPTMFAST ON BIT CHANGES.

R0537 ERASABLE INITIALIZATION: C(IIMODES33) = OCT 16000 ON A FRESH START OR RESTART. THEREFORE, THESE ALARMS WILL
 R0539 REAPPEAR IF THE CONDITIONS PERSIST.

R0540 ALARMS: NONE.

R0541 EXIT: GLOCKMON.

R0542 OUTPUT: UPDATED BITS 13, 12 AND 11 OF IMODES33 WITH CHANGES PROCESSED.

0543	REF	6	LAST	165	06,2374	3 1303 0	C33TEST	CA	IMODES33	SEE IF RELEVANT CHAN 33 BITS HAVE
0544	REF	1			06,2375	7 5026 1		MASK	33RDMSK	
0545	REF	2	LAST	93	06,2376	54 001 1		TS	L	CHANGED.
0546	REF	2	LAST	167	06,2377	3 5026 0		CAF	33RDMSK	
0547					06,2400	0 0006 1		EXTEND		
0548	REF	1			06,2401	03 033 1		WAND	CHAN33	RESETS FLIP-FLOP INPUTS
0549					06,2402	0 0006 1		EXTEND		
0550	REF	3	LAST	161	06,2403	06 001 0		RXOR	LCHAN	
0551					06,2404	0 0006 1		EXTEND		
0552	REF	1			06,2405	1 2434 1		BZF	GLOCKMON	ON NO CHANGE.
0553	REF	8	LAST	162	06,2406	54 070 1		TS	RUPTREG1	SAVE BITS WHICH HAVE CHANGED.
0554	REF	7	LAST	167	06,2407	23 303 0		LXCH	IMODES33	
0555					06,2410	0 0006 1		EXTEND		
0556	REF	4	LAST	167	06,2411	06 001 0		RXOR	LCHAN	
0557	REF	8	LAST	167	06,2412	55 303 1		TS	IMODES33	UPDATED IMODES33.
0558	REF	3	LAST	157	06,2413	3 4755 1		CAF	ZERO	
0559	REF	9	LAST	167	06,2414	56 070 0		XLH	RUPTREG1	
0560					06,2415	6 0000 1		DOUBLE		

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0561	REF	1		06,2416	1 2421 0		TCF	NXTIBT +1	SCAN FOR BIT CHANGES.
0562	REF	4	LAST	162	06,2417	6 4753 1	-1	AD	ONE
0563	REF	10	LAST	167	06,2420	24 070 0	NXTIBT	INCR	RUPTRREG1
0564					06,2421	6 0000 1	+1	DOUBLE	
0565	REF	10	LAST	166	06,2422	54 000 0		TS	A
0566	REF	2	LAST	168	06,2423	1 2420 1		TCF	NXTIBT
0567	REF	3	LAST	162	06,2424	56 071 1		XCH	RUPTRREG2
0568	REF	11	LAST	168	06,2425	50 070 0		INDEX	RUPTRREG1
0569	REF	14	LAST	87	06,2426	3 4737 0		CAF	BIT13
0570	REF	9	LAST	167	06,2427	7 1303 1		MASK	IMODES38
0571	REF	12	LAST	168	06,2430	50 070 0		INDEX	RUPTRREG1
0572	REF	1			06,2431	0 2763 1		TC	C33JMP
0573	REF	4	LAST	168	06,2432	10 071 0	NXTFL33	CCS	RUPTRREG2
0574	REF	3	LAST	168	06,2433	1 2417 0		TCF	NXTIBT -1

(CODING IDENTICAL TO CHAN 30).

GET NEW VALUE OF BIT WHICH CHANGED.

PROCESS POSSIBLE ADDITIONAL CHANGES.

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R0575 PROGRAM NAME: CLOCKMON

R0576 FUNCTIONAL DESCRIPTION: THIS PROGRAM MONITORS THE CDUZ COUNTER TO DETERMINE WHETHER THE ISS IS IN GIMBAL LOCK
 R0578 AND TAKES ACTION IF IT IS. THREE REGIONS OF MIDDLE GIMBAL ANGLE (MGA) ARE USED:

R0580 1) ABS(MGA) LESS THAN OR EQUAL TO 70 DEGREES - NORMAL MODE.
 R0581 2) ABS(MGA) GREATER THAN 70 DEGREES AND LESS THAN OR EQUAL TO 85 DEGREES - GIMBAL LOCK LAMP TURNED ON.
 R0583 3) ABS(MGA) GREATER THAN 85 DEGREES - ISS PUT IN COARSE ALIGN AND NO ATT LAMP TURNED ON.

R0585 CALLING SEQUENCE: EVERY 480 MILLISECONDS AFTER C33TEST.

R0586 JOBS OR TASKS INITIATED: NONE.

R0587 SUBROUTINES CALLED: 1) SETCDARS WHEN ABS(MGA) GREATER THAN 85 DEGREES AND ISS NOT IN COARSE ALIGN.
 R0589 2) LAMPTEST BEFORE TURNING OFF GIMBAL LOCK LAMP.

R0590 ERASABLE INITIALIZATION:

R0591 1) FRESH START OR RESTART WITH NO GROUPS ACTIVE: C(CDUZ) = 0, IMODES30 BIT 6 = 0, IMODES33 BIT 1 = 0.
 R0593 2) RESTART WITH GROUPS ACTIVE: SAME AS FRESH START EXCEPT C(CDUZ) NOT CHANGED SO GIMBAL MONITOR
 R0595 PROCEEDS AS BEFORE.

R0596 ALARMS: 1) MGA REGION (2) CAUSES GIMBAL LOCK LAMP TO BE LIT.
 R0597 2) MGA REGION (3) CAUSES THE ISS TO BE PUT IN COARSE ALIGN AND THE NO ATT LAMP TO BE LIT IF EITHER NOT
 R0599 SO ALREADY.

0600	REF	1		06,2434	10 034 1	CLOCKMON	CCS	CDUZ	
0601	REF	1		06,2435	1 2441 0		TCF	GLOCKCHK	SEE IF MAGNITUDE OF MGA IS GREATER THAN
0602	REF	1		06,2436	1 2465 0		TCF	SETGLOCK	70 DEGREES.
0603	REF	2	LAST 169	06,2437	1 2441 0		TCF	GLOCKCHK	
0604	REF	2	LAST 169	06,2440	1 2465 0		TCF	SETGLOCK	
0605	REF	1		06,2441	6 2512 0	GLOCKCHK	AD	-70DEGS	
0606				06,2442	0 0006 1		EXTEND		
0607	REF	3	LAST 169	06,2443	6 2464 0		BZMF	SETGLOCK -1	NO LOCK.
0608	REF	1		06,2444	6 2513 1		AD	-15DEGS	SEE IF ABS(MGA) GREATER THAN 85 DEGREES.
0609				06,2445	0 0006 1		EXTEND		
0610	REF	1		06,2446	6 2462 0		BZMF	NOGIMRUN	
0611	REF	12	LAST 166	06,2447	3 4750 1		CAF	FIT4	IF SO, SYSTEM SHOULD BE IN COARSE ALIGN
0612				06,2450	0 0006 1		EXTEND		TO PREVENT GIMBAL RUNAWAY.
0613	REF	6	LAST 166	06,2451	02 012 0		RAND	CHAN12	
0614	REF	11	LAST 168	06,2452	10 000 0		CCS	A	
0615	REF	2	LAST 169	06,2453	1 2462 1		TCF	NOGIMRUN	
0616	REF	3	LAST 166	06,2454	0 4674 0		TC	ISNKCALL	
0617	REF	1		06,2455	17144 0		CADR	SETCDARS	
06173	REF	1		06,2456	3 6242 0		CAF	SIX	ENABLE ISS ERROR COUNTERS IN 60 MS
06174	REF	4	LAST 166	06,2457	0 5203 0		TC	WAITLIST	

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06175	REF	2	LAST	166	E3,1474			EBANK= COUNO		
06176	REF	1			06,2460	03140 1		2CADR	CA+ECE	
06176	REF	1			06,2461	16103 1				
0618	REF	16	LAST	166	06,2462	3 4746 0	NOGINRUN	CAF	BIT6	TURN ON GIMBAL LOCK LAMP.
0619	REF	4	LAST	169	06,2463	1 2465 0		TCF	SETGLOCK	
0620	REF	4	LAST	167	06,2464	3 4755 1	-1	CAF	ZERO	
0621	REF	6	LAST	157	06,2465	6 1036 0	SETGLOCK	AD	DSPTAB +110	SEE IF PRESENT STATE OF GIMBAL LOCK LAMP
0622	REF	17	LAST	170	06,2466	7 4746 1		MASK	BIT6	AGREES WITH DESIRED STATE BY HALF ADDING
0623					06,2467	0 0006 1		EXTEND		THE TWO.
0624	REF	1			06,2470	1 5270 0		BZF	GLOCKOK	OK AS IS.
0625	REF	7	LAST	170	06,2471	7 1036 1		MASK	DSPTAB +110	IF OFF, DONT TURN ON IF IMU BEING CAGED.
0626	REF	12	LAST	169	06,2472	10 000 0		CCS	A	
0627	REF	1			06,2473	1 2507 0		TCF	GLAMPTST	TURN OFF UNLESS LAMP TEST IN PROGRESS.
0628	REF	18	LAST	170	06,2474	3 4746 0		CAF	BIT6	
0629	REF	16	LAST	165	06,2475	7 1302 0		MASK	IMODES30	
0630	REF	13	LAST	170	06,2476	10 000 0		CCS	A	
0631	REF	2	LAST	170	06,2477	1 5270 0		TCF	GLOCKOK	
0632	REF	8	LAST	170	06,2500	4 1036 1	GLINVERT	CS	DSPTAB +110	INVERT GIMBAL LOCK LAMP.
0633	REF	19	LAST	170	06,2501	7 4746 1		MASK	BIT6	
0634	REF	13	LAST	165	06,2502	6 4735 1		AD	BIT15	TO INDICATE CHANGE IN DSPTAB +110.
0635	REF	9	LAST	170	06,2503	57 036 0		XCH	DSPTAB +110	
0636	REF	1			06,2504	7 2162 1		MASK	GCT37737	
0637	REF	10	LAST	170	06,2505	27 036 1		ADS	DSPTAB +110	
0638	REF	3	LAST	170	06,2506	1 5270 0		TCF	GLOCKOK	
0639	REF	1			06,2507	0 2766 1	GLAMPTST	TC	LAMPTST	TURN OFF UNLESS LAMP TEST IN PROGRESS.
0640	REF	4	LAST	170	06,2510	1 5270 0		TCF	GLOCKOK	
0641	REF	1			06,2511	1 2500 1		TCF	GLINVERT	
0642					06,2512	63434 1	-70DEGS	DEC	-.38888	-70 DEGREES SCALED IN HALF-REVOLUTIONS.
0643					06,2513	75252 0	-15DEGS	DEC	-.04333	

L T4RUPT PROGRAM

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P0644 PROGRAM NAME: TLIM.

R0645 FUNCTIONAL DESCRIPTION: THIS PROGRAM MAINTAINS THE TEMP LAMP (BIT 4 OF CHANNEL 11) ON THE OSKY TO AGREE WITH
 R0647 THE TEMP SIGNAL FROM THE ISS (BIT 15 OF CHANNEL 30). HOWEVER, THE LIGHT WILL NOT BE TURNED OFF IF A LAMP TEST
 R0649 IS IN PROGRESS.

R0650 CALLING SEQUENCE: CALLED BY IMUMON ON A CHANGE OF BIT 15 OF CHANNEL 30.

R0651 JOBS OR TASKS INITIATED: NONE.

R0652 SUBROUTINES CALLED: LAMPTEST.

R0653 ERASABLE INITIALIZATION: FRESH START AND RESTART TURN THE TEMP LAMP OFF.

R0655 ALARMS: TEMP LAMP TURNED ON WHEN IHU TEMP GOES OUT OF LIMITS.

R0656 EXIT: NXTIFAIL.

R0657 OUTPUT: SERVICE OF TEMP LAMP.

IN A, EXCEPT FOR TLIM.

0659	REF	1		06,2514	7 4733 0	TLIM	MASK	POS MAX	REMOVE BIT FROM WORD OF CHANGE AND SET
0660	REF	5	LAST 168	06,2515	54 071 0		TS	RUPTREG2	OSKY TEMP LAMP ACCORDINGLY.
0661	REF	17	LAST 170	06,2516	11 302 0		CCS	IMODES30	
0662	REF	1		06,2517	1 2525 0		TCF	TEMPDK	
0663	REF	2	LAST 171	06,2520	1 2525 0		TCF	TEMPDK	
0664	REF	13	LAST 169	06,2521	3 4750 1		CAF	BIT4	TURN ON LAMP.
0665				06,2522	0 0006 1		EXTEND		
0666	REF	1		06,2523	05 011 1		WOR	DSALMOUT	
0667	REF	1		06,2524	1 2225 1		TCF	NXTIFAIL	
0668	REF	2	LAST 170	06,2525	0 2766 1	TEMPDK	TC	LAMPTEST	IF TEMP NOW OK, DONT TURN OFF LAMP IF
0669	REF	2	LAST 171	06,2526	1 2225 1		TCF	NXTIFAIL	LAMP TEST IN PROGRESS.
0670	REF	14	LAST 171	06,2527	4 4750 0		CS	BIT4	
0671				06,2530	0 0006 1		EXTEND		
0672	REF	2	LAST 171	06,2531	03 011 1		WAND	DSALMOUT	TURN OFF LAMP
0673	REF	3	LAST 171	06,2532	1 2225 1		TCF	NXTIFAIL	

L T4RUPT PROGRAM

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P0674 PROGRAM NAME: ITURNON.

R0675 FUNCTIONAL DESCRIPTION: THIS PROGRAM IS CALLED BY IMUMON WHEN A CHANGE OF BIT 14 OF CHANNEL 12 (ISS TURN-ON REQUEST) IS DETECTED. UPON ENTRY, ITURNON CHECKS IF A TURN-ON DELAY SEQUENCE HAS FAILED, AND IF SO, IT EXITS.
 R0677 IF NOT, IT CHECKS WHETHER THE TURN-ON REQUEST CHANGE IS TO ON OR OFF. IF ON, IT SETS BIT 7 OF IMODES30 TO 1 SO
 R0679 THAT TNONTEST WILL INITIATE THE ISS INITIALIZATION SEQUENCE. IF OFF, THE TURN-ON DELAY SIGNAL, CHANNEL 12 BIT
 R0681 15, IS CHECKED AND IF IT IS ON, ITURNON EXITS. IF THE DELAY SIGNAL IS OFF, PROGRAM ALARM 00207 IS ISSUED. BIT 2
 R0683 OF IMODES30 IS SET TO 1 AND THE PROGRAM EXITS.

R0685 THE SETTING OF BIT 2 OF IMODES30 (ISS DELAY SEQUENCE FAIL) INHIBITS THIS ROUTINE AND IMUMON FROM
 R0686 PROCESSING ANY CHANGES. THIS BIT WILL BE RESET BY THE ENDTMON ROUTINE WHEN THE CURRENT 90 SECOND DELAY PERIOD
 R0688 ENDS.
 R0690

R0691 CALLING SEQUENCE: FROM IMUMON WHEN ISS TURN-ON REQUEST CHANGES STATE.

R0692 JOBS OR TASKS INITIATED: NONE.

R0693 SUBROUTINES CALLED: ALARM, IF THE ISS TURN-ON REQUEST IS NOT PRESENT FOR 90 SECONDS.

R0695 ERASABLE INITIALIZATION: FRESH START AND RESTART SET BIT 15 OF CHANNEL 12 AND BITS 2 AND 7 OF IMODES30 TO 0.
 R0697 AND BIT 14 OF IMODES30 TO 1.

R0698 ALARMS: PROGRAM ALARM 00207 IS ISSUED IF THE ISS TURN-ON REQUEST SIGNAL IS NOT PRESENT FOR 90 SECONDS.

R0700 EXIT: NXTIFAIL.

R0701 OUTPUT: BIT 7 OF IMODES30 TO START ISS INITIALIZATION, OR BIT 2 OF IMODES30 AND PROGRAM ALARM 00207 TO INDICATE
 R0703 A FAILED TURN-ON SEQUENCE.

0704	REF	15	LAST	164	06,2533	3 4752 0	ITURNON	CAF	BIT2	IF DELAY REQUEST HAS GONE OFF
0705	REF	18	LAST	171	06,2534	7 1302 0		MASK	IMODES30	PREMATURELY. DO NOT PROCESS ANY CHANGES
0706	REF	14	LAST	170	06,2535	10 000 0		CCS	A	UNTIL THE CURRENT 90 SEC WAIT EXPIRES.
0707	REF	4	LAST	171	06,2536	1 2225 1		TCF	NXTIFAIL	
0708	REF	20	LAST	164	06,2537	3 4736 1		CAF	BIT14	SEE IF JUST ON OR OFF.
0709	REF	19	LAST	172	06,2540	7 1302 0		MASK	IMODES30	
0710					06,2541	0 0006 1		EXTEND		
0711	REF	1			06,2542	1 2556 1		BZF	ITURNON2	IF JUST ON.
0712	REF	14	LAST	170	06,2543	3 4735 1		CAF	BIT15	
0713					06,2544	0 0006 1		EXTEND		SEE IF DELAY PRESENT DISCRETE HAS BEEN
0714	REF	7	LAST	169	06,2545	02 012 0		RAND	CHAN12	SENT. IF SO, ACTION COMPLETE
0715					06,2546	0 0006 1		EXTEND		
0716					06,2547	1 2551 0		BZF	+2	
0717	REF	5	LAST	172	06,2550	1 2225 1		TCF	NXTIFAIL	
0718	REF	16	LAST	172	06,2551	3 4752 0		CAF	BIT2	IF NOT, SET BIT TO INDICATE REQUEST NOT
0719	REF	20	LAST	172	06,2552	27 1302 0		ADS	IMODES30	PRESENT FOR FULL DURATION.
0720	REF	2	LAST	164	06,2553	0 5567 0		TC	ALARM	
0721					06,2554	00207 1		OCT	207	
0722	REF	6	LAST	172	06,2555	1 2225 1		TCF	NXTIFAIL	

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0723	REF	21	LAST	172	06,2556	4 1302 0	1TURNONZ	CS	IMODES30	SET BIT7 TO INDICATE WAIT OF 1 SAMPLE
0724	REF	16	LAST	164	06,2557	7 4745 1		MASK	BIT7	
0725	REF	22	LAST	173	06,2560	27 302 0		ADS	IMODES30	
0726	REF	1			06,2561	3 2564 1		CAF	RRINIT	
07261	REF	2	LAST	154	06,2562	54 110 0		TS	PADMODES	
0727	REF	7	LAST	172	06,2563	1 2225 1		TCF	NXTIFAIL	
07271					06,2564	00102 1	RRINIT	DCT	00102	

L T4RUPT PROGRAM

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P0728 PROGRAM NAME: IMUCAGE.

R0729 FUNCTIONAL DESCRIPTION: THIS PROGRAM PROCESSES CHANGES OF THE IMUCAGE INBIT. CHANNEL 40 BIT 1. IF THE BIT
 R0731 CHANGES TO 0 (CAGE BUTTON PRESSED), THE ISS IS CAGED (ICDU ZERO + COARSE ALIGN + NO ATT LAMP) UNTIL THE
 R0733 ASTRONAUT SELECTS ANOTHER PROGRAM TO ALIGN THE ISS. ANY PULSE TRAINS TO THE ICDU'S AND GYRO'S ARE TERMINATED,
 R0735 THE ASSOCIATED OUTCOUNTERS ARE ZEROED AND THE GYRO'S ARE DE-SELECTED. NO ACTION OCCURS WHEN THE BUTTON IS
 R0737 RELEASED (INBIT CHANGES TO 1).

R0738 CALLING SEQUENCE: BY IMUMON WHEN IMU CAGE BIT CHANGES.

R0739 JOBS OR TASKS INITIATED: NONE.

R0740 SUBROUTINES CALLED: CAGESUB.

R0741 ERASABLE INITIALIZATION: FRESH START AND RESTART SET BIT 11 OF IMODES30 TO 1.

R0743 ALARMS: NONE.

R0744 EXIT: NRTIFAIL.

R0745 OUTPUT: ISS CAGED, COUNTERS ZEROED, PULSE TRAINS TERMINATED AND NO ATT LAMP LIT.

0747	REF	15	LAST	172	06,2565	10 000 0	IMUCAGE	CCS	A	NO ACTION IF GOING OFF.
0748	REF	1			06,2566	1 2361 0		TCF	ISSZERO	
0749	REF	1			06,2567	4 3002 1		CS	ECT77000	TERMINATE ICDU, RCDU, GYRO PULSE TRAINS
0750					06,2570	0 0006 1		EXTEND		
0751	REF	1			06,2571	03 014 1		WAND	CHAN14	
0752	REF	1			06,2572	4 2776 1		CS	ECT272	KNOCK DOWN DISPLAY INERTIAL DATA, IMU
07521					06,2573	0 0006 1		EXTEND		ERROR COUNTER ENABLE, ZERO ICDU, COARSE
07522	REF	8	LAST	172	06,2574	03 012 1		WAND	CHAN12	ALIGN ENABLE, RR ERROR COUNTER ENABLE.
075221	REF	1			06,2575	4 4745 1		CS	ENGONBIT	INSURE ENGONFLG IS CLEAR.
075222	REF	2	LAST	157	06,2576	7 0101 0		MASK	FLAGWRD5	
075223	REF	3	LAST	174	06,2577	54 101 0		TS	FLAGWRD5	
07523	REF	1			06,2600	4 4355 1		CS	PRID30	TURN ENGINE OFF.
07524					06,2601	0 0006 1		EXTEND		
07525	REF	3	LAST	171	06,2602	02 011 0		RAND	DSALMOUT	
075251	REF	21	LAST	172	06,2603	6 4736 1		AD	BIT14	
075252					06,2604	0 0006 1		EXTEND		
075253	REF	4	LAST	174	06,2605	01 011 0		WRITE	DSALMOUT	FORCE BIT14=1, BIT13=0.
07526	REF	1			06,2606	0 2743 0		TC	CAGE-UB1	
07527	REF	4	LAST	169	06,2607	0 4674 0		TC	TONECALL	KNOCK DOWN TRACK, LIFESMART, DRIFF FLAGS
07528	REF	1			06,2610	17175 1		CADR	RNDREFDR	
0753	REF	5	LAST	170	06,2611	4 4755 0		CS	ZERO	
0754	REF	1			06,2612	54 050 0		TS	CDUXCMD	
0755	REF	1			06,2613	54 051 1		TS	CDUYCMD	

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0756	REF	1	06.2614	54 052 1
0757	REF	1	06.2615	54 047 0
0758	REF	1	06.2616	4 3001 1
0759			06.2617	0 0006 1
0760	REF	2	06.2620	03 014 1
0761	REF	8	06.2621	1 2225 1

TS	CDUZCMD
TS	GYRUCMD
CS	UCT740
EXTEND	
WARD	CHAN14
TCF	EXTIFAIL

HAVING WAITED AT LEAST 27 HRT FROM
GYRD PULSE TRAIN TERMINATION, WE CAN
DE-SELECT THE GYRUS

L T4RUPT PROGRAM

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P0762 PROGRAM NAME: IMUOP.

R0763 FUNCTIONAL DESCRIPTION: THIS PROGRAM PROCESSES CHANGES IN THE ISS OPERATE DISCRETE, BIT 9 OF CHANNEL 30.
 R0765 IF THE INBIT CHANGES TO 0, INDICATING ISS ON, IMUOP GENERALLY SETS BIT 7 OF IMODES30 TO 1 TO REQUEST ISS
 R0767 INITIALIZATION VIA TMONTEST. AN EXCEPTION IS DURING A FAILED ISS DELAY DURING WHICH BIT 2 OF IMODES30 IS SET
 R0769 TO 1 AND NO FURTHER INITIALIZATION IS REQUIRED. WHEN THE INBIT CHANGES TO 1, INDICATING ISS OFF, IMOUSEFLG IS
 R0771 TESTED TO SEE IF ANY PROGRAM WAS USING THE ISS. IF SO, PROGRAM ALARM 00214 IS ISSUED.

R0773 CALLING SEQUENCE: BY IMUDON WHEN BIT 9 OF CHANNEL 30 CHANGES.

R0774 JOBS OR TASKS INITIATED: NONE.

R0775 SUBROUTINES CALLED: ALARM, IF ISS IS TURNED OFF WHILE IN USE.

R0776 ERASABLE INITIALIZATION: ON FRESH START AND RESTART. BIT 7 OF IMODES30 IS SET TO 1 EXCEPT WHEN THE GIMBAL LOCK
 R0778 LAMP IS ON, IN WHICH CASE IT IS SET TO 0. THIS PREVENTS ICDD ZERO BY TMONTEST WITH THE ISS IN GIMBAL LOCK.

R0780 ALARMS: PROGRAM ALARM 00214 IF THE ISS IS TURNED OFF WHILE IN USE.

R0781 EXIT: NXTIFAIL.

R0782 OUTPUT: ISS INITIALIZATION REQUEST (IMODES30 BIT 7) OR PROGRAM ALARM 00214.

0784				06,2622	0 0006 1	IMUOP	EXTEND		
0785	REF	1		06,2623	1 2643 0		BZF	IMUOP2	
0786	REF	10	LAST	168	06,2624	4 1303 1	CS	IMODES33	DISABLE DAP
0787	REF	20	LAST	170	06,2625	7 4746 1	MASK	BIT6	
0788	REF	11	LAST	176	06,2626	27 303 1	ADS	IMODES33	
07885	REF	5	LAST	174	06,2627	0 4674 0	TC	IBNKCALL	KNOCK DOWN TRACK, REFRESH, DRIFT FLAGS
07886	REF	2	LAST	174	06,2630	17175 1	CADR	RNDKEFDR	
07887	REF	2	LAST	164	06,2631	4 2777 0	CS	BIT5768	KNOCK DOWN RENDEZVOUS, IMOUSE FLAGS
07888	REF	3	LAST	166	06,2632	7 0074 0	MASK	FLAGWRDO	
0789	REF	4	LAST	176	06,2633	56 074 1	XCH	FLAGWRDO	IF GOING OFF, ALARM IF PROG USING IMU.
07891					06,2634	4 0000 0	CON		
0790	REF	1			06,2635	7 4744 0	MASK	IMOUSEFLG	
0791	REF	16	LAST	174	06,2636	10 000 0	CCS	A	
0792	REF	9	LAST	175	06,2637	1 2225 1	TCF	NXTIFAIL	
0793	REF	3	LAST	172	06,2640	0 5567 0	TC	ALARM	
0794					06,2641	00214 0	UCT	214	
0795	REF	10	LAST	176	06,2642	1 2225 1	TCF	NXTIFAIL	
0796	REF	17	LAST	172	06,2643	3 4752 0	CAP	BIT2	SEE IF FAILED ISS TURN-ON SEQ IN PRG.
0797	REF	23	LAST	173	06,2644	7 1302 0	MASK	IMODES30	
0798	REF	17	LAST	176	06,2645	10 000 0	CCS	A	
0799	REF	11	LAST	176	06,2646	1 2225 1	TCF	NXTIFAIL	IF SO, CONT PROCESS UNTIL PRESENT 90
0800	REF	2	LAST	172	06,2647	1 2556 1	TCF	ITURNON	SECONDS EXPIRES.

L T4RUPT PROGRAM

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PO801 PROGRAM NAME: PIPFAIL

RO802 FUNCTIONAL DESCRIPTION: THIS PROGRAM PROCESSES CHANGES OF BIT 15 OF CHANNEL 33, PIPA FAIL. IT SETS BIT 10 OF
 RO804 IMODES30 TO AGREE. IT CALLS SETISSW IN CASE A PIPA FAIL NECESSITATES AN ISS WARNING. IF NOT, I.E., IMODES30
 RO806 BIT 1 = 1, AND A PIPA FAIL IS PRESENT AND THE ISS IS NOT BEING INITIALIZED, PROGRAM ALARM 00212 IS ISSUED.

RO808 CALLING SEQUENCE: BY C33TEST ON CHANGES OF CHANNEL 33 BIT 15.

RO809 JOBS OR TASKS INITIATED: NONE.

RO810 SUBROUTINES CALLED: 1) SETISSW, AND 2) ALARM (SEE FUNCTIONAL DESCRIPTION).

RO812 ERASABLE INITIALIZATION: SEE IMUMOD FOR INITIALIZATION OF IMODES30. THE RELEVANT BITS ARE 5, 7, 8, 9, AND 10.

RO814 ALARMS: PROGRAM ALARM 00212 IF PIPA FAIL IS PRESENT BUT NEITHER ISS WARNING IS TO BE ISSUED NOR THE ISS IS
 RO816 BEING INITIALIZED.

RO817 EXIT: NXTFL33.

RO818 OUTPUT: PROGRAM ALARM 00212 AND ISS WARNING MAINTENANCE.

0819	REF	18	LAST	176	06,2650	10 000 0	PIPFAIL	CCS	A	SET BIT10 IN IMODES30 SO ALL ISS WARNING
0820	REF	14	LAST	131	06,2651	3 4742 1		CAF	BIT10	INFO IS IN ONE REGISTER.
0821	REF	24	LAST	176	06,2652	57'302 1		XCH	IMODES30	
0822	REF	1			06,2653	7 3004 1		MASK	-BIT10	
0823	REF	25	LAST	177	06,2654	27'302 0		ADS	IMODES30	
0824	REF	2	LAST	165	06,2655	0 2703 1		TC	SETISSW	
0825	REF	26	LAST	177	06,2656	4 1302 0		CS	IMODES30	IF PIP FAIL DOESNT LIGHT ISS WARNING, DO
0826	REF	13	LAST	88	06,2657	7 4753 0		MASK	BIT1	A PROGRAM ALARM IF IMU OPERATING BUT NOT
0827	REF	19	LAST	177	06,2660	10 000 0		CCS	A	CAGED OR BEING TURNED ON.
0828	REF	1			06,2661	1 2432 1		TCF	NXTFL33	
0829	REF	27	LAST	177	06,2662	3 1302 1		CA	IMODES30	
0830	REF	1			06,2663	7 3000 0		MASK	OCT1720	
0831	REF	20	LAST	177	06,2664	10 000 0		CCS	A	
0832	REF	2	LAST	177	06,2665	1 2432 1		TCF	NXTFL33	ABOVE CONDITION NOT MET.
0833	REF	4	LAST	176	06,2666	0 5567 0		TC	ALARM	
0834					06,2667	00212 0		OCT	212	
0835	REF	3	LAST	177	06,2670	1 2432 1		TCF	NXTFL33	

L T4RUPT PROGRAM

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PO836 PROGRAM NAMES: DNTMFAST, UPTMFAST

RO837 FUNCTIONAL DESCRIPTION: THESE PROGRAMS PROCESS CHANGES OF BITS 12 AND 11 OF CHANNEL 3A. IF A BIT CHANGES TO A
RO839 0, A PROGRAM ALARM IS ISSUED. THE ALARMS ARE:

	BIT	ALARM	CAUSE
RO840			
RO841			
RO842	12	01105	DOWNLINK TOO FAST
RO843	11	01106	UPLINK TOO FAST

RO844 CALLING SEQUENCE: BY C3BTST ON A BIT CHANGE.

RO845 SUBROUTINES CALLED: ALARM, IF A BIT CHANGES TO A 0.

RO846 ERASABLE INITIALIZATION: FRESH START OR RESTART, BITS 12 AND 11 OF 1400ES33 ARE SET TO 1.

RO848 ALARMS: SEE FUNCTIONAL DESCRIPTION.

RO849 EXIT: NXTFL33.

RO850 OUTPUT: PROGRAM ALARM ON A BIT CHANGE TO 0.

0851	REF	21	LAST	177	06,2671	10-000-0	DNTMFAST	CCS	A	DO PROG ALARM IF TM TOO FAST.
0852	REF	4	LAST	177	06,2672	1-2432-1		TCF	NXTFL33	
0853	REF	5	LAST	177	06,2673	0-5567-0		TC	ALARM	
0854					06,2674	01105-1		OCT	1105	
0855	REF	5	LAST	178	06,2675	1-2432-1		TCF	NXTFL33	

0856	REF	22	LAST	178	06,2676	10-000-0	UPTMFAST	CCS	A	SAME AS UNLINK TOO FAST WITH DIFFERENT
0857	REF	6	LAST	178	06,2677	1-2432-1		TCF	NXTFL33	ALARM CODE.

0858	REF	6	LAST	178	06,2700	0-5567-0		TC	ALARM	
0859					06,2701	01106-1		OCT	1106	
0860	REF	7	LAST	178	06,2702	1-2432-1		TCF	NXTFL33	

L T4RUPT PROGRAM

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PO861 PROGRAM NAME: SETISSW

RO862 FUNCTIONAL DESCRIPTION: THIS PROGRAM TURNS THE ISS WARNING LAMP ON AND OFF (CHANNEL 11 BIT 1 = 1 FOR ON,
 RO864 0 FOR OFF) DEPENDING ON THE STATUS OF IMODES30 BITS 13 (IMU FAIL) AND 4 (INHIBIT IMU FAIL), 12 (ICDU FAIL) AND
 RO866 3 (INHIBIT ICDU FAIL), AND 10 (PIPA FAIL) AND 1 (INHIBIT PIPA FAIL). THE LAMP IS LEFT ON IF A LAMP TEST IS IN
 RO868 PROGRESS.

RO869 CALLING SEQUENCE: CALLED BY IMUMON ON CHANGES TO IMU FAIL AND ICDU FAIL. CALLED BY IFAILOK AND PFAILOK UPON
 RO871 REMOVAL OF THE FAIL INHIBITS. CALLED BY PIPFAIL WHEN THE PIPA FAIL DISCRETE CHANGES. IT IS CALLED BY PIPUSE-
 RO873 SINCE THE PIPA FAIL PROGRAM ALARM MAY NECESSITATE AN ISS WARNING, AND LIKEWISE BY PIPFREE WHEN THE ALARM DEPARTS
 RO875 AND IT IS CALLED BY IMUZERD3 AND ISSUP AFTER THE FAIL INHIBITS HAVE BEEN REMOVED.

RO877 JOBS OR TASKS INITIATED: NONE.

RO878 SUBROUTINES CALLED: NONE.

RO879 ERASABLE INITIALIZATION:

RO880 1) IMODES30 - SEE IMUMON.
 RO881 2) IMODES33-BIT-1 = 0 (LAMP TEST NOT IN PROGRESS).

RO882 ALARMS: ISS WARNING.

RO8821 THE FOLLOWING PROGRAM ALARMS WILL SHOW WHICH FAILURE CAUSED THE ISS WARN

RO8822 PROGRAM ALARM 00777 PIPA FAIL

RO8823 PROGRAM ALARM 03777 ICDU FAIL

RO8824 PROGRAM ALARM 04777 ICDU, PIPA FAILS

RO8825 PROGRAM ALARM 07777 IMU FAIL

RO8826 PROGRAM ALARM 10777 IMU, PIPA FAILS

RO8827 PROGRAM ALARM 13777 IMU, ICDU FAILS

RO8828 PROGRAM ALARM 14777 IMU, ICDU, PIPA FAILS

RO883 EXIT: VIA Q.

RO884 OUTPUT: ISS WARNING LAMP SET PROPERLY.

0885	REF	1		06.2703	3 4761 0	SETISSW	CAF	OCT15	SET ISS WARNING USING THE FAIL BITS IN
0886	REF	28	LAST 177	06.2704	7 1302 0		MASK	IMODES30	BITS 13, 12, AND 10 OF IMODES30 AND THE
0887				06.2705	0 0006 1		EXTEND		FAILURE INHIBIT BITS IN POSITIONS
0888	REF	15	LAST 177	06.2706	7 4742 0		MP	BIT10	4, 3, AND 1.
0889	REF	29	LAST 179	06.2707	3 1302 1		CA	IMODES30	
0890				06.2710	0 0006 1		EXTEND		
0891	REF	5	LAST 167	06.2711	04 001 1		RDR	LCHAN	0 INDICATES FAILURE
0892				06.2712	4 0000 0		CON		
0893	REF	1		06.2713	7 5025 1		MASK	OCT15000	
0894	REF	23	LAST 178	06.2714	10 000 0		CCS	A	
0895	REF	1		06.2715	1 2726 1		TCF	ISSWON	FAILURE.
0896	REF	14	LAST 177	06.2716	3 4753 1	ISSWOFF	CAF	BIT1	DONT TURN OFF ISS WARNING IF LAMP TEST
0897	REF	12	LAST 176	06.2717	7 1303 1		MASK	IMODES33	IN PROGRESS.

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0898	REF	24	LAST	179	06,2720	10 000 0	CCS	A	
0899	REF	3	LAST	157	06,2721	0 0002 0	TC	0	
0900	REF	15	LAST	179	06,2722	4 4753 0	CS	BIT1	
0901					06,2723	0 0006 1	EXTEND		
0902	REF	5	LAST	174	06,2724	03 011 1	WAND	DSALMOUT	
0903	REF	4	LAST	180	06,2725	0 0002 0	TC	0	
0904					06,2726	0 0006 1	ISSWON	EXTEND	
090402	REF	1			06,2727	22 066 1	QXCH	ITEMP6	
090404	REF	1			06,2730	0 5744 0	TC	VARALARM	TELL EVERYONE WHAT CAUSED THE ISSWARNING
09041	REF	16	LAST	180	06,2731	3 4753 1	CAP	BIT1	
0905					06,2732	0 0006 1	EXTEND		
0906	REF	6	LAST	180	06,2733	05 011 1	WOR	DSALMOUT	
0907	REF	2	LAST	180	06,2734	0 0066 1	TC	ITEMP6	
0908	REF	1			06,2735	4 3003 0	CAGESUB	CS	BITS0&15
0909					06,2736	0 0006 1	EXTEND		SET OUTBITS AND INTERNAL FLAGS FOR
0910	REF	9	LAST	174	06,2737	03 012 1	WAND	CHAN12	SYSTEM TURN-ON OR CAGE. DISABLE THE
0911	REF	2	LAST	165	06,2740	3 4763 1	CAP	BITS4&5	ERROR COUNTER AND REMOVE IMU DELAY COMP.
0912					06,2741	0 0006 1	EXTEND		SEND ZERO AND COARSE.
0913	REF	10	LAST	180	06,2742	05 012 1	WOR	CHAN12	
0914	REF	11	LAST	176	06,2743	4 1036 1	CAGESUB1	CS	DSPTAB +110
0915	REF	1			06,2744	7 2773 1	MASK	0040010	TURN ON NO ATT LAMP
0916	REF	12	LAST	180	06,2745	27 036 1	ADS	DSPTAB +110	
0918	REF	30	LAST	179	06,2746	4 1302 0	CAGESUB2	CS	IMODES30
0919	REF	1			06,2747	7 2775 1	MASK	OCT75	SET FLAGS TO INDICATE CAGING OR TURN-ON
0920	REF	31	LAST	180	06,2750	27 302 0	ADS	IMODES30	AND INHIBIT ALL ISS WARNING INFO
0922	REF	13	LAST	179	06,2751	4 1303 1	CS	IMODES33	DISABLE DAP AUTO AND HOLD MODES
0923	REF	21	LAST	176	06,2752	7 4746 1	MASK	BIT6	
0924	REF	14	LAST	180	06,2753	27 303 1	ADS	IMODES33	
0925	REF	5	LAST	180	06,2754	0 0002 0	TC	0	
0926	REF	3	LAST	177	06,2703		IMUFAIL	EQUALS SETISSW	
0927	REF	4	LAST	180	06,2703		ICOUFAIL	EQUALS SETISSW	

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JUMP TABLES AND CONSTANTS.

0929	REF	1		06,2755	1 2532 1	IFAILJMP	TCF	ITURNON	CHANNEL 30 DISPATCH.
0930	REF	1		06,2756	1 2703 0		TCF	IMUFAIL	
0931	REF	1		06,2757	1 2703 0		TCF	ICDIFAIL	
0932	REF	1		06,2760	1 2565 1		TCF	IMUCAGE	
0933				06,2761	76400 1	3ORDMSK	DET	76400	(BIT 10 NOT SAMPLED HERE).
0934	REF	1		06,2762	1 2622 1		TCF	IMUOP	

0935	REF	1		06,2763	1 2650 1	CB5JMP	TCF	PIFFAIL	CHANNEL 33 DISPATCH.
0936	REF	1		06,2764	1 2671 1		TCF	DNMFEST	
0937	REF	1		06,2765	1 2676 0		TCF	UPTMFEST	

R0938 SUBROUTINE TO SKIP IF LAMP TEST NOT IN PROGRESS.

0939	REF	15	LAST 180	06,2766	4 1303 1	LAMPTEST	CS	IMODES33	BIT 1 OF IMODES33 = 1 IF LAMP TEST IN
0940	REF	17	LAST 180	06,2767	7 4753 0		MASK	BIT1	PROGRESS.
0941	REF	25	LAST 180	06,2770	10 000 0		CCS	A	
0942	REF	6	LAST 180	06,2771	24 002 0		INCR	Q	
0943	REF	7	LAST 181	06,2772	0 0002 0		TC	Q	

0944	REF	1		5026		33ORDMSK	EQUALS	PRID16	
0945				06,2773	40010 1	OC40010	DET	40010	
0947				06,2774	00054 0	DET54	DET	54	
0948				06,2775	00075 0	DET75	DET	75	
09485				06,2776	00272 0	DET272	DET	00272	
0949				06,2777	00300 1	BITS768	DET	300	
0950				06,3000	01720 0	DET1720	DET	1720	
0951				06,3001	00740 1	DET740	DET	00740	
0952	REF	1		5025		DET15000	EQUALS	PRID15	
0953				06,3002	77000 1	DET77000	DET	77000	
0954				06,3003	40040 1	BITS6&15	DET	40040	
0955				06,3004	76777 1	-BIT10	DET	-1000	

0956				06,3005	21450 0	90SECS	DEC	9000	
0957	REF	1		5751		120MS	=	DET14	(DET12)
0958	REF	4	LAST 160	5270		GLOCKOK	EQUALS	RESUME	

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P0959 PROGRAM NAME_ RRAUTCHK

R0960 FUNCTIONAL DESCRIPTION_

R0961 RRAUTCHK IS THE RENDEZVOUS RADAR INBIT MONITOR. INITIALLY THE RR
R0962 POWER ON AUTO (CHAN 33 BIT 2) INBIT IS CHECKED. IF NO CHANGE, THE
R0963 PROGRAM EXITS TO RRCDUCHK. IF A CHANGE, RADMODES IS UPDATED
R0964 AND A CHECK MADE IF RR POWER HAS JUST COME ON. IF JUST OFF, A CHECK
R0965 IS MADE TO SEE IF A PROGRAM WAS USING THE RR (STATE BIT 7). IF NO,
R0966 THE PROGRAM EXITS TO RRCDUCHK. IF YES, PROGRAM ALARM 00514
R0967 IS REQUESTED BEFORE EXITING TO RRCDUCHK. IF RR POWER HAS JUST COME
R0968 ON, A CHECK IS MADE TO SEE IF A PROGRAM WAS USING THE RR (STATE BIT 7).
R0969 IF YES, THE PROGRAM EXITS TO RRCDUCHK WITHOUT REQUESTING THE TURN-ON
R0970 SEQUENCE. IF NO, RADMODES IS UPDATED TO INDICATE RR CDU ZERO AND
R0971 RR TURN-ON SEQUENCE (BITS 13, 1). A 10-MILLISECOND WAITLIST CALL
R0972 IS THEN SET FOR RRTURNON BEFORE THE PROGRAM EXITS TO NORRGMON.

R0973 CALLING SEQUENCE_

R0974 T4RUPT EVERY 480 MILLISECONDS

R0975 ERASABLE INITIALIZATION REQUIRED_

R0976 RADMODES, STATE

R0977 SUBROUTINES CALLED_

R0978 WAITLIST

R0979 JOBS OR TASKS INITIATED_

R0980 RRTURNON

R0981 ALARMS_ PROGRAM ALARM 00514 - RADAR GOES OUT OF AUTO MODE WHILE BEING
R0982 USED

R0983 EXIT_ RRCDUCHK, NORRGMON

0984	REF	3	LAST	173	06,3006	4 0110 1	RRAUTCHK	CA	RADMODES	SEE IF CHANGE IN RR AUTO MODE BIT.
0985					06,3007	0 0006 1		EXTEND		
0986	REF	2	LAST	167	06,3010	06 033 1		RXDR	CHAN33	
0987	REF	1			06,3011	7 4752 1		MASK	AUTOMBIT	
0988					06,3012	0 0006 1		EXTEND		
0989	REF	1			06,3013	1 3037 1		BZF	RRCDUCHK	
0990	REF	4	LAST	182	06,3014	22 110 1		LXCH	RADMODES	UPDATE RADMODES.
0991					06,3015	0 0006 1		EXTEND		
0992	REF	6	LAST	179	06,3016	06 001 0		RXDR	LCHAN	
09925	REF	1			06,3017	7 3033 0		MASK	GLT05776	CLR CONT. DES., REMOVE, LUTLS, CDZZERO,
0993	REF	5	LAST	182	06,3020	54 110 0		TS	RADMODES	AND TURNON BITS.
0994	REF	18	LAST	176	06,3021	7 4752 1		MASK	BIT2	SEE IF JUST ON.
0995	REF	26	LAST	181	06,3022	10 000 0		CCS		
0996	REF	2	LAST	182	06,3023	1 3034 1		TCF	RRCDUCHK -5	OFF. GO DISABLE RR CDU ERROR COUNTERS.
0999	REF	1			06,3024	3 7663 0		CA	DCT10001	SET RRCDUZRO AND TURNON BITS.
1000	REF	6	LAST	182	06,3025	26 110 0		ADS	RADMODES	

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1001	REF	5	LAST	168	06.3026	3 4753 1	CAF	ONE
1002	REF	5	LAST	169	06.3027	0 5203 0	TC	WAITLIST
1003	REF	1			E7.1456		EBANK	LOGCOUNT
1004	REF	1			06.3030	02062 1	2CADR	RETURNON
1004	REF	1			06.3031	52107 0		
1005	REF	1			06.3032	1 3132 0	TCF	ROBBERMON
1006					06.3033	05776 1-06T05776	OCF	5776

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P1007 PROGRAM NAME_ RRCDUCHK

P1008 FUNCTIONAL DESCRIPTION_

R1009 RRCDUCHK CHECKS FOR RR CDU FAIL (CHAN 30 BIT 7). INITIALLY THE
R1010 RR CDU FAIL BIT IS SAMPLED (CHAN 30 BIT 7). IF NO CHANGE, THE
R1011 PROGRAM EXITS TO RRGIMON. IF A CHANGE, THE RR AUTO MODE
R1012 (RADMODES BIT 2) BIT IS CHECKED. IF NOT IN RR AUTO MODE, THE
R1013 PROGRAM EXITS TO NORRGIMON. IF IN AUTO MODE, RADMODES BIT 7
R1014 (RR CDU OK) IS UPDATED AND IF P-20 IS OPERATING PROGRAM ALARM 00515 IS
R1015 REQUESTED. CONTROL IS TRANSFERRED TO SETTRKF TO UPDATE
R1016 THE TRACKER FAIL LAMP (DSPTAB+110 BIT 8). CONTROL RETURNS TO
R1017 RRGIMON.

R1018 CALLING SEQUENCE_

R1019 EVERY 480 MILLISECONDS FROM RAUTCHK (VIA T4RUPT) UNLESS A
R1020 TURN-ON SEQUENCE HAS JUST BEEN INITIATED.

R1021 ERASABLE INITIALIZATION REQUIRED_

R1022 RADMODES

R1023 SUBROUTINES CALLED_

R1024 SETTRKF

R1025 JOBS OR TASKS INITIATED_

R1026 NONE

R1027 ALARMS_

R1028 TRACKER FAIL

R1029 PROGRAM ALARM 00515 - RRCDU FAIL DURING P-20

R1030 EXIT_

R1031 RRGIMON, NORRGIMON

10315	REF	19	LAST	182	06,3034	4 4752 1	-3	CS	BIT2	
10316					06,3035	0 0006 1		EXTEND		
10317	REF	11	LAST	180	06,3036	03 012 1		WAND	CHAN12	AT TURNON, DISABLE CDU TRACK COUNTERS.
1032	REF	7	LAST	182	06,3037	3 0110 1	RRCDUCHK	CA	RADMODES	LAST SAMPLED BIT IN RADMODES.
1033					06,3040	0 0006 1		EXTEND		
1034	REF	2	LAST	161	06,3041	06 030 1		RXOR	CHAN30	
1035	REF	1			06,3042	7 4745 1		MASK	RCDFBIT	
1036					06,3043	0 0006 1		EXTEND		
1037	REF	1			06,3044	1 3071 0		BZF	RRGIMON	
1038	REF	2	LAST	182	06,3045	3 4752 0		CAF	AUTOMBIT	IF RR NOT IN AUTO MODE, DON'T CHANGE BIT
1039	REF	8	LAST	184	06,3046	7 0110 0		MASK	RADMODES	7 OF RADMODES. IF THIS WERE NOT DONE,
1040	REF	27	LAST	182	06,3047	10 000 0		CCS	A	THE TRACKER FAIL MIGHT COME ON WHEN
1041	REF	2	LAST	183	06,3050	1 3132 0		TCF	NORRGIMON	JUST READING LR DATA.
1042	REF	2	LAST	184	06,3051	3 4745 0		CAF	RCDFBIT	SET BIT 7 OF RADMODES FOR SETTRKF.

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1043	REF	9	LAST	184	06,3052	22-110-1	LXCH	RADMODES	UPDATE RADMODES.
1044					06,3053	0 0006 1	EXTEND		
1045	REF	3	LAST	167	06,3054	06 001 0	RXDR	L	
1046	REF	10	LAST	185	06,3055	54-110-0	TS	RADMODES	
1047	REF	11	LAST	185	06,3056	3 0110 1	CA	RADMODES	DID-RR-CDU FAIL
1048	REF	3	LAST	184	06,3057	7-4745-1	MASK	RCDUFBIT	
1049	REF	28	LAST	184	06,3060	10 000 0	CCS	A	
1050	REF	1			06,3061	1 3070 1	TCF	TRKFLCDU	NO
1051	REF	5	LAST	176	06,3062	4 0074 0	CS	FLAGWRDD	RNDVFLG P20 OR P22 OPERATING
1052	REF	1			06,3063	7-4745-1	MASK	RNDVZBIT	
1053	REF	29	LAST	185	06,3064	10 000 0	CCS	A	
1054	REF	2	LAST	185	06,3065	1 3070 1	TCF	TRKFLCDU	NO
1055	REF	7	LAST	178	06,3066	0 5567 0	TC	ALARM	YES
1056					06,3067	00515 0	UCT	GOSIS	
1057	REF	1			06,3070	0-4564-1	TRKFLCDU-TC	SETTRKF	UPDATE TRACKER FAIL LAMP ON USKY.

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P1058 PROGRAM NAME_ RRGIMON

E AUTO MODE EXCEPT WHEN THE RR CDUS ARE

R1060 FUNCTIONAL DESCRIPTION_

TTER IS INITIATED BY THIS MONITOR WHEN
ED TO DRIVE THE GIMBALS TO T = 0 AND

R1062 RRGIMON IS THE RR GIMBAL LIMIT MONITOR. INITIALLY THE FOLLOWING IS

R1064 CHECKED_ REMODE, RR CDUS BEING ZEROED, REPOSITION, AND RR

R1065 NOT IN AUTO MODE (RADMODES BITS 14, 13, 11 2). IF ANY OF THESE

R1066 EXIST THE PROGRAM EXITS TO GPMATRIX. IF NONE ARE PRESENT RRLIMCHK

R1067 IS CALLED TO SEE IF THE PRESENT RR CDU ANGLES (DPTY, DPTX) ARE WITHIN

R1068 THE LIMITS OF THE CURRENT MODE. IF WITHIN LIMITS, THE PROGRAM EXITS

R1069 TO NORRGIMON. IF NOT WITHIN LIMITS, THE REPOSITION FLAG (RADMODES

R1070 BIT 11) IS SET. THE RR AUTO TRACKER AND RR ERROR COUNTER

R1071 (CHAN 12 BITS 14, 2) ARE DISABLED, AND A 20-MILLISECOND WAITLIST

R1072 CALL IS SET FOR DORREPOS AFTER WHICH THE PROGRAM EXITS TO NORRGIMON.

R1073 CALLING SEQUENCE_

R1074 EVERY 480 MILLISECONDS FROM RRCDUCHK (VIA T4RUPT) UNLESS TURN-ON

R1075 HAS JUST BEEN INITIATED VIA RRAUTCHK OR IF THERE HAS BEEN A CHANGE IN

R1076 THE RR CDU FAIL BIT (CHAN 30 BIT 7) AND THE RR IS NOT IN THE AUTO MODE

R1077 (RADMODES BIT 2).

R1078 ERASABLE INITIALIZATION_ RADMODES

R1079 SUBROUTINES CALLED_

R1080 RRLIMCHK, WAITLIST

R1081 JOBS OR TASKS INITIATED_

R1082 DORREPOS

R1083 ALARMS_

R1084 NONE

R1085 EXIT_

R1086 NORRGIMON

1087	REF	4	LAST	174	06,3071	30 101 1	RRGIMON	CAF	FLAGWRD5	IS NO ANGLE MONITOR FLAG SET
1088	REF	1			06,3072	7 4750 0		MASK	NORRMBIT	
1089	REF	30	LAST	185	06,3073	10 000 0		CCS	A	
1090	REF	3	LAST	184	06,3074	1 3132 0		TCF	NORRGIMON	YES - SKIP LIMIT CHECK
10901	REF	1			06,3075	4 0103 1		CC	FLAGWRD7	IS SERVICER RUNNING?
10902	REF	1			06,3076	7 4747 0		MASK	AVEGEBIT	
10903	REF	31	LAST	186	06,3077	10 000 0		CCS	A	
10904					06,3100	1 3105 1		TCF	+5	NO. DO #25
10905	REF	1			06,3101	3 0102 1		CA	FLAGWRD6	YES. IS MUNFLAG SET?
10906	REF	1			06,3102	7 4744 0		MASK	MUNFLBIT	
10907	REF	32	LAST	186	06,3103	10 000 0		CCS	A	
10908	REF	4	LAST	186	06,3104	1 3132 0		TCF	NORRGIMON	YES. DON'T DO #25
1091	REF	1			06,3105	3 3127 0	+5	CAF	UCT2002	INHIBIT BY REMODE, ZEROING, MONITOR.
1092	REF	12	LAST	185	06,3106	7 0110 0		MASK	RADMODES	OR RR NOT IN AUTO.
1093	REF	33	LAST	186	06,3107	10 000 0		CCS	A	
1094	REF	5	LAST	186	06,3110	1 3132 0		TCF	NORRGIMON	

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1095	REF	1		06,3111	0 4523 1	TC	4RLINCHK	SEE IF ANGLES IN LIMITS.
1096	REF	1		06,3112	00035 1	ADRES	CDUT	
1097	REF	1		06,3113	1 3115 0	TCF	MONREPOS	
1098	REF	6	LAST 186	06,3114	1 3132 0	TCF	NORRMON	(ADDITIONAL CODING MAY GO HERE).
1099	REF	1		06,3115	3 4741 1	MONREPOS CAP	REPLSBIT	SET FLAG TO SHOW REPOSITION IN PROGRESS.
1100	REF	13	LAST 186	06,3116	26 110 0	ADS	PAD4005	
1101	REF	1		06,3117	4 3130 1	CS	OCT20002	DISABLE TRACKER AND EPRDA COUNTER.
1102	REF	1		06,3120	0 0006 1	EXTEND		
1103	REF	12	LAST 184	06,3121	03 012 1	WAND	CHAN12	
1104	REF	2	LAST 37	06,3122	3 4752 0	CAP	FWD	
1105	REF	6	LAST 183	06,3123	0 5203 0	TC	WAITLIST	
1106	REF	2	LAST 183	E7,1456		EBANK	LOSCOUNT	
1107	REF	1		06,3124	02127 1	2CADR	DORREPOS	
1107	REF	1		06,3125	52107 0			
1108	REF	7	LAST 187	06,3126	1 3132 0	TCF	NORRMON	
1109				06,3127	32002 1	OCT32002	OCT	32002
1110				06,3130	20002 1	OCT20002	OCT	20002
1111				06,3131	02100 1	OCT02100	OCT	02100

P20,P22 MASK BITS

L T4RUPT PROGRAM

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P1112 PROGRAM NAME: GPMATRIX (DAPT4S) MOD. NO. 2 DATE: OCTOBER 27, 1966

R1113 AUTHOR: JONATHAN D. ADDELSTON (ADAMS ASSOCIATES)

R11131 MODIFIED: 7FEB. 1968 BY P. S. WEISSMAN TO DELETE COMPUTATION OF MR12 AND MR13, WHICH ARE NO LONGER REQUIRED.

R1114 THIS PROGRAM CALCULATES ALL THE SINGLE-PRECISION MATRIX ELEMENTS WHICH ARE USED BY LEM DAP TO TRANSFORM VECTORS
R1116 FROM GIMBAL TO PILOT (BODY) AXES AND BACK AGAIN. THESE ELEMENTS ARE USED EXCLUSIVELY BY BASIC LANGUAGE ROUTINES
R1118 AND THEREFORE ARE NOT ARRAYED FOR USE BY INTERPRETIVE PROGRAMS.

R1119 CALLING SEQUENCE: GPMATRIX IS TRANSFERRED TO FROM DAPT4S AND IS THUS EXECUTED 4 TIMES A SECOND BY T4RUPT.
R1121 DAPT4S IS LISTED IN T4JUMP TABLE TWICE EXPLICITLY AND ALSO OCCURS AFTER BRAUTCHK (WHICH IS ALSO LISTED TWICE).

R1123 SUBROUTINES CALLED: SPSIN, SPCOS.

R1124 NORMAL EXIT MODE: TCF RESUME

R1125 ALARM AND ABORT MODES: NONE.

R1130 INPUT: CDUX, CDUY, CDUZ.

R1131 OUTPUT: M11, M21, M31, M22, M32.

R1132 AOG = CDUX, AIG = CDUY, AMG = CDUZ: MNEMONIC IS: DIM = XYZ

R1133 * * SIN(MG) 0 1 *
R1134 M = * COS(MG)COS(OG) SIN(OG) 0 *
R1135 GP * -COS(MG)SIN(OG) COS(OG) 0 *

R1136 * * 0 COS(OG)/COS(MG) -SIN(OG)/COS(MG) *
R1137 M = * 0 SIN(OG) COS(OG) *
R1138 PG * 1 -SIN(MG)COS(OG)/COS(MG) SIN(MG)SIN(OG)/COS(MG) *

1143 REF 5 LAST 166 E6.1414 EBANK= M11
1144 REF 1 06.3132 DAPT4S EQUALS GPMATRIX
R1145 T4RUPT DAP LOGIC:

1146	REF 2	LAST 169	06.3132	30 034 0	GPMATRIX	CAE	CDUZ	SINGLE ENTRY POINT
1147	REF 1		06.3133	0 5033 1	TC	SPSIN	SIN(CDUZ) = SIN(MG)	
1148	REF 6	LAST 188	06.3134	55 1414 0	TS	M11	SCALED AT 1	
1149	REF 3	LAST 188	06.3135	30 034 0	CAE	CDUZ		
1150	REF 1		06.3136	0 5032 0	TC	SPCOS	COS(CDUZ) = COS(MG)	
1151	REF 1		06.3137	54 061 1	TS	COSMG	SCALED AT 1 (ONLY A FACTOR)	
1152	REF 1		06.3140	30 032 0	CAE	CDUX		
1153	REF 2	LAST 188	06.3141	0 5033 1	TC	SPSIN	SIN(CDUX) = SIN(OG)	
1154	REF 1		06.3142	55 1417 0	TS	M22	SCALED AT 1 (ALSO IS MR22)	
1155	REF 2	LAST 188	06.3143	4 1417 0	CS	M22		

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1156				06,3144	0 0006 1	EXTEND		
1157	REF	2	LAST	188	06,3145	7 0061 1	MP	COSMG
1158	REF	1			06,3146	55'416 1	TS	M31
								-SIN(OG)COS(MG)
								SCALED AT 1
1159	REF	2	LAST	188	06,3147	30 032 0	CAE	CDUX
1160	REF	2	LAST	188	06,3150	0 5032 0	TC	SPCOS
1161	REF	1			06,3151	55'420 1	TS	M32
								COS(CDUX) = COS(OG)
								SCALED AT 1 (ALSO IS MR23)
1162					06,3152	0 0006 1	EXTEND	
1163	REF	3	LAST	189	06,3153	7 0061 1	MP	COSMG
1164	REF	1			06,3154	55'415 1	TS	M21
								COS(OG)COS(MG)
								SCALED AT 1
1191	REF	5	LAST	181	06,3155	0 5270 1	TC	RESUME
1192	REF	3	LAST	159	06,3132			
1193	REF	6	LAST	189	5270			
								NORRGMDN EQUALS DAPT45
								ENDDAPT4 EQUALS RESUME

L RCS FAILURE MONITOR

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R0001 PROGRAM DESCRIPTION

R0002 AUTHOR: J S MILLER

R00025 MODIFIED 6 MARCH 1968 BY P S WEISSMAN TO SET UP JOB FOR 1/ACCS WHEN THE MASKS ARE CHANGED.

R0003 THIS ROUTINE IS ATTACHED TO T4RPT, AND IS ENTERED EVERY 480 MS. ITS FUNCTION IS TO EXAMINE THE LOW 8 BITS
R0005 OF CHANNEL 32 TO SEE IF ANY ISOLATION-VALVE CLOSURE BITS HAVE APPEARED OR DISAPPEARED (THE CREW IS WARNED OF JET
R0007 FAILURES BY LAMPS LIT BY THE GRUMMAN FAILURE-DETECTION CIRCUITRY; THEY MAY RESPOND BY OPERATING SWITCHES WHICH
R0009 ISOLATE PAIRS OF JETS FROM THE PROPELLANT TANKS AND SET BITS IN CHANNEL 32). IN THE EVENT THAT CHANNEL 32 BITS
R0011 DIFFER FROM 'PVALVEST', THE RECORD OF ACTIONS TAKEN BY THIS ROUTINE, THE APPROPRIATE BITS IN 'CH5MASK' &
R0013 'CH6MASK', USED BY THE DAP JET-SELECTION LOGIC, ARE UPDATED, AS IS 'PVALVEST'. TO SPEED UP & SHORTEN THE
R0015 ROUTINE, NO MORE THAN ONE CHANGE IS ACCEPTED PER ENTRY. THE HIGHEST-NUMBERED BIT IN CHANNEL 32 WHICH REQUIRES
R0017 ACTION IS THE ONE PROCESSED.

R0018 THE CODING IN THE FAILURE MONITOR HAS BEEN WRITTEN SO AS TO HAVE ALMOST COMPLETE RESTART PROTECTION. FOR
R0020 EXAMPLE, NO ASSUMPTION IS MADE WHEN SETTING A 'CH5MASK' BIT TO 1 THAT THE PREVIOUS STATE IS 0, ALTHOUGH IT OF
R0022 COURSE SHOULD BE. ONE CASE WHICH MAY BE SEEN TO EVADE PROTECTION IS THE OCCURRENCE OF A RESTART AFTER UPDATING
R0024 ONE OR BOTH DAP MASK-WORDS BUT BEFORE UPDATING 'PVALVEST', COUPLED WITH A CHANGE IN THE VALVE-BIT BACK TO ITS
R0026 FORMER STATE. THE CONSEQUENCE OF THIS IS THAT THE NEXT ENTRY WOULD NOT SEE THE CHANGE INCOMPLETELY INCORP-
R0028 ORATED BY THE LAST PASS (BECAUSE IT WENT AWAY AT JUST THE RIGHT TIME), BUT THE DAP MASK-WORDS WILL BE INCORRECT.
R0030 THIS COMBINATION OF EVENTS SEEMS QUITE REMOTE, BUT NOT IMPOSSIBLE UNLESS THE CREW OPERATES THE SWITCHES AT HALF-
R0032 SECOND INTERVALS OR LONGER. IN ANY EVENT, A DISAGREEMENT BETWEEN REALITY AND THE DAP MASKS WILL BE CURED IF
R0034 THE MISINTERPRETED SWITCH IS REVERSED AND THEN RESTORED TO ITS CORRECT POSITION (SLOWLY).

R0036 CALLING SEQUENCE:

R0037 TCF RCSMONIT (IN INTERRUPT MODE, EVERY 480 MS.)

R0038 EXIT: TCF RCSMONEX (ALL PATHS EXIT VIA SUCH AN INSTRUCTION)
R0039 REF 7 LAST 189 5270 RCSMONEX EQUALS RESUME

R0040 FRASABLE INITIALIZATION REQUIRED:

R0041 VIA FRESH START: PVALVEST = +0 (ALL JETS ENABLED)
R0042 CH5MASK, CH6MASK = +0 (ALL JETS OK)

R0043 OUTPUT: CH5MASK & CH6MASK UPDATED (1'S WHERE JETS NOT TO BE USED, IN CHANNEL 5 & 6 FORMAT)
R0045 PVALTEST UPDATED (1'S WHEN VALVE CLOSURES HAVE BEEN TRANSLATED INTO CH5MASK & CH6MASK; CHAN 32 FORMAT)
R00465 JOB TO DO 1/ACCS.

R0047 DEBRIS: A, L, Q AND DEBRIS OF NOVAC.

R0048 SUBROUTINE CALLED: NOVAC.

0052	REF	1	1262	EBANK = CH5MASK
0059			23,2000	BANK 23
0060	REF	1	06,2000	SETLOC RCSMONIT
0061			06,3156	BANK

L RCS FAILURE MONITOR

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0062	REF	1							COUNT* 33/T4RCS	
00625	REF	1			06.3156			RCSMONIT	EQUALS	PCSMON
0063	REF	6	LAST	174	06.3156	4 4755 0	PCSMON	CS	ZERO	
0064					06.3157	0 0006 1		EXTEND		
0065	REF	2	LAST	158	06.3160	06 032 0		RXDR	CHAN32	PICK UP + INVERT INVERTED CHANNEL 32.
0066	REF	1			06.3161	7 4357 0		MASK	LOW8	KEEP JET-FAIL BITS ONLY.
0067	REF	8	LAST	181	06.3162	54 002 1		TS	0	
0068	REF	1			06.3163	4 1276 1		CS	PVALVEST	
0069	REF	9	LAST	191	06.3164	7 0002 1		MASK	0	FORM PC + PC.
0070	REF	4	LAST	185	06.3165	54 001 1		TS	L	IP = PREVIOUS ISOLATION VALVE STATE.
0071	REF	10	LAST	191	06.3166	4 0002 1		CS	0	C = CURRENT VALVE STATE (CH 32)).
0072	REF	2	LAST	191	06.3167	7 1276 1		MASK	PVALVEST	
0073	REF	5	LAST	191	06.3170	26 001 1		ADS	L	RESULT NZ INDICATES ACTION REQUIRED.
0074					06.3171	0 0006 1		EXTEND		
0075	REF	1			06.3172	1 5270 0		BZF	RCSMONEX	QUIT IF NO ACTION REQUIRED.
0076					06.3173	0 0006 1		EXTEND		
0077	REF	17	LAST	173	06.3174	7 4745 1		MP	BIT7	MOVE BITS 8 - 1 OF A TO 14 - 7 OF L.
0078	REF	6	LAST	191	06.3175	56 001 0		XCH	L	ZERO TO L IN THE PROCESS.
0079	REF	7	LAST	191	06.3176	24 001 0	-3	INCR	L	
0080					06.3177	6 0000 1		DOUBLE		ROUND TO GET OVERFLOW IN THIS LOOP.
0081					06.3200	54 000 0		OVSK		SINCE WE ASSURED INITIAL NZ IN A.
0082					06.3201	1 3176 0		TCF	-3	
0083	REF	8	LAST	191	06.3202	50 001 0		INDEX	L	
0084	REF	15	LAST	164	06.3203	3 4743 0		CA	BIT8 -1	SAVE THE RELEVANT BIT (8 - 1).
0085	REF	11	LAST	191	06.3204	54 002 1		TS	0	
0086	REF	3	LAST	191	06.3205	7 1276 1		MASK	PVALVEST	LOOK AT PREVIOUS VALVE STATE BIT.
0087	REF	34	LAST	186	06.3206	10 000 0		CCS	A	
0088	REF	1			06.3207	1 3223 0		TCF	VOPENED	THE VALVE HAS JUST BEEN OPENED.
0089	REF	2	LAST	190	06.3210	4 1262 1		CS	CH5MASK	THE VALVE HAS JUST BEEN CLOSED.
0090	REF	9	LAST	191	06.3211	50 001 0		INDEX	L	
0091	REF	1			06.3212	7 3242 1		MASK	5FAILTAB	
0092	REF	3	LAST	191	06.3213	27 262 1		ADS	CH5MASK	SET INHIBIT BIT FOR CHANNEL 5 JET.
0093	REF	1			06.3214	4 1263 0		CS	CH5MASK	
0094	REF	10	LAST	191	06.3215	50 001 0		INDEX	L	
0095	REF	1			06.3216	7 3252 0		MASK	6FAILTAB	
0096	REF	2	LAST	191	06.3217	27 263 0		ADS	CH6MASK	SET INHIBIT BIT FOR CHANNEL 6 JET.
0097	REF	12	LAST	191	06.3220	3 0002 0		CA	0	
0098	REF	4	LAST	191	06.3221	27 276 1		ADS	PVALVEST	RECORD ACTION TAKEN.
0099	REF	1			06.3222	1 3236 1		TCF	1/ACCFIX	SET UP 1/ACCFIX AND EXIT.

L RCS FAILURE MONITOR

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0100	REF	11	LAST	191	06,3223	50 001 0	VOPENED	INDEX	L	A VALVE HAS JUST BEEN OPENED.
0101	REF	2	LAST	191	06,3224	4 3242 1		CS	5FAILTAB	
0102	REF	4	LAST	191	06,3225	7 1262 1		MASK	CH5MASK	
0103	REF	5	LAST	192	06,3226	55 262 1		TS	CH5MASK	REMOVE INHIBIT BIT FOR CHANNEL 5 JET.
0104	REF	12	LAST	192	06,3227	50 001 0		INDEX	L	
0105	REF	2	LAST	191	06,3230	4 3252 0		CS	6FAILTAB	
0106	REF	3	LAST	191	06,3231	7 1263 0		MASK	CH6MASK	
0107	REF	4	LAST	192	06,3232	55 263 0		TS	CH6MASK	REMOVE INHIBIT BIT FOR CHANNEL 6 JET.
0108	REF	13	LAST	191	06,3233	4 0002 1		CS	Q	
0109	REF	5	LAST	191	06,3234	7 1276 1		MASK	PVALVEST	
0110	REF	6	LAST	192	06,3235	55 276 1		TS	PVALVEST	RECORD ACTION TAKEN.
0111	REF	1			06,3236	3 7715 0	1/ACCFIX	CAF	PA1627	SET UP 1/ACCS SO THAT THE SWITCH CURVES
0112	REF	2	LAST	158	06,3237	0 5072 1		TC	NOVAC	FOR TJETLAW CAN BE MODIFIED IF CH5MASK
0113	REF	4	LAST	133	E6,1537			EBANK	AD5Q	HAS BEEN ALTERED.
0114	REF	1			06,3240	02454 0		2CABR	1/ACCJER	
0114	REF	1			06,3241	40106 1				
0115	REF	2	LAST	191	06,3242	1 5270 0		TCF	RCSMONEX	EXIT.
0117					06,3241			5FAILTAB	EQUALS	-1
0118					06,3243	00040 0		OCT	00040	8
0119					06,3244	00020 0		OCT	00020	7
0120					06,3245	00100 0		OCT	00100	6
0121					06,3246	00200 0		OCT	00200	5
0122					06,3247	00010 0		OCT	00010	4
0123					06,3250	00001 0		OCT	00001	3
0124					06,3251	00004 0		OCT	00004	2
0125					06,3252	00002 0		OCT	00002	1
0126					06,3251			6FAILTAB	EQUALS	-1
0127					06,3253	00010 0		OCT	00010	8
0128					06,3254	00020 0		OCT	00020	7
0129					06,3255	00004 0		OCT	00004	6
0130					06,3256	00200 0		OCT	00200	5
0131					06,3257	00001 0		OCT	00001	4
0132					06,3260	00002 0		OCT	00002	3
0133					06,3261	00040 0		OCT	00040	2
0134					06,3262	00100 0		OCT	00100	1

CH 5 JET BIT CORRESPONDING TO CH 32 BIT:

CH 6 JET BIT CORRESPONDING TO CH 32 BIT:

L DOWNLINK LISTS

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0001 22,2004 BANK 22
 0002 REF 1 05,2000 SETLOC DOWNTLM
 0003 05,2065 BANK

0004 REF 2 LAST 154 0340 EBANK DNTNBUFF

R0005 SPECIAL DOWNLINK OP CODES

OP CODE	ADDRESS (EXAMPLE)	SENDS..	BIT 15	BITS 14-12	BITS 11
1DNADR TIME2	(2 AGC WDS)	0	0	ECADR	
2DNADR TEPHEM	(4 AGC WDS)	0	1	ECADR	
3DNADR YGBODY	(6 AGC WDS)	0	2	ECADR	
4DNADR STATE	(8 AGC WDS)	0	3	ECADR	
5DNADR UPBUFF	(10 AGC WDS)	0	4	ECADR	
6DNADR DSPTAB	(12 AGC WDS)	0	5	ECADR	
DNCHAN 30	CHANNELS	0	7	CHANNEL	
DNPTR NEXTLIST	POINTS TO NEXT LIST.	0	6	ADDRESS	

R0020 DOWNLIST FORMAT DEFINITIONS AND RULES-

- R0021 1. END OF A LIST = -XDNADR (X = 1 TO 6), -DNPTR, OR -DNCHAN.
 R0022 2. SNAPSHOT-SUBLIST = LIST WHICH STARTS WITH A -1DNADR.
 R0023 3. SNAPSHOT-SUBLIST CAN ONLY CONTAIN 1DNADRS.
 R0024 4. TIME2 1DNADR MUST BE LOCATED IN THE CONTROL LIST OF A DOWNLIST.
 R0025 5. ERASABLE DOWN-TELEMETRY WORDS SHOULD BE GROUPED IN SEQUENTIAL
 R0026 LOCATIONS AS MUCH AS POSSIBLE TO SAVE STORAGE USED BY DOWNLINK LISTS.

0027 REF 1 COUNT# 33/DLIST
 0028 0007 ERASZERO EQUALS 7
 0029 REF 1 0007 UNKNOWN EQUALS ERASZERO
 0030 REF 2 LAST 193 0007 SPARE EQUALS ERASZERO
 0032 05,2065 77340 0 LOWIDCOD OCT 77340 USE SPARE TO INDICATE AVAILABLE SPACE
 LOW ID CODE

0033 REF 1 05,2172 NOMDNLIST EQUALS LMCSTABL FRESH START AND POST P27 DOWNLIST

0034 REF 1 05,2407 AGSLIST EQUALS LMAGSIDL

0035 REF 2 LAST 193 05,2407 UPDNLIST EQUALS LMAGSIDL UPDATE PROGRAM (P27) DOWNLIST

L DOWNLINK LISTS

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PG036 LM ORBITAL MANEUVERS LIST

R0037 ----- CONTROL LIST -----

REF	LAST	05,2066	LMORBM01	EQUALS	SEND ID BY SPECIAL CODING
0038		05,2066	32127 1	DNPTR LMORBM01	COLLECT SNAPSHOT
0039	REF 1	05,2066	24340 0	6DNADR DNTABUFF	SEND SNAPSHOT
0040	REF 3	05,2067	03451 1	1DNADR DELLT4	DELLT4,+1
0041	REF 1	05,2071	13443 0	3DNADR RTARG	RTARG,+1...+5
0042	REF 1	05,2072	02256 1	1DNADR ELEV	ELEV,+1
0043	REF 1	05,2073	01344 0	1DNADR TEVENT	TEVENT,+1
0044	REF 1	05,2074	25733 1	6DNADR REFSMAT	REFSMAT+C...+110
0045	REF 1	05,2075	03633 1	1DNADR TCSI	TCSI,+1
0046	REF 1	05,2076	12266 0	3DNADR DELVEET1	DELVEET1+0...+5
0047	REF 1	05,2077	13700 1	3DNADR VGTIG	VGTIG+0...+5
0048	REF 2	05,2100	01340 1	1DNADR DNLVELZ	DNLVELZ,DNLRALT
0049	REF 2	05,2101	03630 1	1DNADR TPASS4	TPASS4,+1
0050	REF 2	05,2102	32136 1	DNPTR LMORBM02	COMMON DATA
0051	REF 1	05,2103	00024 1	1DNADR TIME2	TIME2/1
0052	REF 1	05,2104	32145 0	DNPTR LMORBM03	COLLECT SNAPSHOT
0053	REF 1	05,2105	24340 0	6DNADR DNTABUFF	SEND SNAPSHOT
0054	REF 4	05,2106	32154 0	DNPTR LMORBM04	COMMON DATA
0055	REF 1	05,2107	07115 0	2DNADR POSTORKJ	POSTORKJ,NEGTOORKJ,POSTORKV,NEGTOORKV
0056	REF 1	05,2110	00007 0	1DNADR SPARE	
0057	REF 1	05,2111	01776 0	1DNADR TCOH	TCOH,+1
0058	REF 1	05,2112	12274 0	3DNADR DELVEET2	DELVEET2+0...+5
0059	REF 1	05,2113	03635 1	1DNADR TTPI	TTPI,+1
0060	REF 1	05,2114	12365 1	3DNADR DELVEET3	DELVEET3+0...+5
0061	REF 2	05,2115	01333 0	1DNADR DNRANGE	DNRANGE,DNRDOT
0062	REF 2	05,2116	05336 1	2DNADR DNLVELX	DNLVELX,DNLVELY,DNLVELZ,DNLRALT
0063	REF 2	05,2117	03577 1	1DNADR DIFFALT	DIFFALT,+1
0064	REF 1	05,2120	01331 1	1DNADR LEMMASS	LEMMASS,CSMASS
0065	REF 1	05,2121	01302 1	1DNADR IMODES30	IMODES30,IMODES33
0066	REF 32	05,2122	03441 0	1DNADR TIG	TIG,+1
0067	REF 1	05,2123	32157 0	DNPTR LMORBM05	COMMON DATA
0068	REF 1	05,2124	32170 0	DNPTR LMORBM06	COMMON DATA
0069	REF 2	05,2125	00007 0	1DNADR SPARE	FORMERLY PIF
0070	REF 2	05,2126	74261 1	-1DNADR TGI	TGI,+1

R0074 ----- SUB-LISTS -----

0075	REF 2	05,2127	76056 0	LMORBM01-1DNADR K-OTHER +2	K-OTHER+2,+3	SNAPSHOT
0076	REF 3	05,2130	01723 0	1DNADR K-OTHER +4	K-OTHER+4,+5	
0077	REF 2	05,2131	01725 0	1DNADR V-OTHER	V-OTHER,+1	
0078	REF 3	05,2132	01727 1	1DNADR V-OTHER +2	V-OTHER+2,+3	
0079	REF 4	05,2133	01731 0	1DNADR V-OTHER +4	V-OTHER+4,+5	
0080	REF 1	05,2134	01570 1	1DNADR T-OTHER	T-OTHER,+1	
0081	REF 4	05,2135	76060 0	-1DNADR K-OTHER	K-OTHER+0,+1	
0082	REF 1	05,2136	04320 1	LMORBM02 2DNADR REDUCTR	REDUCTR,THETAD,+1,+2	COMMON DATA

L DOWNLINK LISTS

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0083	REF	1		05,2137	01432 0	1DNADR RSBBQ	RSBBQ,+1	
0084	REF	5	LAST 129	05,2140	07021 0	2DNADR OMEGAP	OMEGAP,OMEGAQ,OMEGAR,GARBAGE	
0085	REF	4	LAST 136	05,2141	07235 1	2DNADR CDUXD	CDUXD,CDUYD,CDUZD,GARBAGE	
0086	REF	3	LAST 189	05,2142	04032 1	2DNADR CDUX	CDUX,CDUY,CDUZ,CDUT	
0087	REF	16	LAST 96	05,2143	24074 1	6DNADR STATE	STATE+0...+110 (FLAGWORDS)	
0088	REF	13	LAST 180	05,2144	52754 0	-6DNADR DSPTAB	DSPTAB TABLES	
0089	REF	1		05,2145	76555 0	LMORBM03-1DNADR RN +2	RN +2,+3	SNAPSHOT
0090	REF	2	LAST 195	05,2146	01224 1	1DNADR RN +4	RN +4,+5	
0091	REF	1		05,2147	01226 0	1DNADR VN	VN,+1	
0092	REF	2	LAST 195	05,2150	01230 1	1DNADR VN +2	VN +2,+3	
0093	REF	3	LAST 195	05,2151	01232 0	1DNADR VN +4	VN +4,+5	
0094	REF	1		05,2152	01234 0	1DNADR PIPTIME	PIPTIME,+1	
0095	REF	3	LAST 195	05,2153	76557 1	-1DNADR RN	RN,+1	
0096	REF	3	LAST 134	05,2154	07243 0	LMORBM04 2DNADR OMEGAPD	OMEGAPD,OMEGAQD,OMEGARD,GARBAGE	
0097	REF	1		05,2155	10372 0	3DNADR CADRFLSH	CADRFLSH,+1,+2,FAILREG,+1,+2	
0098	REF	14	LAST 187	05,2156	77667 0	-1DNADR RADMODES	RADMODES,DAPBDOLS	COMMON DATA
0099	REF	6	LAST 195	05,2157	07021 0	LMORBM05 2DNADR OMEGAP	OMEGAP,OMEGAQ,OMEGAR,GARBAGE	
0100	REF	5	LAST 195	05,2160	07235 1	2DNADR CDUXD	CDUXD,CDUXD,CDUZD,GARBAGE	
0101	REF	4	LAST 195	05,2161	04032 1	2DNADR CDUX	CDUX,CDUY,CDUZ,CDUT	
0102	REF	1		05,2162	03024 1	1DNADR ALPHAQ	ALPHAQ,ALPHA	COMMON DATA
0103	REF	1		05,2163	03113 1	1DNADR POSTURKP	POSTURKP,NEGTURKP	
0104				05,2164	34011 0	DNCHAN 11	CHANNELS11,12	
0105				05,2165	34013 1	DNCHAN 13	CHANNELS13,14	
0106				05,2166	34030 0	DNCHAN 30	CHANNELS30,31	
0107				05,2167	43745 0	-DNCHAN 32	CHANNELS32,33	
0108	REF	2	LAST 147	05,2170	03560 1	LMORBM06 1DNADR PIPTIME1	PIPTIME,+1	COMMON DATA
0109	REF	4	LAST 99	05,2171	67453 1	-3DNADR DELV	DELV+0...+5	

R0110

L DOWNLINK LISTS

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PO111 LN COAST AND ALIGNMENT DOWNLIST

RO112 ----- CONTROL LIST

0113				05,2172		LMCSTADL	EQUALS	SEND ID BY SPECIAL CODING
0114	REF	1		05,2172	32127 1		DNPTR LMCSTAO1	COLLECT SNAPSHOT
0115	REF	5	LAST 194	05,2173	24340 0		6DNADR DNTMBUFF	SEND SNAPSHOT
0116	REF	1		05,2174	02020 1		1DNADR AGSK	AGSK,+1
0117	REF	2	LAST 124	05,2175	02774 1		1DNADR TALIGN	TALIGN,+1
0118	REF	2	LAST 194	05,2176	07115 0		2DNADR POSTORUKU	POSTORUKU,NEGTORUKU,POSTORUKV,NEGTORUKV
0120	REF	3	LAST 194	05,2177	01333 0		1DNADR DNRRANGE	DNRRANGE,DNRRDOT
0121	REF	2	LAST 194	05,2200	01344 0		1DNADR TEVENT	TEVENT,+1
0122	REF	2	LAST 194	05,2201	25733 1		6DNADR REF5MMAT	REF5MMAT+0...+110
0123	REF	1		05,2202	00735 0		1DNADR AOTCODE	AOTCODE,GARBAGE
0124	REF	-1		05,2203	12022 1		3DNADR RLS	RLS+0...+5
0125	REF	-3	LAST 194	05,2204	05336 1		2DNADR DNLRVELX	DNLRVELX,DNLRVELY,DNLRVELZ,DNLRALT
0126	REF	-1		05,2205	32224 1		DNPTR LMCSTAO6	COMMON DATA
0127	REF	-1		05,2206	32136 1		DNPTR LMCSTAO2	COMMON DATA
0128	REF	-2	LAST 194	05,2207	00024 1		1DNADR TIME2	TIME2/1
0129	REF	-1		05,2210	32145 0		DNPTR LMCSTAO3	COLLECT SNAPSHOT
0130	REF	-6	LAST 196	05,2211	24340 0		6DNADR DNTMBUFF	SEND SNAPSHOT
0131	REF	-1		05,2212	32154 0		DNPTR LMCSTAO4	COMMON DATA
0132	REF	-1		05,2213	32226 0		DNPTR LMCSTAO7	COMMON DATA
0133	REF	-4	LAST 196	05,2214	05336 1		2DNADR DNLRVELX	DNLRVELX,DNLRVELY,DNLRVELZ,DNLRALT
0134	REF	-1		05,2215	04036 0		2DNADR COUS	COUS,PIPAZ,PIPAY,PIPAZ
0135	REF	2	LAST 96	05,2216	00112 0		1DNADR LASTYCMD	LASTYCMD,LASTXCMD
0136	REF	2	LAST 194	05,2217	01331 1		1DNADR LEMHASS	LEMHASS,CSMHASS
0137	REF	33	LAST 194	05,2220	01302 1		1DNADR IMODES30	IMODES30,IMODES33
0138	REF	2	LAST 194	05,2221	03441 0		1DNADR TIG	TIG,+1
0139	REF	1		05,2222	32157 0		DNPTR LMCSTAO5	COMMON DATA
0140	REF	14	LAST 195	05,2223	52754 0		-6DNADR DSPTAB	DSPTAB+0...+110 TABLE

R0141 ----- SUB-LISTS

0142	REF	2	LAST	194	05.2127	LMCSTA01	EQUALS	LMORBM01	COMMON DOWNLIST DATA
0143	REF	2	LAST	194	05.2136	LMCSTA02	EQUALS	LMORBM02	COMMON DOWNLIST DATA
0144	REF	2	LAST	194	05.2145	LMCSTA03	EQUALS	LMORBM03	COMMON DOWNLIST DATA
0145	REF	2	LAST	194	05.2154	LMCSTA04	EQUALS	LMORBM04	COMMON DOWNLIST DATA
0146	REF	2	LAST	194	05.2157	LMCSTA05	EQUALS	LMORBM05	COMMON DOWNLIST DATA
0147	REF	1			05.2224	05700 0	LMCSTA06	2DNADR X789	X789+0...+3 COMMON DATA
0148	REF	3	LAST	196	05.2225	77665 1	-1DNADR	LASTYCHD	LASTYCHD, LASTXCHD
0149	REF	2	LAST	123	05.2226	12737 1	LMCSTA07	3DNADR	IGC, +1, IGC, +1, HGC, +1 COMMON DATA
0150	REF	2	LAST	124	05.2227	02755 1	1DNADR	BESTI	BESTI, BLSTJ
0151	REF	2	LAST	124	05.2230	12760 0	3DNADR	STARS AV1	STARS AV1+0...+5
0152	REF	3	LAST	128	05.2231	65011 1	-3DNADR	STARS AV2	STARS AV2+0...+5

L DOWNLINK LISTS

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PO153

L DOWNLINK LISTS

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P0154 LM RENDEZVOUS AND PRE-THRUST DOWNLIST

R0155 ----- CONTROL LIST -----

0156				05,2232	LMRENODL	EQUALS	SEND ID BY SPECIAL CODING
0157	REF	1		05,2232	32127-1	DNPTR LMRENOD1	COLLECT SNAPSHOT
0158	REF	7	LAST 196	05,2233	24340-0	6DNADR DNTHBUFF	SEND SNAPSHOT
0159	REF	1		05,2234	32276-0	DNPTR LMRENOD7	COLLECT SNAPSHOT
0160	REF	8	LAST 198	05,2235	14340-0	4DNADR DNTHBUFF	SEND SNAPSHOT
0161	REF	2	LAST 194	05,2236	03451-1	1DNADR DELLT4	DELLT4.+1
0162	REF	2	LAST 194	05,2237	13443-0	3DNADR RTANG	RTANG+0...+5
0163	REF	1		05,2240	13433-1	3DNADR DELVSLV	DELVSLV+0...+5
0164	REF	2	LAST 194	05,2241	03633-1	1DNADR TCSI	TCSI.+1
0165	REF	2	LAST 194	05,2242	12266-0	3DNADR DELVELT1	DELVELT+0...+5
0166	REF	3	LAST 194	05,2243	00007-0	1DNADR SPARE	
0167	REF	3	LAST 194	05,2244	03630-1	1DNADR TPASS4	TPASS4.+1
0168	REF	1		05,2245	32224-1	DNPTR LMRENOD6	COMMON DATA
0169	REF	1		05,2246	32136-1	DNPTR LMRENOD2	COMMON DATA
0170	REF	3	LAST 196	05,2247	00024-1	1DNADR TIME2	TIME2/1
0171	REF	1		05,2250	32145-0	DNPTR LMRENOD3	COLLECT SNAPSHOT
0172	REF	9	LAST 198	05,2251	24340-0	6DNADR DNTHBUFF	SEND SNAPSHOT
0173	REF	1		05,2252	32154-0	DNPTR LMRENOD4	COMMON DATA
0174	REF	3	LAST 196	05,2253	07115-0	2DNADR POSTORKU	POSTORKU, NEGTOCKU, POSTORKV, NEGTOCKV
0175	REF	4	LAST 198	05,2254	00007-0	1DNADR SPARE	
0177	REF	2	LAST 194	05,2255	01776-0	1DNADR TCDH	TCDH.+1
0178	REF	2	LAST 194	05,2256	12274-0	3DNADR DELVEET2	DELVEET2+0...+5
0179	REF	2	LAST 194	05,2257	03635-1	1DNADR TTPI	TTPI.+1
0180	REF	2	LAST 194	05,2260	12365-1	3DNADR DELVEET3	DELVEET3+0...+5
0181	REF	2	LAST 194	05,2261	02256-1	1DNADR ELEV	ELEV.+1
0182	REF	2	LAST 196	05,2262	04036-0	2DNADR CDUS	CDUS, PIPAX, PIPAY, PIPAZ
0183	REF	4	LAST 196	05,2263	00112-0	1DNADR LASTYCMD	LASTYCMD, LASTXCMD
0184	REF	3	LAST 196	05,2264	01331-1	1DNADR LEMHASS	LEMHASS, CSMHASS
0185	REF	34	LAST 196	05,2265	01302-1	1DNADR IMODES30	IMODES30, IMODES33
0186	REF	3	LAST 196	05,2266	03441-0	1DNADR TIC	TIC.+1
0187	REF	1		05,2267	32157-0	DNPTR LMRENOD5	COMMON DATA
0188	REF	3	LAST 117	05,2270	02302-1	1DNADR DELTAR	DELTAR.+1
0189	REF	1		05,2271	03620-0	1DNADR CENTANG	CENTANG.+1
0190	REF	1		05,2272	03466-0	1DNADR NN	NN.+1
0191	REF	2	LAST 194	05,2273	03577-1	1DNADR DIFFALT	DIFFALT.+1
0192	REF	1		05,2274	02347-0	1DNADR DELVTPE	DELVTPE.+1
0193	REF	5	LAST 198	05,2275	77770-1	1DNADR SPARE	

R0194 ----- SUB-LISTS -----

0195	REF	3	LAST 196	05,2127	LMRENOD1	EQUALS LMORBOD1	COMMON DOWNLIST DATA
0196	REF	3	LAST 196	05,2136	LMRENOD2	EQUALS LMORBOD2	COMMON DOWNLIST DATA
0197	REF	3	LAST 196	05,2145	LMRENOD3	EQUALS LMORBOD3	COMMON DOWNLIST DATA

L DOWNLINK LISTS

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0198	REF	3	LAST	196	05,2154	LMREND04 EQUALS LMDRHH04	COMMON DOWNLIST DATA
0199	REF	3	LAST	196	05,2157	LMREND05 EQUALS LMDRHH05	COMMON DOWNLIST DATA
0200	REF	2	LAST	196	05,2224	LMREND06 EQUALS LMCSTAG6	COMMON DOWNLIST DATA
0201	REF	1			05,2276 74320 0	LMREND07-1DNADR AUG	AUG,AMG SNAPSHOT
0202	REF	1			05,2277 03461 1	1DNADR AUG	AUG,TRKMKCHT
0203	REF	2	LAST	146	05,2300 03752 1	1DNADR TANGNB	TANGNB,+1
0204	REF	2	LAST	146	05,2301 03754 1	1DNADR MKTIME	MKTIME,+1
0205	REF	2	LAST	146	05,2302 74017 1	1DNADR RANGRODT	DNKRANGE,DNKRDOT
R0206	-----						

L DOWNLINK LISTS

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P0207 LM DESCENT AND ASCENT DOWNLIST

R0208

CONTROL LIST

0209				05,2303		LMDSASDL	EQUALS	SEND ID BY SPECIAL CODING
0210	REF	1		05,2303	32341 0		DNPTR LMDSAS07	COLLECT SNAPSHOT
0211	REF	1		05,2304	32355 0		DNPTR LMDSAS08	SEND SNAPSHOT
0212	REF	3	LAST 196	05,2305	01344 0		1DNADR TEVENT	TEVENT,+1
0213	REF	2	LAST 136	05,2306	13253 1		1DNADR UNFC/2	UNFC/2+0...+5
0214	REF	2	LAST 152	05,2307	13645 1		3DNADR VGVECT	VGVECT+0...+5
0215	REF	2	LAST 149	05,2310	03642 1		1DNADR TTF/8	TTF/8,+1
0216	REF	2	LAST 150	05,2311	03664 0		1DNADR DELTAH	DELTAH,+1
0217	REF	2	LAST 196	05,2312	12022 1		3DNADR RLS	RLS+0...+5
0220	REF	6	LAST 198	05,2313	00007 0		1DNADR SPARE	
0221	REF	1		05,2314	32224 1		DNPTR LMDSAS09	COMMON DATA
0222	REF	1		05,2315	32136 1		DNPTR LMDSAS02	COMMON DATA
0223	REF	4	LAST 198	05,2316	00024 1		1DNADR TIME2	TIME2/1
0224	REF	1		05,2317	32145 0		DNPTR LMDSAS03	COLLECT SNAPSHOT
0225	REF	10	LAST 198	05,2320	24340 0		6DNADR DNTMBUFF	SEND SNAPSHOT
0226	REF	1		05,2321	32154 0		DNPTR LMDSAS04	COMMON DATA
0227	REF	4	LAST 198	05,2322	07115 0		2DNADR POSTORKU	POSTORKU,NEGTOARKU,POSTORKV,NEGTOARKV
0229	REF	1		05,2323	12636 1		3DNADR RGU	RGU+0...+5
0230	REF	2	LAST 149	05,2324	13626 1		3DNADR VGU	VGU+0...+5
0231	REF	2	LAST 149	05,2325	13634 1		3DNADR LAND	LAND+0...+5
0232	REF	2	LAST 119	05,2326	02262 0		1DNADR AT	AT,+1
0233	REF	2	LAST 121	05,2327	02400 1		1DNADR TLAND	TLAND,+1
0234	REF	2	LAST 149	05,2330	03615 0		1DNADR FC	FC,GARBAGE
0235	REF	5	LAST 198	05,2331	00112 0		1DNADR LASTYCMD	LASTYCMD, LASTXCMD
0236	REF	4	LAST 198	05,2332	01331 1		1DNADR LEMASS	LEMMASS,CSMASS
0237	REF	35	LAST 198	05,2333	01302 1		1DNADR IMODES30	IMODES30,IMODES33
0238	REF	4	LAST 198	05,2334	03441 0		1DNADR TIG	TIG,+1
0239	REF	1		05,2335	32157 0		DNPTR LMDSAS05	COMMON DATA
0240	REF	1		05,2336	32170 0		DNPTR LMDSAS06	COMMON DATA
0241	REF	2	LAST 149	05,2337	03614 1		1DNADR PSEUDU05	PSEUDU05,GARBAGE
0242	REF	2	LAST 139	05,2340	74324 1		1DNADR TTODD	TTODD,+1

P0243

SUB-LISTS

0244	REF	4	LAST 198	05,2136		LMDSAS02	EQUALS LMDRBM02	COMMON DOWNLIST DATA
0245	REF	4	LAST 198	05,2145		LMDSAS03	EQUALS LMDRBM03	COMMON DOWNLIST DATA
0246	REF	4	LAST 199	05,2154		LMDSAS04	EQUALS LMDRBM04	COMMON DOWNLIST DATA
0247	REF	4	LAST 199	05,2157		LMDSAS05	EQUALS LMDRBM05	COMMON DOWNLIST DATA
0248	REF	2	LAST 194	05,2170		LMDSAS06	EQUALS LMDRBM06	COMMON DOWNLIST DATA
0249	REF	2	LAST 119	05,2341	75441 1	LMDSAS07-1DNADR	LRZCOUPL	LRZCOUPL,GARBAGE
0250	REF	2	LAST 149	05,2342	03651 0	1DNADR	VSELECT	VSELECT,GARBAGE
0251	REF	1		05,2343	02337 1	1DNADR	LRVTIMDL	LRVTIMDL,+1

SNAPSHOT

L DOWNLINK LISTS USER'S PAGE NO. 9 EO S4

0252	REF	2	LAST	149	05.2344	03652 0	1DNADR VMEAS	VMEAS,+1
0253	REF	3	LAST	199	05.2345	03754 1	1DNADR MKTIME	MKTIME,+1
0254	REF	2	LAST	149	05.2346	03654 0	1DNADR HMEAS	HMEAS,+1
0255	REF	3	LAST	151	05.2347	03756 0	1DNADR RM	RM,+1
0256	REF	2	LAST	199	05.2350	03457 1	1DNADR AIG	AIG,ANG
0257	REF	2	LAST	199	05.2351	03461 1	1DNADR AUG	AUG,TRKMKCNT
0258	REF	3	LAST	199	05.2352	03752 1	1DNADR TANGNB	TANGNB,+1
0259	REF	4	LAST	201	05.2353	03754 1	1DNADR MKTIME	MKTIME,+1
0260	REF	2	LAST	119	05.2354	75443 0	1DNADR LRXCDDDL	LRXCDDDL,LRYCDDDL
0261	REF	11	LAST	200	05.2355	24340 0	LMDSAS08 6DNADR ONTMBUFF	SEND SNAPSHOT
0262	REF	12	LAST	201	05.2356	57423 0	5DNADR ONTMBUFF +120	
0263	REF	3	LAST	199	05.2224		LMDSAS09 EQUALS LMCSTA06	COMMON DOWNLIST DATA

R0264

L DOWNLINK LISTS

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PG265 LM LUNAR SURFACE ALIGN DOWNLIST

R0266 ----- CUNTRCL LIST -----

0267				05.2357		LMLSAL01	EQUALS	SEND ID BY SPECIAL CODING
0268	REF	1		05.2357	32127 1	DNPTR	LMLSAL01	COLLECT SNAPSHOT
0269	REF	13	LAST	201	05.2360	6DNADR	DNTMBUFF	SEND SNAPSHOT
0270	REF	1		05.2361	32276 0	DNPTR	LMLSAL07	COLLECT SNAPSHOT
0271	REF	14	LAST	202	05.2362	4DNADR	DNTMBUFF	SEND SNAPSHOT
0272	REF	3	LAST	196	05.2363	1DNADR	TALIGN	TALIGN.+1
0273	REF	3	LAST	196	05.2364	6DNADR	REFSNMAT	REFSNMAT+0....+110
0274	REF	2	LAST	116	05.2365	6DNADR	YHBSAV	YHBSAV+0....+5, ZHBSAV+0....+5
0275	REF	1		05.2366	32224 1	DNPTR	LMLSAL08	COMMON DATA
0276	REF	1		05.2367	32136 1	DNPTR	LMLSAL02	COMMON DATA
0277	REF	5	LAST	200	05.2370	1DNADR	TIMEZ	TIMEZ/1
0278	REF	1		05.2371	32145 0	DNPTR	LMLSAL03	COLLECT SNAPSHOT
0279	REF	15	LAST	202	05.2372	6DNADR	DNTMBUFF	SEND SNAPSHOT
0280	REF	1		05.2373	32154 0	DNPTR	LMLSAL04	COMMON DATA
0281	REF	1		05.2374	32226 0	DNPTR	LMLSAL09	COMMON DATA
0282	REF	4	LAST	116	05.2375	6DNADR	GSAY	GSAY+0....+5
0283	REF	2	LAST	196	05.2376	1DNADR	AGSK	AGSK.+1
0284	REF	6	LAST	200	05.2377	1DNADR	LASTYCHD	LASTYCHD, LASTXCMD
0285	REF	5	LAST	200	05.2400	1DNADR	LEMMASS	LEMMASS, GSNMASS
0286	REF	36	LAST	200	05.2401	1DNADR	IMODES30	IMODES30, IMODES33
0287	REF	5	LAST	200	05.2402	1DNADR	TIG	TIG.+1
0288	REF	1		05.2403	32157 0	DNPTR	LMLSAL05	COMMON DATA
0289	REF	1		05.2404	32170 0	DNPTR	LMLSAL06	COMMON DATA
0290	REF	7	LAST	200	05.2405	1DNADR	SPACE	
0291	REF	8	LAST	202	05.2406	-1DNADR	SPACE	

R0292 ----- SUB-LISTS -----

0293	REF	4	LAST	198	05.2127	LMLSAL01	EQUALS	LMORBN01	COMMON DOWNLIST DATA
0294	REF	5	LAST	200	05.2136	LMLSAL02	EQUALS	LMORBN02	COMMON DOWNLIST DATA
0295	REF	5	LAST	200	05.2145	LMLSAL03	EQUALS	LMORBN03	COMMON DOWNLIST DATA
0296	REF	5	LAST	200	05.2154	LMLSAL04	EQUALS	LMORBN04	COMMON DOWNLIST DATA
0297	REF	5	LAST	200	05.2157	LMLSAL05	EQUALS	LMORBN05	COMMON DOWNLIST DATA
0298	REF	3	LAST	200	05.2170	LMLSAL06	EQUALS	LMORBN06	COMMON DOWNLIST DATA
0299	REF	2	LAST	196	05.2276	LMLSAL07	EQUALS	LMORBN07	COMMON DOWNLIST DATA
0300	REF	4	LAST	201	05.2224	LMLSAL08	EQUALS	LMCSTAG6	COMMON DOWNLIST DATA
0301	REF	2	LAST	196	05.2226	LMLSAL09	EQUALS	LMCSTAG7	COMMON DOWNLIST DATA

L DOWNLINK LISTS

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R0302

L DOWNLINK LISTS

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P0303 LM AGS INITIALIZATION AND UPDATE DOWNLIST

P0304 ----- CONTROL LIST -----

REF	LAST	05,2407	05,2407	12200 0	LMAGSIDL EQUALS	SEND ID BY SPECIAL CODING
0305			05,2407	12200 0	3DNADR AGSBUFF +0	AGSBUFF+0...+5
0306	REF 2	LAST 117	05,2407	12200 0	1DNADR AGSBUFF +12D	AGSBUFF+12D,GARBAGE
0307	REF 3	LAST 204	05,2410	02214 1	3DNADR AGSBUFF +1	AGSBUFF+1...+6
0308	REF 4	LAST 204	05,2411	12201 1	1DNADR AGSBUFF +13D	AGSBUFF+13D,GARBAGE
0309	REF 5	LAST 204	05,2412	02215 0	3DNADR AGSBUFF +6	AGSBUFF+6...+11
0310	REF 6	LAST 204	05,2413	12206 0	1DNADR AGSBUFF +12D	AGSBUFF+12,GARBAGE
0311	REF 7	LAST 204	05,2414	02214 1	3DNADR AGSBUFF +7	AGSBUFF+7...+12D
0312	REF 8	LAST 204	05,2415	12207 1	1DNADR AGSBUFF +13D	AGSBUFF+13D,GARBAGE
0313	REF 9	LAST 204	05,2416	02215 0	6DNADR COMPNUMB	COMPNUMB.UPOLDMOD.UPVERB.UPCOUNT,
0314	REF 2	LAST 104	05,2417	25170 0		UPBUFF+0...+7
A0315						
0316	REF 1		05,2420	25204 0	6DNADR UPBUFF +8D	UPBUFF +8D...+19D
0317	REF 1		05,2421	32136 1	DNPTR LMAGSI02	COMMON DATA
0318	REF 6	LAST 202	05,2422	00024 1	1DNADR TIME2	TIME2/1
0319	REF 1		05,2423	32145 0	DNPTR LMAGSI03	COLLECT SNAPSHOT
0320	REF 16	LAST 202	05,2424	24340 0	6DNADR DNTMBUFF	SEND SNAPSHOT
0321	REF 1		05,2425	32154 0	DNPTR LMAGSI04	COMMON DATA
0322	REF 5	LAST 200	05,2426	07115 0	2DNADR POSTORKU	POSTORKU.NEGTORKU.POSTORKV.NEGTORKV
0324	REF 9	LAST 202	05,2427	00007 0	1DNADR SPARE	
0325	REF 10	LAST 204	05,2430	00007 0	1DNADR SPARE	
0326	REF 3	LAST 202	05,2431	02020 1	1DNADR AGSK	AGSK.+1
0327	REF 2	LAST 204	05,2432	25174 1	6DNADR UPBUFF	UPBUFF+0...+11D
0328	REF 3	LAST 204	05,2433	15210 0	4DNADR UPBUFF +12D	UPBUFF+12D...+19D
0329	REF 6	LAST 202	05,2434	01331 1	1DNADR LEHMASS	LEHMASS,CSHMASS
0330	REF 37	LAST 202	05,2435	01302 1	1DNADR IMODES30	IMODES30,IMODES33
0331	REF 11	LAST 204	05,2436	00007 0	1DNADR SPARE	
0332	REF 1		05,2437	32157 0	DNPTR LMAGSI05	COMMON DATA
0333	REF 15	LAST 196	05,2440	52754 0	6DNADR DSPTAB	DSPTAB+0...+11D

R0334 ----- SUB-LISTS -----

0335	REF 6	LAST 202	05,2136	LMAGSI02 EQUALS LMORBM02	COMMON DOWNLIST DATA
0336	REF 6	LAST 202	05,2145	LMAGSI03 EQUALS LMORBM03	COMMON DOWNLIST DATA
0337	REF 6	LAST 202	05,2154	LMAGSI04 EQUALS LMORBM04	COMMON DOWNLIST DATA
0338	REF 6	LAST 202	05,2157	LMAGSI05 EQUALS LMORBM05	COMMON DOWNLIST DATA

R0339 -----

0340	REF 2	LAST 193	05,2441	02172 1	DNABLE GENADR LMCSTADL	LM COAST AND ALIGN DOWNLIST
0341	REF 3	LAST 193	05,2442	02407 0	GENADR LMAGSIDL	LM AGS INITIALIZATION/UPDATE DOWNLIST
0342	REF 1		05,2443	02232 0	GENADR LMRENDUL	LM RENDEZVOUS AND PRE-THRUST DOWNLIST
0343	REF 1		05,2444	02066 0	GENADR LMORBM01	LM ORBITAL MANEUVERS DOWNLIST
0344	REF 1		05,2445	02303 0	GENADR LMDSASDL	LM DESCENT AND ASCENT DOWNLIST

L DOWNLINK LISTS

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0345 REF 1

05,2446 02357 1

GENADR LMLSALDL

LH LUNAR SURFACE ALIGN DOWNLIST

R0346

3778840

L AGS INITIALIZATION

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R0001 PROGRAM NAME: AGS INITIALIZATION (R47)

R0002 WRITTEN BY : RHODE / KILROY / FOLLETT

R0003 MOD NO. : 0

R0004 DATE : 23 MARCH 1967

R0005 MOD BY : KILROY

R0006 MOD NO. : 1

R0007 DATE : 26 OCTOBER 1967

R0008 MOD BY : FOLLETT

R0009 FUNCT. DESC.: (1) TO PROVIDE THE AGS ABORT ELECTRONICS ASSEMBLY(AEA) WITH THE LEM AND CSA STATE VECTORS
 R0011 (POSITION, VELOCITY, TIME) IN LEM INU COORDINATES BY MEANS OF THE LGC DIGITAL DOWNLINK.

R0013 (2) TO ZERO THE ICDU, LGC AND AEA GIMBAL ANGLE COUNTERS SIMULTANEOUSLY IN ORDER TO ESTABLISH A
 R0015 COMMON ZERO REFERENCE FOR THE MEASUREMENT OF GIMBAL(EULER) ANGLES WHICH DEFINE LEM ATTITUDE
 R0019 (3) TO ESTABLISH THE GROUND ELAPSED TIME OF AEA CLOCK ZERO. (IF AN AEA CLOCK ZERO IS
 R0021 REQUESTED DURING THIS PROGRAM)

R0022 LOG SECTION : AGS INITIALIZATION

R0023 CALLING SEQ : PROGRAM IS ENTERED WHEN ASTRONAUT KEYS V47E ON DSKY.
 R0024 R47 MAY BE CALLED AT ANY TIME EXCEPT WHEN ANOTHER EXTENDED VERB IS IN PROGRESS

R0026 SUBROUTINES

R0027 CALLED :

R0028 NORMAL EXIT : ENDEXT

R0029 ALARM/ABORT : ALARM - BAD REFSMMAT - CODE:220
 R0030 OPERATOR ERROR IF V47 SELECTED DURING ANOTHER EXTENDED VERB.

R0032 ERASABLES

R0033 USED : SAMPTIME (2) TIME OF : ENTER: KEYSTROKE
 R0034 AGSK (2) GROUND ELAPSED TIME OF THE AEA CLOCK : ZERO:
 R0036 AGSBUFF (140) CONTAINS AGS INITIALIZATION DATA (SEE :OUTPUT: BELOW)
 R0038 AGSWORD (1) PREVIOUS DOWNLIST SAVED HERE

0039 REF 10 LAST 204 34,1600 EBANK= AGSBUFF

0040 40,2000 BANK 40

0041 REF 1 32,2000 SETLOC R47

0042 32,2005 BANK

0043 REF 1 COUNT* 34/R47

0044 REF 1 32,2005 3 4737 0 AGSINIT CAF REFSMBIT

0045 REF 1 32,2006 7 0077 0 MASK FLAGWRD3

0046 REF 35 LAST 191 32,2007 10 000 0 CCS A

CHECK REFSMFLG.

L AGC INITIALIZATION

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0047	REF	1		32,2010	0 2017 0	TC	REDSPTM	REFSMAT IS OK
0048	REF	8	LAST 185	32,2011	0 5567 0	TC	ALARM	REFSMAT IS BAD
0049				32,2012	00220 1	GCT	220	
0050	REF	1		32,2013	0 5472 0	TC	ENDEXT	
0061				32,2014	0 0006 1	NEWAGS	EXTEND	
0062	REF	1		32,2015	3 0014 1	DCA	SAMPTIME	TIME OF THE ENTERED KEYSTROKE
0063	REF	4	LAST 204	32,2016	53 421 0	DXCH	AGSK	BECOMES NEW AEA CLOCK ZERO
0064				32,2017	0 0006 1	REDSPTM	EXTEND	
0065	REF	5	LAST 207	32,2020	3 1421 1	DCA	AGSK	
0066	REF	2	LAST 102	32,2021	53 052 0	DXCH	DSPTMEX	
0067	REF	1		32,2022	3 2172 1	AGSDISPR	CAF	V06N16
0068	REF	1		32,2023	0 4616 1	TC	HANKCALL	R1 = 00XXX. HRS., R2 = 000XX MIN.,
0069	REF	1		32,2024	20334 1	CAUR	GOMARK	R3 = 0XX.XX SEC.
0070	REF	2	LAST 207	32,2025	0 5472 0	TC	ENDEXT	TERMINATE RETURN
0071	REF	1		32,2026	0 2036 0	TC	AGSVCALC	PROCEED RETURN
00711	REF	22	LAST 180	32,2027	4 4746 1	CS	BIT6	IS ENTER VIA A-V32
00712	REF	12	LAST 98	32,2030	6 0154 1	AD	MPAC	
00713				32,2031	0 0006 1	EXTEND		
00714	REF	1		32,2032	1 2014 1	BZF	NEWAGS	YES, USE KEYSTROKE TIME FOR NEW AGSK
0072				32,2033	0 0006 1	EXTEND		
0073	REF	3	LAST 207	32,2034	3 1052 1	DCA	DSPTMEX	NO. NEW AGSK LOADED VIA V25
0074	REF	2	LAST 207	32,2035	0 2016 1	TC	REDSPTM -1	LOADED INTO DSPTMEX BY KEYING
A0075								V25E FOLLOWED BY HRS., MINS., SECS.
								DISPLAY THE NEW K
0076	REF	1		32,2036	0 6037 0	AGSVCALC	TC	INTPRET
00761				32,2037	77614 1	SET		
00762	REF	1		32,2040	01076 1		MODEFLAG	DONT ALLOW V37
0077				32,2041	77414 0	SET	EXIT	
0078	REF	1		32,2042	02076 1		XDSPFLAG	
0079	REF	2	LAST 207	32,2043	3 2172 1	CAF	V06N16	
00795	REF	2	LAST 207	32,2044	0 4616 1	TC	HANKCALL	
00796	REF	1		32,2045	20620 1	CAUR	EXDSPRET	
0082	REF	2	LAST 207	32,2046	0 6037 0	TC	INTPRET	EXTRAPOLATE LEM AND CSM STATE VECTORS
0083				32,2047	77634 0	RTH		TO THE PRESENT TIME
0084	REF	1		32,2050	21573 0		LOADTIME	LOAD MPAC WITH TIME2, TIME1
0085	REF	1		32,2051	34041 0	STCALL	TDECI	CALCULATE LEM STATE VECTOR
0086	REF	2	LAST 37	32,2052	27057 0		LEMPREC	
0087				32,2053	77624 1	CALL		CALL ROUTINE TO CONVERT TO SH COORDS AND
0088	REF	1		32,2054	64132 0		SCALEVEC	PROVIDE PROPER SCALING
0089	REF	11	LAST 206	32,2055	16201 0	STODI	AGSHUFF	(LEMPREC AND CSMPREC LEAVE TDECI IN TAT)
0090	REF	1		32,2056	00015 0		TAT	TAT = TIME TO WHICH RATT1 AND VATT1 ARE
0091	REF	2	LAST 207	32,2057	34041 0	STCALL	TDECI	COMPUTED (SEC SINCE CLOCK START 6-23).
0092	REF	2	LAST 37	32,2060	27043 0		LEMPREC	CALCULATE CSM STATE VECTOR FOR SAME TIME
0093				32,2061	77624 1	CALL		
0094	REF	2	LAST 207	32,2062	64132 0		SCALEVEC	

L AGC INITIALIZATION USER'S PAGE NO. 14 53

0095	REF	12	LAST	207	32,2063	16207 0	STODL	AGSBUFF +6	
0096	REF	2	LAST	207	32,2064	00015 0		TAT	
0097					32,2065	56225 1	DSU	DDV	CALCULATE AND STORE THE TIME
0098	REF	6	LAST	207	32,2066	02021 0		AGSK	
0099	REF	1			32,2067	24175 1		TSCALE	
0100	REF	13	LAST	208	32,2070	02215 0	STORE	AGSBUFF +120	
0101					32,2071	77776 1	EXIT		
0102	REF	1			32,2072	3 4753 1	CAF	LAGSLIST	
0103	REF	2	LAST	99	32,2073	54 332 1	TS	DNLSTCDD	
0104	REF	1			32,2074	3 2176 0	CAF	20SEC	DELAY FOR 20 SEC WHILE THE AGS
0105	REF	3	LAST	207	32,2075	0 4616 1	TC	BANKCALL	DOWNLIST IS TRANSMITTED
0106	REF	1			32,2076	01735 1	CADR	DELAYJOB	
0107	REF	1			32,2077	3 1324 0	CA	AGSWORD	
0108	REF	3	LAST	208	32,2100	54 332 1	TS	DNLSTCDD	RETURN TO THE OLD DOWNLIST
0109	REF	3	LAST	166	32,2101	3 4744 1	CAF	IMUSEBIT	
0110	REF	6	LAST	185	32,2102	7 0074 0	MASK	FLAGWRDG	CHECK IMUSE FLAG.
0111	REF	36	LAST	206	32,2103	10 000 0	CCS	A	
0112	REF	1			32,2104	0 2122 1	TC	AGSEND	IMU IS BEING USED - DO NOT ZERO
01121	REF	1			32,2105	11 304 0	CKSTALL	CCS	IMUGADR
01122					32,2106	1 2111 0	TCF	+3	CHECK FOR IMU USAGE WHICH AVOIDS THE
01123					32,2107	1 2115 1	TCF	+6	IMUSE BIT: I.E., IMU COMPENSATION.
01124					32,2110	1 2111 0	TCF	+1	FREE. GO AHEAD WITH THE IMU ZERO.
01125	REF	1			32,2111	3 4363 0	+3	CAF	TEN
01126	REF	4	LAST	208	32,2112	0 4616 1	TC	BANKCALL	WAIT .1 SEC AND TRY AGAIN.
01127	REF	2	LAST	208	32,2113	01735 1	CADR	DELAYJOB	
01128	REF	1			32,2114	1 2105 0	TCF	CKSTALL	
0113	REF	5	LAST	208	32,2115	0 4616 1	+6	TC	BANKCALL
0114	REF	1			32,2116	16714 1	CADR	IMUZERO	IMU IS NOT IN USE
0115	REF	6	LAST	208	32,2117	0 4616 1	TC	BANKCALL	SET IMU ZERO DISCRETE FOR 320MSECS
0116	REF	1			32,2120	17716 1	CADR	IMUSTALL	WAIT 3SEC FOR COUNTERS TO INCREMENT
0117	REF	2	LAST	208	32,2121	0 2122 1	TC	AGSEND	
0118	REF	1			32,2122	0 5516 0	AGSEND	TC	DOWNFLAG
0119	REF	2	LAST	207	32,2123	00054 0	ADRES	NOOPFLAG	ALLOW V37
0120	REF	1			32,2124	3 2173 0	CAF	VSON16	
0121	REF	7	LAST	208	32,2125	0 4616 1	TC	BANKCALL	
01211	REF	1			32,2126	20342 0	CADR	GUMARK3	
01212	REF	3	LAST	207	32,2127	1 5472 1	TCF	ENDEXT	
01213	REF	4	LAST	208	32,2130	1 5472 1	TCF	ENDEXT	
0122	REF	5	LAST	208	32,2131	0 5472 0	TC	ENDEXT	
0127					32,2132	64375 1	SCALEVEC	VLOAD	HXV
0128	REF	1			32,2133	00025 0		VATT1	
0129	REF	4	LAST	202	32,2134	01734 0		REFSRMAT	
0130					32,2135	72561 0	VXSC	VSL2	
0131	REF	1			32,2136	24202 1		VSCALE	

L AGS INITIALIZATION

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01311			32,2137	53255 0	VAD	VAD	THIS SECTION ROUNDS THE VECTOR, AND
01312	REF	1	32,2140	24204 1		AGSRND1	CORRECTS FOR THE FACT THAT THE AGS
01313	REF	1	32,2141	24212 0		AGSRND2	IS A 2 S COMPLIMENT MACHINE WHILE THE
01314			32,2142	77634 0	RTB		LGC IS A 1 S COMPLIMENT MACHINE.
01315	REF	1	32,2143	21772 0		VFCSGNAG	
0132	REF	2	32,2144	24025 0	STOVL	VATT1	
0133	REF	1	32,2145	00017 1		RATT1	
0134			32,2146	74321 1	MXV	VXSC	
0135	REF	5	32,2147	01734 0		FFFSHAT	
0136	REF	1	32,2150	24200 0		FSCALE	
0137			32,2151	53212 0	VSLB	VAD	AGAIN THIS SECTION ROUNDS TWO VECTORS
01371	REF	2	32,2152	24204 1		AGSRND1	ARE ADDED TO DEFEAT ALSIGNAG IN THE
01372			32,2153	47055 1	VAD	RTB	CASE OF A HIGH-ORDER ZERO COUPLED WITH
01373	REF	2	32,2154	24212 0		AGSRND2	A LOW ORDER NEGATIVE PART.
01374	REF	2	32,2155	21772 0		VEESGNAG	
01375			32,2156	77750 0	LXA,1		
0138	REF	3	32,2157	00024 1		VATT1	
0139			32,2160	72130 0	SXA,1	LXA,1	
0140	REF	13	32,2161	00155 0		MPAC +1	
0141	REF	4	32,2162	00026 0		VATT1 +2	
0142			32,2163	72130 0	SXA,1	LXA,1	
0143	REF	14	32,2164	00160 0		MPAC +4	
0144	REF	5	32,2165	00030 1		VATT1 +4	
0145			32,2166	43530 0	SXA,1	RVD	
0146	REF	15	32,2167	00162 1		MPAC +6	
0147	REF	6	4753		LAGSLIST	=	ONE
0148			32,2170	00216 1	VOIN14	VN	0114
01485			32,2171	14400 0	VSON00A	VN	5000
0149	REF	1	6010		V00N25	EQUALS	0CT31
01495			32,2172	01420 0	V06N16	VN	0616
01496	REF	1	4242		V00N34	EQUALS	34DEC
01497			32,2173	14420 1	V50N16	VN	5016
0150			32,2174	03100 0	TSCALE	2DEC	100B-10 CSEC TO SEC SCALE FACTOR
0150			32,2175	00000 1			
0151			32,2176	03720 1	20SEC	DPL	2000
0152			32,2177	15077 0	RSCALE	2DEC	3.280839 B-3 METERS TO FEET SCALE FACTOR
0152			32,2200	05041 1			
0153			32,2201	24402 1	VSCALE	2DEC	3.280839 E2 B-9 METERS/CS TO FEET/SEC SCALE FACTOR
0153			32,2202	25724 1			
01531			32,2203	00000 1	AGSRND1	2OCT	0000060000
01531			32,2204	60000 1			
01532			32,2205	00000 1		2OCT	0000060000
01532			32,2206	60000 1			
01533			32,2207	60000 1		2OCT	0000060000
01533			32,2210	60000 1			
01534			32,2211	00000 1	AGSRND2	2OCT	0000037777
01534			32,2212	37777 1			
01535			32,2213	00000 1		2OCT	0000037777
01535			32,2214	37777 1			

L AGS INITIALIZATION

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01556		32.2215	00000 1	20CT	0000037777
01536		32.2216	37777 1		
0154	REF	1	30.2000	SBANK= LOWSUPER	FOR SUBSEQUENT LOW READRS.

FRESH START AND RESTART

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P00743

0075

10.2000

BANK 10

0076

REF

2

LAST

43

05.2000

SETLOC FRANDRES

0077

05.2447

BANK

0078

REF

3

LAST

154

E3.1400

EBANK= LST1

0079

REF

2

LAST

43

TU 43:

1

1*

COUNT* \$3/START

FRESH AND RESTART

0080

05.2447

0 0004 0

SLAP1

INHINT

FRESH START. COMES HERE FROM PINBALL.

0081

REF

1

05.2450

0 3107 1

TC

STARTSUB

SUBROUTINE DOES MOST OF THE WORK.

0082

REF

1

05.2451

1 2456 0

STARTSW

TCF

SKIPSIM

PATCH...TCF STARTSIM...FOR SIMULATION

0083

REF

22

LAST

174

05.2452

3 4736 1

STARTSIM

CAF

BIT14

0084

REF

1

05.2453

0 5105 0

TC

FINDVAC

0085

05.2454

77777 0

SIM2CADR

DCT

77777

PATCH 2CADR (AND EBANK DESIGNATION) OF
SIMULATION START ADDRESS.

0086

05.2455

77777 0

DCT

77777

0087

REF

16

LAST

204

05.2456

3 1036 0

SKIPSIM

CA

DSPTAB +110

00871

REF

1

05.2457

7 4771 0

MASK

BITS466

TURN OFF ALL DSPTAB +110 LAMPS

00872

REF

15

LAST

172

05.2460

6 4735 1

AD

BIT15

EXCEPT THE GIMBAL LOCK & NO ATT ONLY ON

0088

REF

17

LAST

211

05.2461

55 036 1

TS

DSPTAB +110

REQUESTED FRESH START.

0089

REF

14

LAST

87

05.2462

3 4740 0

CA

BIT12

INITIALIZE DOWNLINK ERASABLE MEMORY

0090

REF

1

05.2463

54 333 0

TS

DUMPCNT

DUMP FOR ONE PASS.

0093

REF

7

LAST

191

05.2464

3 4755 1

CA

ZERO

00931

REF

2

LAST

108

05.2465

55 365 1

TS

ERCOUNT

009315

REF

1

05.2466

54 375 1

TS

FAILREG

00932

REF

2

LAST

211

05.2467

54 376 1

TS

FAILREG +1

009325

REF

3

LAST

211

05.2470

54 377 0

TS

FAILREG +2

00933

REF

2

LAST

194

05.2471

54 320 1

TS

REDOCTR

009335

REF

1

05.2472

4 4644 1

CS

PRID12

00934

REF

9

LAST

160

05.2473

55 313 0

TS

DSRUPTSW

0094

REF

23

LAST

211

05.2474

3 4736 1

DOFSTRT

CAF

BIT14

INSURE ENGINE IS OFF.

0095

05.2475

0 0006 1

EXTEND

0096

REF

7

LAST

180

05.2476

01 011 0

WRITE

DSALMOUT

0097

REF

8

LAST

211

05.2477

4 4755 0

CS

ZERO

0098

REF

1

05.2500

54 055 0

TS

THRUST

0099

REF

1

05.2501

3 4751 0

DOFSTRT1

CAF

FOUR

0100

REF

1

05.2502

55 273 1

TS

RCSFLAGS

INITIALIZE ATTITUDE ERROR DISPLAYS.

0101

REF

2

LAST

174

05.2503

3 4355 0

CA

PRID30

0102

REF

1

05.2504

54 366 0

TS

RESTREG

SUPER BANK PRIORITY FOR DISPLAYS.

0103

REF

9

LAST

211

05.2505

3 4755 1

CA

ZERO

0104

REF

2

LAST

105

05.2506

55 246 1

TS

ABDELV

DAP INITIALIZATION

0105

REF

1

05.2507

54 371 0

TS

NVSARE

0106

REF

1

05.2510

55 072 1

TS

FBANKTEN

L FRESH START AND RESTART

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0107	REF	6	LAST	192	05,2511	55'262 1	TS	CH5MASK	
0108	REF	5	LAST	192	05,2512	55'263 0	TS	CH6MASK	
0109	REF	7	LAST	192	05,2513	55'276 1	TS	PVALVEST	FOR RCS FAILURE MONITOR
0110	REF	2	LAST	108	05,2514	55'360 1	TS	FREESTORE	***** MUST NOT BE REMOVED FROM DOFSTART
0111	REF	2	LAST	108	05,2515	55'362 0	TS	SMGLE	***** MUST NOT BE REMOVED FROM DOFSTART
0112	REF	4	LAST	208	05,2516	54 332 1	TS	DNLSSTOD	SELECT POD DOWNLIST
0113	REF	2	LAST	208	05,2517	55'324 1	TS	AGSWDR	ALLOW AGS INITIALIZATION
0114	REF	2	LAST	110	05,2520	55'501 0	TS	UPSVFLAG	ZERO UPDATE STATE VECTOR REQUEST FLAGWORD
0115					05,2521	0 0006 1	EXTEND		
0116	REF	1			05,2522	01 005 0	WRITE	CHAN5	TURN OFF RCS JETS.
0117					05,2523	0 0006 1	EXTEND		
0118	REF	1			05,2524	01 006 0	WRITE	CHAN5	TURN OFF RCS JETS.
0119					05,2525	0 0006 1	EXTEND		
0120	REF	13	LAST	187	05,2526	01 012 0	WRITE	CHAN12	
0121					05,2527	0 0006 1	EXTEND		
0122	REF	1			05,2530	01 013 1	WRITE	CHAN13	
0123					05,2531	0 0006 1	EXTEND		
0124	REF	3	LAST	175	05,2532	01 014 0	WRITE	CHAN14	
0125	REF	18	LAST	211	05,2533	4 1036 1	CS	CSPTAB +110	
0126	REF	2	LAST	211	05,2534	7 4771 0	MASK	BITS4&6	
0127	REF	37	LAST	208	05,2535	10 000 0	CCS	A	
0128					05,2536	0 2542 0	TC	+4	
0129	REF	3	LAST	212	05,2537	3 4771 1	CA	BITS4&6	
0130					05,2540	0 0006 1	EXTEND		THE IMU WAS IN COARSE ALIGN IN GENERAL
0131	REF	14	LAST	212	05,2541	05 012 1	WOR	CHAN12	LOCK, SO PUT IT BACK INTO COARSE ALIGN.
0132	REF	1			05,2542	0 2643 1	TC	RR,KLEAN	
0133	REF	10	LAST	211	05,2543	4 4755 0	CS	ZERO	
0134	REF	1			05,2544	55'011 1	TS	MODEREG	
0135	REF	1			05,2545	3 3362 0	CAF	IMSOINIF	FRESH START IMU INITIALIZATION.
0136	REF	38	LAST	204	05,2546	55'302 0	TS	IMODES30	
0137	REF	1			05,2547	3 3067 0	CAF	MAXDB	
0138	REF	1			05,2550	55'346 0	TS	DB	
0139	REF	2	LAST	211	05,2551	3 4751 0	CAF	FOUR	
0140	REF	1			05,2552	55'325 0	TS	RATEINDX	INITIALIZE KALCMANU RATE
0141	REF	1			05,2553	3 3063 1	CA	BDOLSTR	
0142	REF	1			05,2554	54 111 1	TS	DAPBDLS	
0143	REF	1			05,2555	3 5015 0	CAF	EBANK6	
0144	REF	1			05,2556	54 003 0	TS	EBANK	
0145	REF	1			F6,1400		EBANK=	HIASCENT	
01451	REF	1			05,2557	3 3060 1	CA	STIKSTRT	
01452	REF	1			05,2560	55'444 0	TS	STIKSENS	
01453	REF	1			05,2561	3 3061 0	CA	RATESTAT	
01454	REF	2	LAST	130	05,2562	55'476 1	TS	RATEFDR	
0146	REF	1			05,2563	3 2000 0	CAF	FULLAPS	INITIALIZE MAXIMUM ASCENT MASS FOR USE
0147	REF	2	LAST	212	05,2564	55'400 0	TS	HIASCENT	BY 1/ACCS UNTIL THE PAD LOAD IS DONE.
0148	REF	1			05,2565	3 3064 0	CA	77001DCT	LOAD DAP FILTER GAINS PAD LOAD

L FRESH START AND RESTART

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0149	REF	1		05.2566	55'403 0	TS	DKTPAP	TO BEST PRESENT ESTIMATE OF GOODIES
0150	REF	1		05.2567	55'406 0	TS	LMTRAP	.14 DEG
0151	REF	1		05.2570	3 3065 1	CA	60DEC	
0152	REF	1		05.2571	55'405 0	TS	DKKADSN	
0153	REF	1		05.2572	55'410 1	TS	LNKADSN	6 SEC GAIN FOR ALPHA
0154	REF	11	LAST 212	05.2573	3 4755 1	CA	ZERO	
0155	REF	1		05.2574	55'407 1	TS	LMOMEGAN	UNITY GAIN
0156	REF	2	LAST 208	05.2575	3 4363 0	CA	TEN	
0157	REF	1		05.2576	55'404 1	TS	DKOMEGAN	1 SEC GAIN FOR OMEGA
0158	REF	16	LAST 191	05.2577	3 4744 1	CAF	BIT8	SET DOCKED DB TO 1.4 DEG. MAY OVERWRITE
0159	REF	1		05.2600	55'411 0	TS	DKDB	WITH-PAD-LOAD.
0160	REF	1		05.2601	3 5026 0	CAF	IM33INIT	
0161	REF	23	LAST 207	05.2602	6 4746 0	AD	BIT6	KEEP BOTH DAP AND ERROR-NEEDLES DISPLAY
0162	REF	16	LAST 181	05.2603	55'303 1	TS	IMODE533	OFF UNTIL ICOD ZERO IS FINISHED.

0163				05.2604	0 0006 1	EXTEND		INITIALIZE SWITCHES ONLY ON FRESH START.
0164	REF	1		05.2605	3 3367 0	DCA	SWINIT	
0165	REF	17	LAST 195	05.2606	52 075 1	DXCH	STATE	
0166	REF	2	LAST 213	05.2607	3 3370 0	CA	SWINIT +2	
0167	REF	18	LAST 213	05.2610	54 076 1	TS	STATE +2	
0168	REF	2	LAST 206	05.2611	3 4737 0	CA	PEFSMBIT	DO NOT ALTER REFSHFLG ON FRESH START.
0169	REF	19	LAST 213	05.2612	7 0077 0	MASK	STATE +3	
0170	REF	3	LAST 213	05.2613	6 3371 1	AD	SWINIT +3	
0171	REF	20	LAST 213	05.2614	54 077 0	TS	STATE +3	
0172				05.2615	0 0006 1	EXTEND		
0173	REF	4	LAST 213	05.2616	3 3373 0	DCA	SWINIT +4	
0174	REF	21	LAST 213	05.2617	52 101 0	DXCH	STATE +4	
0175				05.2620	0 0006 1	EXTEND		
0176	REF	5	LAST 213	05.2621	3 3375 0	DCA	SWINIT +6	
0177	REF	22	LAST 213	05.2622	52 103 1	DXCH	STATE +6	
0178	REF	1		05.2623	3 4744 1	CA	SURFFBIT	DO NOT ALTER SURFFLAG ON FRESH START.
0179	REF	1		05.2624	6 4740 0	AD	CMOONBIT	CMOONFLG
0180	REF	1		05.2625	6 4741 1	AD	LMOONBIT	LMOONFLG
0181	REF	23	LAST 213	05.2626	7 0104 0	MASK	STATE +80	
0182	REF	6	LAST 213	05.2627	6 3376 0	AD	SWINIT +80	
0183	REF	24	LAST 213	05.2630	54 104 0	TS	STATE +80	
0184	REF	7	LAST 213	05.2631	3 3377 1	CA	SWINIT +90	
0185	REF	25	LAST 213	05.2632	54 105 1	TS	STATE +90	
0186	REF	1		05.2633	3 4737 0	CA	APSFBLBIT	DO NOT ALTER APSFLAG ON FRESH START.
0187	REF	26	LAST 213	05.2634	7 0106 1	MASK	STATE +100	
0188	REF	8	LAST 213	05.2635	6 3400 0	AD	SWINIT +100	
0189	REF	27	LAST 213	05.2636	54 106 1	TS	STATE +100	
0190	REF	9	LAST 213	05.2637	3 3401 1	CAF	SWINIT +110	
0191	REF	28	LAST 213	05.2640	54 107 0	TS	STATE +110	

0192	REF	2	LAST 165	05.2641	0 4635 0	ENDRSTRT TL	PLSTJUMP	NOW IN ANOTHER BANK.
0193	REF	1		05.2642	03210 1	CAD9	DUMMYJOB + 2	PICKS UP AT RELINT. (DONT ZERO NEWJOB)

0194				05.2643	0 0004 0	MP.KLEAN	INHINT	
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L FRESH START AND RESTART

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0195				05.2644	0 0006 1	EXTEND
0196	REF	2	LAST	157	05.2645 3 4755 1	DCA NEG0
0197	REF	1			05.2646 52 755 1	DXCH -PHASE2
0198					05.2647 0 0006 1	PGCKLEAN EXTEND
0199	REF	3	LAST	214	05.2650 3 4755 1	DCA NEG0
0200	REF	1			05.2651 52 761 0	DXCH -PHASE4
0201					05.2652 0 0006 1	V37KLEAN EXTEND
0202	REF	4	LAST	214	05.2653 3 4755 1	DCA NEG0
0203	REF	1			05.2654 52 753 1	DXCH -PHASE1
0204					05.2655 0 0006 1	EXTEND
0205	REF	5	LAST	214	05.2656 3 4755 1	DCA NEG0
0206	REF	1			05.2657 52 757 0	DXCH -PHASE3
0207					05.2660 0 0006 1	EXTEND
0208	REF	6	LAST	214	05.2661 3 4755 1	DCA NEG0
0209	REF	1			05.2662 52 763 1	DXCH -PHASE5
0210					05.2663 0 0006 1	EXTEND
0211	REF	7	LAST	214	05.2664 3 4755 1	DCA NEG0
0212	REF	1			05.2665 52 765 1	DXCH -PHASE6
0213	REF	14	LAST	192	05.2666 0 0002 0	TC 0

FRESH START AND RESTART

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P0214 COMES HERE FROM LOCATION 4000. GOJAM. RESTART ANY PROGRAMS WHICH MAY HAVE BEEN RUNNING AT THE TIME

0215	REF	4	LAST	211	03,1400			EBANK=	LST1	
0217	REF	3	LAST	211	05,2667	24 320 0	GOPROG	INCR	PEDICTF	ADVANCE RESTART COUNTER.
0218	REF	15	LAST	214	05,2670	22 002 0		LXCH	0	
0219					05,2671	0 0006 1		EXTEND		
0220	REF	1			05,2672	04 007 1		RDK	SUPERBNK	
0221	REF	2	LAST	195	05,2673	53 433 0		DXCH	R5BBQ	
0222	REF	19	LAST	212	05,2674	3 1036 0		CA	DSPTAB +110	
0223	REF	15	LAST	171	05,2675	7 4750 0		MASK	BIT4	
0224					05,2676	0 0006 1		EXTEND		
0225					05,2677	1 2703 0		BZF	+4	
0226	REF	24	LAST	212	05,2700	6 4746 0		AD	BIT6	SET ERROR COUNTER ENABLE
0227					05,2701	0 0006 1		EXTEND		
0228	REF	15	LAST	212	05,2702	05 012 1		WDR	CHANGE	ISS WAS IN COARS ALIGN SO GO BACK TO
0229	REF	1			05,2703	0 3070 0	BUTTONS	TC	LIGHTSET	

R0230
R0232
R0234
R0236
R0238

ERASCHK TEMPORARILY STORES THE CONTENTS OF TWO ERASABLE LOCATIONS. X AND X+1 INTO SKEEP5 AND SKEEP6. IT ALSO STORES X INTO SKEEP7 AND ERESTORE. IF ERASCHK IS INTERRUPTED BY A RESTART, C(ERESTORE) SHOULD EQUAL C(SKEEP7), AND BE A + NUMBER LESS THAN 2000 OCT. OTHERWISE C(ERESTORE) SHOULD EQUAL +0.

0239	REF	2	LAST	157	05,2704	3 4350 0		CAP	H15	
0240	REF	3	LAST	212	05,2705	7 1360 1		MASK	ERESTORE	
0241					05,2706	0 0006 1		EXTEND		
0242					05,2707	1 2711 0		BZF	+2	IF ERESTORE NOT = +0 OR +N LESS THAN 2K.
0243	REF	1			05,2710	1 3105 1		TCF	NONAVKEY +3	DO FRESH START - E MEMORY MIGHT BE BAD
0244	REF	4	LAST	215	05,2711	4 1360 1		CS	ERESTORE	
0245					05,2712	0 0006 1		EXTEND		
0246	REF	1			05,2713	1 2730 0		BZF	DORSTART	= +0 CONTINUE WITH RESTART.
0247	REF	1			05,2714	6 1377 0		AD	SKEEP7	
0248					05,2715	0 0006 1		EXTEND		
0249					05,2716	1 2720 1		BZF	+2	= SKEEP7, RESTORE E MEMORY.
0250	REF	2	LAST	215	05,2717	1 3105 1		TCF	NONAVKEY +3	DO FRESH START - E MEMORY MIGHT BE BAD
0251	REF	2	LAST	108	05,2720	3 1374 0		CA	SKEEP4	
0252	REF	2	LAST	212	05,2721	54 003 0		TS	EBANK	EBANK OF E MEMORY THAT WAS UNDER TEST.
0253					05,2722	0 0006 1		EXTEND		(NOT DXCH SINCE THIS MIGHT HAPPEN AGAIN)
0254	REF	2	LAST	108	05,2723	3 1376 1		DCA	SKEEP5	
0255	REF	2	LAST	215	05,2724	51 377 0		INDEX	SKEEP7	
0256					05,2725	52 001 1		DXCH	0000	E MEMORY RESTORED.
0257	REF	12	LAST	213	05,2726	3 4755 1		CA	ZERO	
0258	REF	5	LAST	215	05,2727	55 360 1		TS	ERESTORE	
0259	REF	2	LAST	211	05,2730	0 3107 1	DORSTART	TC	STARTSUB	DO INITIALIZATION AFTER EPASE RESTORE.
0271	REF	1			05,2731	4 4756 0	SETINFL	CS	INTFLBIT	
0272	REF	2	LAST	81	05,2732	7 0106 1		MASK	FLGWRD10	
0273	REF	3	LAST	215	05,2733	54 106 1		TS	FLGWRD10	

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0274	REF	1		05,2734	3 3364 0	CA	9.6.4	LEAVE PROG ALARM, GIMBAL LOCK, NO-ATT
0275	REF	20	LAST	215	05,2735	7 1036 1	MASK	DSPTAB +110
0276	REF	16	LAST	211	05,2736	6 4735 1	AD	BIT15
0277	REF	21	LAST	216	05,2737	57 036 0	XCH	DSPTAB +110
0278	REF	1			05,2740	3 3350 1	CAF	IFAILINH
0279	REF	39	LAST	212	05,2741	7 1302 0	MASK	IMODES30
0280	REF	1			05,2742	6 3363 1	AD	IM30INIR
0281	REF	40	LAST	216	05,2743	55 1302 0	TS	IMODES30
0282	REF	3	LAST	212	05,2744	3 1324 0	CA	AGSWORD
0283	REF	5	LAST	212	05,2745	54 332 1	TS	DNLSTCOD
0284	REF	16	LAST	215	05,2746	3 4750 1	CA	BIT4
0285					05,2747	0 0006 1	EXTEND	
0286	REF	4	LAST	212	05,2750	05 014 1	WOR	CHAN14
0287	REF	5	LAST	186	05,2751	4 0101 0	CS	FLAGWRD5
0288	REF	2	LAST	174	05,2752	7 4745 1	MASK	ENGDNBIT
0289	REF	38	LAST	212	05,2753	10 000 0	CCS	A
0290					05,2754	1 2761 1	TCF	+5
0291	REF	15	LAST	168	05,2755	3 4737 0	CAF	BIT13
0292					05,2756	0 0006 1	EXTEND	
0293	REF	8	LAST	211	05,2757	05 011 1	WOR	DSALMOUT
0294	REF	1			05,2760	1 2775 1	TCF	GOPROG3
0295	REF	24	LAST	211	05,2761	3 4736 1	CAF	BIT14
0296					05,2762	0 0006 1	EXTEND	
0297	REF	9	LAST	216	05,2763	05 011 1	WOR	DSALMOUT
0298	REF	2	LAST	216	05,2764	1 2775 1	TCF	GOPROG3
0299					05,2765	0 0004 0	ENEMA	INHINT
0300	REF	1			05,2766	0 3116 1	TC	STARTSB1
0301	REF	1			05,2767	1 2771 0	TEF	GOPROG2A
0302	REF	1			05,2770	0 3146 1	GOPROG2	TC
0303	REF	2	LAST	215	05,2771	0 3070 0	GOPROG2A	TC
0304	REF	1			05,2772	4 3066 0	CS	RSFLGBTS
0305	REF	4	LAST	215	05,2773	7 0106 1	MASK	FLGWRD10
0306	REF	5	LAST	216	05,2774	54 106 1	TS	FLGWRD10
0307	REF	1			05,2775	3 4756 1	GOPROG3	CAF
0308	REF	16	LAST	209	05,2776	54 161 0	PCLDOP	TS
0309					05,2777	6 0000 1	DOUBLE	
0310					05,3000	0 0006 1	EXTEND	
0311	REF	39	LAST	216	05,3001	5 0000 1	INDEX	A
0312	REF	2	LAST	214	05,3002	3 0753 0	DCA	-PHASE1
0313					05,3003	0 0006 1	EXTEND	
0314	REF	7	LAST	182	05,3004	06 001 0	RXOR	LCHAN
0315	REF	40	LAST	216	05,3005	10 000 0	CCS	A
0316	REF	1			05,3006	1 3054 1	TCF	PTBAD
0317	REF	2	LAST	216	05,3007	1 3054 1	TCF	PTBAD
0318	REF	3	LAST	216	05,3010	1 3054 1	TCF	PTBAD

LEAVE PROG ALARM, GIMBAL LOCK, NO-ATT
LAMPS INTACT ON HARDWARE RESTARTLEAVE IMU FAILURE INHIBITS INTACT ON
HARDWARE RESTART. RESET ALL FAILURE
CODES.

BE SURE OF CORRECT DOWNLIST

TURN ON THROTTLE COUNTER

TURN ON THRUST DRIVE

TURN ENGINE ON

TURN ENGINE OFF.

CLEAR BITS 7 AND 14.

VERIFY PHASE TABLE AGREEMENTS

COMPLEMENT INTO A, DIRECT INTO L.

RESULT MUST BE -0 FOR AGREEMENT.

RESTART FAILURE.

L FRESH START AND RESTART

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0319	REF	17	LAST	216	05,3011	10 161 0	CCS	MPAC +5	PROCESS ALL RESTART GROUPS.
0320	REF	1			05,3012	1 2776 1	TCF	PCLDDP	
0321	REF	18	LAST	217	05,3013	54 162 0	TS	MPAC +6	SET TO +0.
0322	REF	1			05,3014	0 5315 0	TC	MMDSPLAY	DISPLAY MAJOR MODE
0323					05,3015	0 0004 0	INHINT		RELINT DONE IN MMDSPLAY
0324	REF	1			05,3016	4 4736 0	CS	DIDFLBIT	CLEAR DIDFLAG IN ORDER TO FORCE P10 TO
0325	REF	1			05,3017	7 0075 1	MASK	FLAGRDI	RE-INITIALIZE ITSELF IF IT HAD BEEN
0326	REF	2	LAST	217	05,3020	54 075 1	TS	FLAGRDI	OPERATING AT THE TIME OF THE RESTART.
03262	REF	1			05,3021	4 4740 1	CS	RDOFLBIT	CLEAR RDOFLAG. IF P66 IS IN OPERATION
03264	REF	3	LAST	217	05,3022	7 0075 1	MASK	FLAGRDI	IT WILL RE-INITIALIZE ITSELF AND
03266	REF	4	LAST	217	05,3023	54 075 1	TS	FLAGRDI	CONTINUE.
03267	REF	1			05,3024	4 4741 0	CS	P21FLBIT	CLEAR P21FLAG SO THAT P21 WILL COMPUTE
03268	REF	7	LAST	208	05,3025	7 0074 0	MASK	FLAGRDI	NEW BASE STATE VECTORS.
03269	REF	8	LAST	217	05,3026	54 074 0	TS	FLAGRDI	
0327	REF	2	LAST	216	05,3027	3 4756 1	CAF	NUMGRPS	SEE IF ANY GROUPS RUNNING.
0328	REF	19	LAST	217	05,3030	54 161 0	TS	MPAC +5	
0329					05,3031	6 0000 1	DOUBLE		
0330	REF	41	LAST	216	05,3032	50 000 1	INDEX	A	
0331	REF	1			05,3033	10 753 1	CCS	PHASE1	
0332	REF	1			05,3034	1 3036 0	TCF	PACTIVE	PNZ - GROUP ACTIVE.
0333	REF	1			05,3035	1 3043 1	TCF	PINACT	+0 - GROUP NOT RUNNING.
0334	REF	20	LAST	217	05,3036	54 154 0	PACTIVE	TS	MPAC
0335	REF	21	LAST	217	05,3037	24 154 1	INCR	MPAC	ABS OF PHASE.
0336	REF	22	LAST	217	05,3040	24 162 1	INCR	MPAC +6	INDICATE GROUP DEMANDS PRESENT.
0337	REF	1			05,3041	3 3062 0	CA	RACICADR	
0338	REF	1			05,3042	0 4622 0	TC	SWCALL	MUST RETURN TO SWRETURN.
0339	REF	23	LAST	217	05,3043	10 161 0	PINACT	CCS	MPAC +5
0340	REF	1			05,3044	1 3030 0	TCF	NXTST	PROCESS ALL RESTART GROUPS.
0341	REF	24	LAST	217	05,3045	10 161 0	CCS	MPAC +6	NO, CHECK PHASE ACTIVITY FLAG
0342	REF	1			05,3046	1 2641 1	TCF	ENDRSTRT	PHASE ACTIVE
0343	REF	17	LAST	216	05,3047	3 4735 1	CAF	BIT15	IS MODE -0
0344	REF	2	LAST	212	05,3050	7 1011 1	MASK	MODREG	
0345					05,3051	0 0006 1	EXTEND		
0346	REF	1			05,3052	1 6001 1	BZF	GOTIPODH	NO
0347	REF	2	LAST	217	05,3053	1 2641 1	TCF	ENDRSTRT	YES
0348	REF	9	LAST	207	05,3054	0 5567 0	TC	ALARM	SET ALARM TO SHOW PHASE TABLE FAILURE.
0349					05,3055	01107 0	DCT	1107	
0350	REF	1			05,3056	1 2501 0	TCF	DUFSTRT1	

R0351 *****

L FRESH START AND RESTART

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R0352

R0353 DO NOT USE GOPROG2 OR ENEMA WITHOUT CONSULTING POOH PEOPLE

R0354

0355	REF	16	LAST	216	4737		ACT10000 =	BIT13	
0356	REF	3	LAST	211	4355		ACT30000 =	PRIC30	
0357					05,3057	07777 1	ACT7777	UCT	7777
03571					05,3060	32321 0	STIKSTR	DEC	0.825268
03572					05,3061	77445 1	KATESTR	DEC	-218
0358	REF	1			05,3062	03526 0	WACTCADR	CADR	RESTARTS
0359					05,3063	21312 1	BOOLSTR	UCT	21312
0360					05,3064	77001 0	77001	UCT	77001
0361					05,3065	00074 1	60DEC	DEC	60
0363					05,3066	20100 1	RSFLGTS	UCT	20100
03631					05,3067	03434 1	MAXDB	UCTAL	03434
									5 DEG ATTITUDE DEADBAND. SCALED AT 45.
0364	REF	13	LAST	166	05,3070	3 4747 1	LIGHTSLT	CAP	BIT5
0365					05,3071	0 0006 1		EXTEND	
0366	REF	1			05,3072	02 016 1		RAID	NAVKEYIN
0367					05,3073	0 0006 1		EXTEND	
0368	REF	3	LAST	215	05,3074	1 3102 0		BZF	NONAVKEY
0369					05,3075	0 0006 1		EXTEND	
0370	REF	1			05,3076	00 015 0		READ	HNKEYIN
0371	REF	1			05,3077	6 3361 0		AD	-ELR
0372					05,3100	0 0006 1		EXTEND	
0373					05,3101	1 3103 1		BZF	+2
									CHECK FOR MARK REJECT AND ERROR RESET
0374	REF	16	LAST	215	05,3102	0 0002 0	NONAVKEY	TC	
0375	REF	3	LAST	215	05,3103	0 3107 1		TC	STARTSUB
0376	REF	1			05,3104	1 2474 0		TCF	DOFSTART
03762	REF	4	LAST	218	05,3105	0 3107 1	+3	TC	STARTSUB
03764	REF	2	LAST	217	05,3106	1 2501 0		TCF	DOFSTR1
									DO FRESH START BUT DON'T TOUCH ENGINE

L FRESH START AND RESTART

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P0377 INITIALIZATION COMMON TO BOTH FRESH START AND RESTART.

0378	REF	5	LAST	192	E6,1537		EBANK	AD50	
0379	REF	1			05,3107	3 3351 0	STARTSUB	CAF	LONPHAS1
0380	REF	2	LAST	99	05,3110	54 335 0	TS	DNTHGDTL	
A0381									
A0382									
0383	REF	25	LAST	215	05,3111	3 4746 0		CAF	BIT6
0384					05,3112	0 0006 1		EXTEND	
0385	REF	3	LAST	182	05,3113	02 033 0		RAND	CHAN33
0386	REF	1			05,3114	6 3365 1		AD	RMODINIT
0387	REF	15	LAST	195	05,3115	54 110 0		TS	RADNODES
0388	*REF	2	LAST	171	05,3116	5 4733 1	STARTSUB1	CAF	PUSMAX
0389	REF	1			05,3117	54 026 1		TS	TIME3
0390	REF	1			05,3120	6 7746 0		AD	MINUS2
0391	REF	4	LAST	160	05,3121	54 027 0		TS	TIME4
0392	REF	1			05,3122	6 7747 1		AD	NEGONE
0393	RIF	1			05,3123	54 030 0		TS	TIME5
0394	*RIF	2	LAST	212	05,3124	3 5015 0		CAF	EBANK6
0395	REF	3	LAST	215	05,3125	54 003 0		TS	EBANK
0396	REF	17	LAST	218	05,3126	4 4737 1		CS	BIT13
03961	REF	2	LAST	211	05,3127	7 1273 1		MASK	RCSFLAGS
0397	REF	3	LAST	219	05,3130	55 273 1		TS	RCSFLAGS
03971	REF	3	LAST	219	05,3131	3 4733 1		CAF	PUSMAX
03972	REF	1			05,3132	55 466 0		TS	TENEXT
03973					05,3133	0 0006 1		EXTEND	
03974	REF	2	LAST	212	05,3134	03 013 0		WAND	CHAN13
0398	REF	13	LAST	215	05,3135	3 4755 1		CAF	ZERO
0399	REF	1			05,3136	55 465 0		TS	NXT6ADR
0400	REF	3	LAST	130	05,3137	55 472 0		TS	NEXTP
0401	REF	1			05,3140	4 4751 1		CS	ACC5OKAY
0402	REF	2	LAST	212	05,3141	7 0111 1		MASK	DAPBODLS
0403	REF	3	LAST	219	05,3142	54 111 1		TS	DAPBODLS
0404					05,3143	0 0006 1		EXTEND	
0405	REF	1			05,3144	3 3347 1		DCA	IDLEADR
0406	REF	2	LAST	153	05,3145	53 275 1		DXCH	T5ADR
0407	REF	1			05,3146	3 3360 1	STARTSUB2	CAF	PCT30001
0408					05,3147	0 0006 1		EXTEND	
0409	REF	10	LAST	216	05,3150	03 011 1		WAND	DSALMOUT
04092	REF	1			05,3151	4 4743 1		CS	READRBIT
04093	REF	2	LAST	206	05,3152	7 0077 0		MASK	FLAGWRD3
04094	REF	3	LAST	219	05,3153	54 077 0		TS	FLAGWRD3

SET POINTER SO NEXT 20MS DOWNRUPT WILL CAUSE THE CURRENT DOWNLIST TO BE INTERRUPTED AND START SENDING FROM THE BEGINNING OF THE CURRENT DOWNLIST.

CAUSE DAPIOLER TO CALL 1/ACCS

ZERO BIT-13

DISABLE TIME6 CLOCK. JUST IN CASE A T6 RUPT IS ALREADY IN THE PRIORITY CHAIN, ENSURE THAT IT'S INPUTS WILL RENDER IT INEFFECTUAL.

SET T5RUPT FOR DAPIOLER PROGRAM.

DURING SOFTWARE RESTART, DO NOT DISTURB ENGINE ON, OFF AND ISS WARNING.

CLEAR READRFLG FOR R29.

FRESH START AND RESTART

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0410	REF	4	LAST	219	05,3154	4 0077 0	CS	FLAGWRD3	DURING SOFTWARE RESTART, CLEAR TURNON.
0411	REF	1			05,3155	7 4741 0	MASK	NR29FBIT	REPOSITION, CDU ZERO AND REMODE BITS
0412					05,3156	0 0006 1	EXTEND		IN RADMODES, SINCE TASKS ASSOCIATED
0413					05,3157	1 3161 0	BZF	+2	WITH THESE BITS HAVE BEEN KILLED
0414	REF	16	LAST	179	05,3160	3 4742 1	CAF	BIT10	ALSO IF R29 HAD BEEN REQUESTED.
0415	REF	1			05,3161	6 3354 0	AD	ACT32001	(NR29FLG = 0) CLEAR BIT 10 RADMODES
0416					05,3162	4 0000 0	CDM		TO MAKE R29 FORGET IT HAD STARTED
0417	REF	16	LAST	219	05,3163	7 0110 0	MASK	RADMODES	DESIGNATING
0418	REF	17	LAST	220	05,3164	54 110 0	TS	RADMODES	
0419	REF	1			05,3165	3 3356 1	CAF	ACT27470	DURING SOFTWARE RESTART, DO NOT DISTURB
0420					05,3166	0 0006 1	EXTEND		IMU FLAGS. (COURSE ALIGN ENABLE, ZERO
0421	REF	16	LAST	215	05,3167	03 012 1	WAND	CHAN12	IMU CDUS, ENABLE IMU COUNTER) AND GIMBAL
A0422									TRIM DRIVES. LEAVE RR LOCKON ENABLE
A0423									ALONE.
04232	REF	2	LAST	186	05,3170	4 4750 0	CS	NORRMBIT	ENABLE R25.
04234	REF	6	LAST	216	05,3171	7 0101 0	MASK	FLAGWRD5	
04236	REF	7	LAST	220	05,3172	54 101 0	TS	FLAGWRD5	
04237	REF	1			05,3173	4 4741 0	CS	R77FLBIT	CLEAR R77FLAG
04238	REF	8	LAST	220	05,3174	7 0101 0	MASK	FLAGWRD5	
04239	REF	9	LAST	220	05,3175	54 101 0	TS	FLAGWRD5	
0424	REF	1			05,3176	3 3357 0	CAF	ACT74160	DURING SOFTWARE RESTART, DO NOT DISTURB
0425					05,3177	0 0006 1	EXTEND		TELEMETRY FLAGS, RESET TRAP FLAGS, AND
0426	REF	2	LAST	219	05,3200	03 013 0	WAND	CHAN13	ENABLE T6RUPT FLAG.
0427	REF	15	LAST	211	05,3201	3 4740 0	CAF	BIT12	REFNABLE PUPT10 (RUPT QUICKLY
0428					05,3202	0 0006 1	EXTEND		RESUMES EXCEPT DURING P64)
0429	REF	4	LAST	220	05,3203	05 013 0	WDR	CHAN13	
0430	REF	26	LAST	219	05,3204	3 4746 0	CAF	BIT6	DURING SOFTWARE RESTART, DO NOT DISTURB
0431					05,3205	0 0006 1	EXTEND		GYRO ENABLE FLAG.
0432	REF	5	LAST	216	05,3206	03 014 1	WAND	CHAN14	
0433	REF	5	LAST	215	E3,1400		EBANK=	LST1	
0434	REF	1			05,3207	3 5007 0	CAF	STARTED	
0435	REF	4	LAST	219	05,3210	54 003 0	TS	EBANK	SET FOR E3
0436	REF	1			05,3211	3 4734 0	CAF	REG1/2	INITIALIZE WAITLIST DELTA-TS.
0437	REF	6	LAST	220	05,3212	55 1407 1	TS	LST1 +7	
0438	REF	7	LAST	220	05,3213	55 1406 0	TS	LST1 +6	
0439	REF	8	LAST	220	05,3214	55 1405 0	TS	LST1 +5	
0440	REF	9	LAST	220	05,3215	55 1404 1	TS	LST1 +4	
0441	REF	10	LAST	220	05,3216	55 1403 0	TS	LST1 +3	
0442	REF	11	LAST	220	05,3217	55 1402 1	TS	LST1 +2	
0443	REF	12	LAST	220	05,3220	55 1401 1	TS	LST1 +1	
0444	REF	13	LAST	220	05,3221	55 1400 0	TS	LST1	
0445	REF	1			05,3222	4 5236 1	CS	ENDTASK	
0446	REF	1			05,3223	55 1410 1	TS	LST2	

FRESH START AND RESTART

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0447	REF	2	LAST	220	05, 224	55'412 0	TS	LST2 +2
0448	REF	3	LAST	221	05, 3225	55'414 0	TS	LST2 +4
0449	REF	4	LAST	221	05, 3226	55'416 1	TS	LST2 +6
0450	REF	5	LAST	221	05, 3227	55'420 1	TS	LST2 +8D
0451	REF	6	LAST	221	05, 3230	55'422 0	TS	LST2 +10D
0452	REF	7	LAST	221	05, 3231	55'424 0	TS	LST2 +12D
0453	REF	8	LAST	221	05, 3232	55'426 1	TS	LST2 +14D
0454	REF	9	LAST	221	05, 3233	55'430 0	TS	LST2 +16D
0455	REF	2	LAST	220	05, 3234	4 5237 0	CS	ENDTASK +1
0456	REF	10	LAST	221	05, 3235	55'411 0	TS	LST2 +1
0457	REF	11	LAST	221	05, 3236	55'413 1	TS	LST2 +3
0458	REF	12	LAST	221	05, 3237	55'415 1	TS	LST2 +5
0459	REF	13	LAST	221	05, 3240	55'417 0	TS	LST2 +7
0460	REF	14	LAST	221	05, 3241	55'421 0	TS	LST2 +9D
0461	REF	15	LAST	221	05, 3242	55'423 1	TS	LST2 +11D
0462	REF	16	LAST	221	05, 3243	55'425 1	TS	LST2 +13D
0463	REF	17	LAST	221	05, 3244	55'427 0	TS	LST2 +15D
0464	REF	18	LAST	221	05, 3245	55'431 1	TS	LST2 +17D

0465	REF	14	LAST	219	05, 3246	4 4755 0	CS	ZERO	MAKE ALL EXECUTIVE REGISTER SETS
0466	REF	1			05, 3247	54 167 0	TS	PRIORITY	AVAILABLE.
0467	REF	2	LAST	221	05, 3250	54 203 1	TS	PRIORITY +12D	
0468	REF	3	LAST	221	05, 3251	54 217 1	TS	PRIORITY +24D	
0469	REF	4	LAST	221	05, 3252	54 233 1	TS	PRIORITY +36D	
0470	REF	5	LAST	221	05, 3253	54 247 1	TS	PRIORITY +48D	
0471	REF	6	LAST	221	05, 3254	54 263 1	TS	PRIORITY +60D	
0472	REF	7	LAST	221	05, 3255	54 277 1	TS	PRIORITY +72D	
0473	REF	8	LAST	221	05, 3256	54 313 1	TS	PRIORITY +84D	

0474	REF	10	LAST	211	05, 3257	55'313 0	TS	DISRUPTSW	
0475	REF	1			05, 3260	54 067 1	TS	NEWJOB	SHOWS NO ACTIVE JOBS.

0476	REF	1			05, 3261	3 3353 1	CAF	VAC1AUSE	MAKE ALL VAC AREAS AVAILABLE.
0477	REF	1			05, 3262	54 400 1	TS	VAC1USE	
0478	REF	1			05, 3263	6 3355 1	AD	LTHVACA	
0479	REF	1			05, 3264	54 454 0	TS	VAC2USE	
0480	REF	2	LAST	221	05, 3265	6 3355 1	AD	LTHVACA	
0481	REF	1			05, 3266	54 530 0	TS	VAC3USE	
0482	REF	3	LAST	221	05, 3267	6 3355 1	AD	LTHVACA	
0483	REF	1			05, 3270	54 604 1	TS	VAC4USE	
0484	REF	4	LAST	221	05, 3271	6 3355 1	AD	LTHVACA	
0485	REF	1			05, 3272	54 660 0	TS	VAC5USE	

0486	REF	3	LAST	213	05, 3273	3 4363 0	CAF	TEN	
0487	REF	25	LAST	217	05, 3274	54 154 0	TS	MPAC	+1, +2, +3).
0489	REF	16	LAST	220	05, 3275	4 4740 1	TS	BIT2	
0490	REF	26	LAST	221	05, 3276	50 154 1	INDEX	MPAC	
0491	REF	22	LAST	216	05, 3277	55'023 0	TS	DSPTAB	
0492	REF	27	LAST	221	05, 3280	10 154 0	CS	MPAC	
0493	REF	1			05, 3301	1 3274 1	TEF	DSPOFF	

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0494	REF	1		05,3302	55'326 0	TS	DELAYLOC	
0495	REF	2	LAST 222	05,3303	55'327 1	TS	DELAYLOC +1	
0496	REF	3	LAST 222	05,3304	55'330 1	TS	DELAYLOC +2	
0497	REF	1		05,3305	55'074 1	TS	RISAVE	
0498	REF	1		05,3306	54 045 1	TS	INLINK	
0499	REF	7	LAST 157	05,3307	54 776 0	TS	DSPCNT	
0500	REF	1		05,3310	55'042 1	TS	CADRSTDR	
0501	REF	1		05,3311	55'013 0	TS	REQRET	
0502	REF	1		05,3312	55'015 0	TS	CLPASS	
0503	REF	1		05,3313	55'012 1	TS	DSPLOCK	
0504	REF	1		05,3314	55'020 0	TS	MONSAVE	KILL MONITOR
0505	REF	1		05,3315	55'021 1	TS	MONSAVE1	
0506	REF	1		05,3316	55'001 0	TS	VERBREG	
0507	REF	1		05,3317	55'002 0	TS	NOUNREG	
0508	REF	1		05,3320	55'043 0	TS	DSPLIST	
0509	REF	1		05,3321	55'312 1	TS	MARKSTAT	
0510	REF	1		05,3322	55'044 1	TS	EXTVBACT	MAKE EXTENDED VERBS AVAILABLE
0511	REF	2	LAST 208	05,3323	55'304 0	TS	IMUCADR	
0512	REF	1		05,3324	55'305 1	TS	OPTCADR	
0513	REF	1		05,3325	55'306 1	TS	RADCADR	
0514	REF	2	LAST 106	05,3326	55'307 0	TS	ATTCADR	
0515	REF	1		05,3327	55'314 1	TS	LGYRO	
0516	REF	1		05,3330	54 100 1	TS	FLAGWRD4	KILL INTERFACE DISPLAYS
0517	REF	1		05,3331	3 4760 1	C-F	ROUTCON	
0518	REF	5	LAST 160	05,3332	55'016 0	TS	ROUT	
0519	REF	7	LAST 209	05,3333	4 4755 0	CS	ONE	
0520	REF	1		05,3334	55'100 0	TS	SAMPLIN	
0521	REF	27	LAST 220	05,3335	3 4746 0	CAF	BIT6	
0522	REF	17	LAST 213	05,3336	7 1303 1	MASK	IMODES33	LEAVE BIT 6 UNCHANGED
0523	REF	2	LAST 213	05,3337	6 5026 0	AD	IM33INIT	NO PIP OR TM FAILS. BIT6=0 IN TM33 R.W.C.
0524	REF	18	LAST 222	05,3340	55'303 1	TS	IMODES33	
0525	REF	1		05,3341	3 3350 0	CAF	LESCHK	SELF CHECK GO-TO REGISTER.
0526	REF	2	LAST 108	05,3342	55'361 0	TS	SELFRET	
0527	REF	1		05,3343	4 4360 1	CS	VD1	
0528	REF	2	LAST 158	05,3344	54 777 1	TS	DSPCOUNT	
0529	REF	17	LAST 218	05,3345	0 0002 0	TC	0	
0530	REF	6	LAST 219	E6,1537		EBANK=	ADSO	
0531	REF	1		05,3346	02024 0	TOLEADR	2CADR	0APIDLER
0531	REF	1		05,3347	34066 0			
0532				05,3350	00455 0	IFAILINH	PCT	435
0533	REF	1		05,3351	03515 0	LDNPHAS1	GENADR	DNPHASE1
0534	REF	1		05,3352	03336 1	LESCHK	GENADR	SELFCHK
0535	REF	2	LAST 221	05,3353	00400 0	VAC1ADRC	ADRES	VAC1USE
0536				05,3354	32001 1	PCT32001	OCT	32001
0537				05,3355	00054 0	LTHVACA	DEC	44

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0538		05,3356	27470 1	UCT27470	UCT	27470	
0539		05,3357	74160 0	UCT74160	UCT	74160	
0540		05,3360	30001 0	UCT30001	UCT	30001	
0541	REF 1		5007	STARTED	EQUALS	EBANK3	
0542	REF 1		4750	NUMGRPS	EQUALS	FIVE	
0543		05,3361	77755 0	-ELR	UCT	-22	-ERROR LIGHT RESET KEY CODE.
0544		05,3362	37411 1	IM30INIT	UCT	37411	INHIBITS IMU FAIL FOR 5 SEC AND PIP ISSW
0545		05,3363	37000 0	IM30INIT	UCT	37000	
0546	REF 2 LAST 181		5026	IM33INIT	UCT	5026	NO PIP OR TM FAIL SIGNALS.
0547		05,3364	00450 0	9.6.4	UCT	450	
0548		05,3365	00102 1	RMODINIT	UCT	00102	
0549		05,3366	00000 1	SWINIT	UCT	0	
0550		05,3367	00000 1		UCT	0	
0551		05,3370	00000 1		UCT	0	
0552		05,3371	02000 0		UCT	02000	BIT 11 = NOR29FLG
0553		05,3372	00000 1		UCT	0	
0554		05,3373	00000 1		UCT	0	
0555		05,3374	00000 1		UCT	0	
0556		05,3375	00100 0		UCT	00100	
0557		05,3376	00000 1		UCT	0	
0558		05,3377	00000 1		UCT	0	
0559		05,3400	00000 1		UCT	0	
0560		05,3401	40000 0		UCT	40000	BIT 15 = LRBYPASS.

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P0561 PROGRAM NAME GOTOPDCH ASSEMBLY SUNDANCE
 R0562 LOG SECTION FRESH START AND RESTART

R0563 FUNCTIONAL DESCRIPTION

R0564 FLASH V 37 ON DSKY XMM CHANGE REQUEST "

R0565 INPUT/OUTPUT INFORMATION

R0566 A. CALLING SEQUENCE TC GOTOPDCH

R0567 B. ERASABLE INITIALIZATION NONE

R0568 C. OUTPUT FLASH V 37 ON DSKY

R0569 D. DEBRIS L

R0570 PROGRAM ANALYSIS

R0571 A. SUBROUTINES CALLED PRIDDSPE, LINUS

R0572 B. NORMAL EXIT TCF ENDOFJOB

R0573 C. ALARM AND ABORT EXITS NONE

0574 6001 BLOCK 03
 0575 REF 2 LAST 40 6000 SETLDC FFTAG5
 0576 6001 BANK

0577 REF 1 COUNT* 33/P00
 0578 REF 1 6001 3 4764 0 GOTOPDCH CAF OCT33 4.33SPOT FOR GOPDDEFIX
 0579 REF 13 LAST 192 6002 54 001 1 TS L
 0580 6003 4 0000 0 CDH
 0581 REF 2 LAST 214 6004 52 761 0 DXCH -PHASE4

0582 REF 3 LAST 213 6005 0 4635 0 TC POSTJUMP
 0583 REF 1 6006 10024 0 CAD GOPDDEFIX
 0584 6007 00024 1 OCT24 MM 20
 0585 6010 00031 0 OCT31 MM 25

0586 20,2004 BANK 20
 0587 REF 1 04,2000 SETLDC VERB47
 0588 04,2024 BANK

0589 REF 1 COUNT* 33/P00 VERR 37 AND P00 IN BANK 4.
 0590 REF 2 LAST 208 04,2024 0 5516 0 GOPDDEFIX TC DOWNFLAG ALLOW X-AXIS OVERRIDE
 0591 REF 1 04,2025 00311 1 ADRES XDVINFLG

0592 REF 3 LAST 224 04,2026 0 5516 0 TC DOWNFLAG INSURE THAT ULLAGE IS OFF
 0593 REF 1 04,2027 00314 1 ADRES ULLAGFLG

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05935	REF	1	04,2030	0 5476 1	TC	CLEARMRK +2	RELEASE MARK DISPLAY SYSTEM.
0594	REF	1	04,2031	3 2037 1	CAF	V37N99	
0595	REF	8	LAST 208	04,2032	0 4616 1	TC	BANKCALL
0596	REF	1	04,2033	20476 0	CAON	GOFLASH	
0597			04,2034	1 2031 0	TCF	-3	
0598			04,2035	1 2031 0	TCF	-4	
0599			04,2036	1 2031 0	TCF	-5	
0600			04,2037	11343 0	V37N99	V4	-795

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P0601 PROGRAM NAME V37 ASSEMBLY SUNDANCE

R0602 LOG SECTION FRESH START AND RESTART

R0603 FUNCTIONAL DESCRIPTION

- R0604 1. CHECK IF NEW PROGRAM ALLOWED. IF BIT 1 OF FLAG#02(NODOFLAG) IS SET, AN ALARM 1520 IS CALLED.
R0606 2. CHECK FOR VALIDITY OF PROGRAM SELECTED. IF AN INVALID PROGRAM IS SELECTED, THE OPERATOR TRAIN LIGHT IS
R0608 SET AND CURRENT ACTIVITY, IF ANY, CONTINUES.
R0609 3. SERVICER IS TERMINATED IF IT HAS BEEN RUNNING.
R0610 4. INSTALL IS EXECUTED TO AVOID INTERRUPTING INTEGRATION.
R0611 5. THE ENGINE IS TURNED OFF AND THE DAP IS INITIALIZED FOR COAST.
R0612 6. TRACK AND UPDATE FLAGS ARE SET TO ZERO.
R0613 7. DISPLAY SYSTEM IS RELEASED.
R0614 8. THE FOLLOWING ARE PERFORMED FOR EACH OF THE THREE CASES.
R0615 A. PROGRAM SELECTED IS P00.
R0616 1. RENDEZVOUS AND P25 FLAGS ARE RESET. (KILL P20 AND P25)
R0617 2. STATINT1 IS SCHEDULED BY SETTING RESTART GROUP 2.
R0618 3. MAJOR MODE 00 IS STORED IN THE MODE REGISTER(MODREG).
R0619 4. SUPERBANK 3 IS SELECTED.
R0620 5. NODOFLAG IS RESET.
R0621 6. ALL RESTART GROUPS EXCEPT GROUP 2 ARE CLEARED. CONTROL IS TRANSFERRED TO RESTART PROGRAM (GOPROG2)
R0623 WHICH CAUSES ALL CURRENT ACTIVITY TO BE DISCONTINUED AND A 9 MINUTE INTEGRATION CYCLE TO BE
R0625 INITIATED.
R0626 B. PROGRAM SELECTED IS P20 OR P25.
R0627 1. IF THE CURRENT MAJOR MODE IS THE SAME AS THE SELECTED NEW PROGRAM, THE PROGRAM IS RE-INITIALIZED
R0629 VIA V37XEQ. ALL RESTART GROUPS, EXCEPT GROUP 4 ARE CLEARED.
R0631 2. IF THE CURRENT MAJOR MODE IS NOT EQUAL TO THE NEW REQUEST, A CHECK IS MADE TO SEE IF THE REQUEST-
R0633 ED MAJOR MODE HAS BEEN RUNNING IN THE BACKGROUND,
R0634 AND IF IT HAS, NO NEW PROGRAM IS SCHEDULED, THE EXISTING
R0635 P20 OR P25 IS RESTARTED TO CONTINUE, AND ITS M-M IS SET.
R0636 3. CONTROL IS TRANSFERRED TO GOPROG2.
R0637 C. PROGRAM SELECTED IS NEITHER P00, P20, NOR P25.
R0638 1. V37XEQ IS SCHEDULED (AS A JOB) BY SETTING RESTART GROUP 4.
R0639 2. ALL CURRENT ACTIVITY EXCEPT RENDEZVOUS AND TRACKING IS DISCONTINUED BY CLEARING ALL RESTART
R0641 GROUPS. IF THE RENDEZVOUS OR THE P25 FLAG IS ON, GROUP 2 IS NOT CLEARED, ALLOWING THESE PROGRAMS
R0643 TO CONTINUE.

R0644 INPUT/OUTPUT INFORMATION

R0645 A. CALLING SEQUENCE

R0646 CONTROL IS DIRECTED TO V37 BY THE VERBFAN ROUTINE.
R0647 VERBFAN GOES TO C(VERBTAB+C(VERBREG)). VERB 37 = MHCHANG.
R0648 MHCHANG EXECUTES A TC POSTJUMP, CALL V37.

R0649 B. ERASABLE INITIALIZATION NONE

R0650 C. OUTPUT
R0651

L FRESH START AND RESTART

R0652 MAJOR MODE CHANGE

R0653 D. DEBRIS

R0654 MMNUMBER, MPAC +1, MINDEX, BASETEMP +C(MINDEX), FLAGWRD0, FLAGWRD1, FLAGWRD2, MEDREG, GOLOC -1,

R0656 GOLOC, GOLOC +1, GOLDC +2, BASETEMP, -PHASE2, PHASE2, -PHASE4

R0657 PROGRAM ANALYSIS

R0658 A. SUBROUTINES CALLED

R0659 ALARM, RELDSP, PINBRNCH, INTSTALL, ENGINEF2, ALLECAST, V37KLEAN, G0PROG2, FALTON, FINDVAC, SUPER5W,

R0661 DSPMM

R0662 B. NORMAL EXIT TC ENDOFJOB

R0663 C. ALARMS 1520 (MAJOR MODE CHANGE NOT PERMITTED)

0664	REF	1		04,2040	54 775 0	V37	TS	MMNUMBER	SAVE MAJOR MODE
0665	REF	4	LAST 218	04,2041	3 4355 0		CAF	PR130	RESTART AT PINGALL PRIORITY
0666	REF	2	LAST 211	04,2042	54 366 0		TS	RESTREG	
0667	REF	41	LAST 216	04,2043	3 1302 1		CA	IMODE50	IS IMU BEING INITIALIZED
0668	REF	28	LAST 222	04,2044	7 4746 1		MASK	HIT6	
0669	REF	42	LAST 217	04,2045	10 000 0		CCS	A	
0670	REF	1		04,2046	1 2065 1		TCF	CANTROD	
0671	REF	2	LAST 227	04,2047	4 0775 0		CS	MMNUMBER	IS P70 REQUESTED?
0672	REF	1		04,2050	6 2400 1		AD	DEC70	
0673				04,2051	0 0006 1		EXTEND		
0674	REF	1		04,2052	1 2375 0		BZF	SETUP70	YES
0675	REF	8	LAST 222	04,2053	6 4753 1		AD	ONE	IS P71 REQUESTED?
0676				04,2054	0 0006 1		EXTEND		
0677	REF	1		04,2055	1 2372 1		BZF	SETUP71	YES
0678	REF	3	LAST 227	04,2056	3 0775 1		CA	MMNUMBER	IS NEW REQUEST P00
0679				04,2057	0 0006 1		EXTEND		
0680	REF	1		04,2060	1 2107 1		BZF	ISSERVON	YES, CHECK SERVICER STATUS
0681	REF	3	LAST 165	04,2061	4 0076 1		CS	FLAGWRD2	NO, IS N000 V37 FLAG SET
0682	REF	1		04,2062	7 4753 0		MASK	N000BIT	
0683	REF	43	LAST 227	04,2063	10 000 0		CCS	A	
0684	REF	1		04,2064	1 2072 1		TCF	CHECKTAB	NO
0685	REF	10	LAST 217	04,2065	0 5567 0	CANTROD	TC	ALARM	
0686				04,2066	01520 1		DCT	1520	
0687	REF	1		04,2067	0 4457 0	V37BAD	TC	RELDSP	RELEASES DISPLAY FROM ASTRONAUT
0688	REF	4	LAST 224	04,2070	0 4635 0		TC	POSTJUMP	BRING BACK LAST NORMAL DISPLAY IF THERE
0689	REF	1		04,2071	21050 1		CADR	PINBRNCH	WAS ONE. OTHERWISE DO AN EDJ.
0690	REF	1		04,2072	3 2477 1	CHECKTAB	CA	N0057MM	INDEX FOR MM TABLES.

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0691	REF	28	LAST	221	04,2073	54 155 1	AGAINMM	TS	MPAC +1	
0692	REF	29	LAST	228	04,2074	50 155 0		NDX	MPAC +1	
0693	REF	1			04,2075	3 2441 1		CA	FFEMM1	OBTAIN WHICH MM THIS IS FOR
0694	REF	1			04,2076	7 6074 0		MASK	LOW7	
0695					04,2077	4 0000 0		COM		
0696	REF	4	LAST	227	04,2100	6 0775 1		AD	MMNUMBER	
0697	REF	44	LAST	227	04,2101	10 000 0		CCS	A	
0698	REF	30	LAST	228	04,2102	10 155 1		CCS	MPAC +1	IF GR, SEE IF ANYMORE IN LIST
0699	REF	1			04,2103	1 2073 0		TCF	AGAINMM	YES, GET NEXT ONE
0700	REF	1			04,2104	1 2322 1		TCF	V37COND	LAST TIME OR PASSED MM
0701	REF	31	LAST	228	04,2105	3 0155 0		CA	MPAC +1	
0702	REF	1			04,2106	54 774 1		TS	MINDEX	SAVE INDEX FOR LATER
0703	REF	2	LAST	186	04,2107	4 0103 1	ISSEAVON	CS	FLAGWRD7	V37 FLAG SET - I.E. IS-SERVICER GOING
0704	REF	1			04,2110	7 4746 1		MASK	V37FLBIT	
0705	REF	45	LAST	228	04,2111	10 000 0		CCS	A	
0706	REF	1			04,2112	1 2134 1		TCF	CANV37	NO
0707	REF	4	LAST	224	04,2113	0 5516 0		TC	DOWNFLAG	YES, TURN OFF THE AVERAGE FLAG AND
0708	REF	1			04,2114	00163 0		ADRES	AVEGFLAG	WAIT FOR SERVICER TO RETURN TO CANV37.
0709	REF	1			04,2115	3 2366 0		CAF	V37RETAD	
0710	REF	1			04,2116	55 260 0		TS	OUTROUTE	
0711	REF	1			04,2117	1 5155 1		TCF	ENDOFJOB	
0712	REF	9	LAST	217	04,2120	4 0074 0	V37RET	CS	FLAGWRD0	IS P20 OR P22 RUNNING?
0713	REF	2	LAST	185	04,2121	7 4745 1		MASK	RNDVZBIT	
0714	REF	46	LAST	228	04,2122	10 000 0		CCS	A	
0715					04,2123	1 2125 1		TCF	+2	NO, CHECK FOR P25.
0716	REF	1			04,2124	1 2132 1		TCF	2.7SPT	YES, DO 2.7SPOT
0717	REF	10	LAST	228	04,2125	4 0074 0		CS	FLAGWRD0	IS P25 RUNNING?
0718	REF	1			04,2126	7 4743 1		MASK	P25FLBIT	
0719	REF	47	LAST	228	04,2127	10 000 0		CCS	A	
0720	REF	1			04,2130	3 2367 1	2.0SPT	CA	DCT37667	
0721	REF	14	LAST	218	04,2131	6 4747 1	2.11SPT	AD	BIT5	
0722	REF	1			04,2132	6 2370 1	2.7SPT	AD	DCT40072	
0723	REF	1			04,2133	0 5357 0		TC	PHSCHNGA	
0724	REF	15	LAST	221	04,2134	3 4759 1	CANV37	CAF	ZFRG	
0725					04,2135	0 0006 1		EXTEND		
0726	REF	2	LAST	215	04,2136	01 007 1		WRITE	SUPERBNK	
0727	REF	1			04,2137	3 2365 0		CAF	ROGAD	
0728	REF	1			04,2140	54 374 0		TS	TEMPFLSH	
0729	REF	1			04,2141	0 5353 1		TC	PHSCHNG	
0730					04,2142	00014 1		DCT	14	

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0731	REF	3	LAST	207	04,2143	0 6037 0	RD0	TC	INTPRET	
0732					04,2144	77624 1		CALL		WAIT FOR INTEGRATION TO FINISH
0733	REF	1			04,2145	27414 0			INTSTALL	
0734					04,2146	77776 1	DUMHYAD	EXIT		
0735	REF	5	LAST	228	04,2147	0 5516 0		TC	DOWNFLAG	
0736	REF	1			04,2150	00124 0		ADRES	3AXISFLG	RESET 3-AXIS FLAG
0737	REF	1			04,2151	3 4735 1		CAF	LRBYBIT	CLEAN UP THE R12 FLAGWORD.
0738	REF	1			04,2152	54 107 0		TS	FLGWRD11	
07382	REF	6	LAST	229	04,2153	0 5516 0		TC	DOWNFLAG	INSURE THAT THE R04FLAG IS CLEAR.
07384	REF	2	LAST	71	04,2154	00063 1		ADRES	R04FLAG	
07386	REF	7	LAST	229	04,2155	0 5516 0		TC	DOWNFLAG	INSURE MONFLAG IS CLEAR.
07388	REF	1			04,2156	00141 0		ADRES	MUNFLAG	
0739	REF	8	LAST	229	04,2157	0 5516 0		TC	DOWNFLAG	ALLOW X-AXIS OVERRIDE.
0740	REF	2	LAST	224	04,2160	00311 1		ADRES	XOVINFLG	
0741	REF	5	LAST	228	04,2161	10 775 0		CCS	RRNUNREF	IS THIS A POCH REQUEST
0742	REF	1			04,2162	1 2310 0		TCF	RCOUVEAU	NO. PICK UP NEW PROGRAM
0743	REF	2	LAST	227	04,2163	0 4457 0	POCH	TC	RELOSP	RELEASE DISPLAY SYSTEM
0744	REF	1			04,2164	3 5017 1		CAF	PRID5	SET VARIABLE RESTART PRIORITY FOR
0745	REF	1			04,2165	55 056 1		TS	PHSPRDT2	POG INTEGRATION.
0746	REF	1			04,2166	0 6011 1		TC	CLRADMDD	CLRADMDD DOES AN INHINT.
0747	REF	2	LAST	227	04,2167	4 4753 0		CS	NODDBIT	TURN OFF NODDFLAG.
0748	REF	4	LAST	227	04,2170	7 0076 1		MASK	FLAGWRD2	
0749	REF	5	LAST	229	04,2171	54 076 1		TS	FLAGWRD2	
0750	REF	2	LAST	223	04,2172	3 4756 1		CA	FIVE	SET RESTART FOR STATEINT1
0751	REF	14	LAST	224	04,2173	54 001 1		TS	L	
0752					04,2174	4 0000 0		COM		
0753	REF	2	LAST	214	04,2175	52 755 1		DXCH	-PHASE2	
0754	REF	1			04,2176	4 2371 1		CS	DC1700	TURN OFF P20, P25, IHU IN USE FLAG
0755	REF	11	LAST	228	04,2177	7 0074 0		MASK	FLAGWRD0	
0756	REF	12	LAST	229	04,2200	54 074 0		TS	FLAGWRD0	RENDFLG
0757	REF	1			04,2201	3 4755 1		CAF	DNLADPOG	
0758	REF	6	LAST	216	04,2202	54 332 1	SEUDOPOL	TS	DNLSTCOD	SET UP APPROPRIATE DOWNLIST CODE
0759	REF	4	LAST	216	04,2203	55 324 1		TS	AGSWARD	(CURRENT LIST WILL BE COMPLETED BEFORE
A0760										NEW ONE IS STARTED)
0761	REF	6	LAST	176	04,2204	0 4674 0		TC	IBNKCALL	
0762	REF	1			04,2205	75555 0		CADR	ENGINEOF1	

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0763	REF	7	LAST	229	04,2206	0 4674 0	TC	IBNKCALL	INSURE ALLCOAST.
0764	REF	1			04,2207	40204 0	CADR	ALLOCAST	DOES A RESTORDB.
0765	REF	1			04,2210	4 4775 1	CS	DCT120	TURN OFF TRACK. UPDATE FLAGS
0766	REF	2	LAST	211	04,2211	55'072 1	TS	EBANKTEM	
0767	REF	5	LAST	217	04,2212	7 0075 1	MASK	FLAGWRD1	
0768	REF	6	LAST	230	04,2213	54 075 1	TS	FLAGWRD1	
0769	REF	8	LAST	230	04,2214	0 4674 0	TC	IBNKCALL	KILL GROUPS 1,3,5,6
0770	REF	1			04,2215	12652 0	CADR	V07KLEAN	
0771	REF	6	LAST	229	04,2216	10 775 0	CCS	MMNUMBER	IS IT POOH
0772	REF	1			04,2217	1 2226 1	TCF	RENDVUD	NO
0773	REF	9	LAST	230	04,2220	0 4674 0	TC	IBNKCALL	REDUNDANT EXCEPT FOR GROUP 4
0774	REF	1			04,2221	12647 1	CADR	P00KLEAN	
0775	REF	7	LAST	230	04,2222	3 0775 1	CA	MMNUMBER	
0776	REF	3	LAST	217	04,2223	55'011 1	TS	H0DREG	
0777	REF	5	LAST	227	04,2224	0 4635 0	TC	POSTJUMP	
0778	REF	1			04,2225	12770 1	CADR	G0P0G2	
0779	REF	4	LAST	230	04,2226	4 1011 1	CS	H0DREG	IS CURRENT PROGRAM 22
0780	REF	1			04,2227	6 2326 1	AD	DCT26	
0781					04,2230	0 0006 1	EXTEND		
0782	REF	1			04,2231	1 2250 0	BZF	RESE22	YES - CLEAR RENDEZVOUS FLAG
0783	REF	8	LAST	230	04,2232	4 0775 0	CS	MMNUMBER	IS NEW PROGRAM P22
0784	REF	2	LAST	230	04,2233	6 2326 1	AD	DCT26	
0785					04,2234	0 0006 1	EXTEND		
0786	REF	2	LAST	230	04,2235	1 2250 0	BZF	RESE22	
0787	REF	1			04,2236	6 7746 0	AD	NEG2	IS NEW PROGRAM = P20 OR P25
0788					04,2237	0 0006 1	EXTEND		
0789	REF	1			04,2240	1 2262 1	BZF	RENDVUD	YES
0790	REF	3	LAST	229	04,2241	6 4756 1	AD	FIVE	25
0791					04,2242	0 0006 1	EXTEND		
0792	REF	2	LAST	230	04,2243	1 2262 1	BZF	RENDVUD	YES
0793	REF	1			04,2244	3 2324 0	CA	DCT500	NO, IS EITHER P20 OR P25 RUNNING
0794	REF	13	LAST	229	04,2245	7 0074 0	MASK	FLAGWRDD	
0795	REF	48	LAST	228	04,2246	10 000 0	CCS	A	
0796	REF	1			04,2247	1 2257 1	TCF	POST122	YES, LEAVE GROUP 2 TO PICK UP P20 OR P25
0797	REF	2	LAST	229	04,2250	4 2371 1	CS	DCT700	CLEAR RENDEZVOUS, P25
0798	REF	14	LAST	230	04,2251	7 0074 0	MASK	FLAGWRDD	AND 1MD IN USE FLAGS
0799	REF	15	LAST	230	04,2252	54 074 0	TS	FLAGWRDD	
0800	REF	2	LAST	229	04,2253	0 6011 1	TC	CLRADMDD	

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Line	REF	LAST	Address	Value	Label	Operation	Comments
0801			04,2254	0 0006 1	KILL2	EXTEND	NO. KILL 2
0802	REF	8	LAST 214	04,2255	3 4755 1	DCA	NEGO
0803	REF	3	LAST 229	04,2256	52 755 1	DXGH	-PHASE2
0804	REF	1		04,2257	3 2364 1	PGGF1ZZ	CAF V37QCAD
0805	REF	2	LAST 228	04,2260	54 374 0	TS	TEMPFLSH
0806	REF	1		04,2261	1 2224 0	TCF	G0G0PR0G
0807	REF	5	LAST 230	04,2262	4 1011 1	RENDNOD	CS R0DREG
0808	REF	1		04,2263	6 6007 0	AD	DET24
0809				04,2264	0 0006 1	EXTEND	
0810	REF	1		04,2265	1 2254 1	BZF	KILL2
0811	REF	4	LAST 230	04,2266	6 4756 1	AD	FIVE
0812				04,2267	0 0006 1	EXTEND	
0813	REF	2	LAST 231	04,2270	1 2254 1	BZF	KILL2
0814	REF	2	LAST 230	04,2271	3 2324 0	CA	OCT500
0815	REF	16	LAST 230	04,2272	7 0074 0	MASK	FLAGWRD0
0816	REF	9	LAST 230	04,2273	6 0775 1	AD	MMNUMBER
0817				04,2274	4 0000 0	COM	
0818	REF	1		04,2275	6 2327 0	AD	P20REG
0819				04,2276	0 0006 1	EXTEND	
0820	REF	1		04,2277	1 2304 0	BZF	STATQUD
0821	REF	1		04,2300	6 2325 1	AD	OCT505
0822				04,2301	0 0006 1	EXTEND	
0823	REF	2	LAST 231	04,2302	1 2304 0	BZF	STATQUD
0824	REF	3	LAST 231	04,2303	1 2254 1	TCF	KILL2
0825	REF	7	LAST 230	04,2304	4 0075 1	STATQUD	LS
0826	REF	2	LAST 230	04,2305	7 4775 1	MASK	OCT120
0827	REF	8	LAST 231	04,2306	26 075 1	ADS	FLAGWRD1
0828	REF	1		04,2307	1 2220 1	TCF	G0M00
0829	REF	3	LAST 231	04,2310	3 2324 0	NGUVEAU	CAF
0830	REF	17	LAST 231	04,2311	7 0074 0	MASK	FLAGWRD0
0831	REF	49	LAST 230	04,2312	10 000 0	CCS	A
0832				04,2313	1 2316 0	TCF	+3
0833	REF	9	LAST 229	04,2314	0 5516 0	TC	DOWNFLAG
0834	REF	1		04,2315	00007 0	ADRES	INUSE
0835	REF	2	LAST 228	04,2316	50 774 0	INDEX	MINDEX
0836	REF	1		04,2317	3 2500 0	CAF	DMADHMI
0837				04,2320	0 0004 0	INHINT	
0838	REF	1		04,2321	1 2202 1	TCF	SEUDOP00
0839	REF	1		04,2322	0 4364 1	V37N0ND	TC

RESTART POINT FOR V37XEQ

P20 OR P25 ON TOP OF P20 OR P25 -

IS IT 20 AND IS RENDEZVOUS FLAG ON

YES

IS IT 25 AND IS P25 BIT ON

YES. LEAVE AS IS

SET TRACKFLAG

UPDATE FLAG

IS P20 OR P25 FLAG SET

YES

NO, RESET INHINUSE FLAG

OBTAIN APPROPRIATE DOWNLIST ADDRESS

COME HERE IF MM REQUESTED DOESNT EXIST

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REF	1	04,2323	1 2067 0	TCF	V37BAD	
0841	REF	17 LAST 216	4750	DCT00010	EQUALS	BIT4
0842			04,2324 00500 1	DCT500	DCT	500 BITS 7 AND 9
0843			04,2325 00305 1	DCT305	DCT	305
0844			04,2326 00026 0	DCT26	DCT	26
0845			04,2327 00124 0	P2OREG	DCT	124
0846			04,2330 0 0004 0	V37XEQ	INHINT	
0847	REF	3 LAST 231	04,2331 50 774 0	INDEX	MINDEX	
0848	REF	2 LAST 228	04,2332 3 2441 1	CAF	PREHMI	OBTAIN PRIO, EBANK, AND MM
0849	REF	1	04,2333 55 060 1	TS	MTEMP	
0850	REF	1	04,2334 54 020 1	TS	CYR	SHIFT RIGHT TO BITS 14 - 10
0851	REF	2 LAST 232	04,2335 3 0020 0	CA	CYR	
0852	REF	1	04,2336 7 7725 1	MASK	PRIO37	
0853	REF	1	04,2337 55 062 0	TS	PHSPRDT4	PRESET GROUP 4 RESTART PRIORITY
0854	REF	1	04,2340 54 063 0	TS	NEWPRIO	STORE PRIO FOR SPVAC
0855	REF	2 LAST 232	04,2341 3 1060 0	CA	MTEMP	OBTAIN EBANK - BITS 8, 9, 10 OF MTEMP.
0856			04,2342 0 0006 1	EXTEND		
0857	REF	17 LAST 213	04,2343 7 4744 0	MP	BIT8	
0858	REF	1	04,2344 7 4757 1	MASK	LOW3	
0859	REF	15 LAST 229	04,2345 54 001 1	TS	L	
0860	REF	4 LAST 232	04,2346 50 774 0	INDEX	MINDEX	
0861	REF	1	04,2347 3 2403 1	CAF	FCADRMHI	
0862	REF	1	04,2350 55 061 0	TS	BASETEMP	MAKE BBCON BY ADDING HIS OF FCADR
0863	REF	3 LAST 215	04,2351 7 4350 1	MASK	HIS	
0864	REF	16 LAST 232	04,2352 26 001 1	ADS	L	
0865	REF	2 LAST 232	04,2353 3 1061 1	CA	BASETEMP	OBTAIN GENADR PORTION OF 2CADR.
0866	REF	1	04,2354 7 5012 0	MASK	LOW10	
0867	REF	15 LAST 165	04,2355 6 4741 1	AD	BIT11	
0868	REF	1	04,2356 0 5116 1	TC	SPVAC	
0869	REF	3 LAST 232	04,2357 3 1060 0	V37XEQC	CA	MTEMP
0870	REF	2 LAST 228	04,2360 7 6074 0	MASK	LOW7	UPON RETURN FROM FINDVAC PLACE THE NEW MM IN ADDRREG (THE LOW 7 BITS OF PHSPRDT1)
0871	REF	1	04,2361 0 5314 1	TC	NEWIDEA	
0872	REF	3 LAST 229	04,2362 0 4457 0	TC	RELEASE-P	RELEASE DISPLAY
0873	REF	2 LAST 228	04,2363 0 5155 0	TC	ENDOFFJOB	AND EXIT
0874	REF	1	5660	NEG7	EQUALS	DCT77770
0875	REF	1	1060	MTEMP	EQUALS	PHSPRDT3
0876	REF	1	1061	BASETEMP	EQUALS	TBASE4
0877	REF	1	04,2364 10333 0	V37QCAD	CADR	V37XEQ +3
0878	REF	1	04,2365 10146 0	R00AD	CADR	DUMMYAD

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0879	REF	1		04,2366	10120 0	V37RETAD	CAOR	V37RET
0880				04,2367	37667 1	OCT37667	OCT	37667
0881				04,2370	40072 0	OCT40072	OCT	40072
0882				04,2371	06700 0	OCT700	OCT	700
R0883								
0884	REF	1		04,2372	3 6245 1	SETUP71	CAF	THREE
0885	REF	18	LAST 222	04,2373	54 002 1	SETUP70	TS	Q
0886				04,2374	0 0006 1		EXTEND	
0887	REF	1		04,2375	3 2402 0		DCA	P70CADR
0888	REF	19	LAST 233	04,2376	6 0002 0		AD	Q
0889				04,2377	52 006 0		DTCH	

0890				04,2400	00106 0	DEC70	DEC	70
0891	REF	3	LAST 147	E7,1520			EBANK	R
0892	REF	1		04,2401	02072 0	P70CADR	2CADR	P70
0892	REF	1		04,2402	42067 0			

R0893 FOR VERB 37 TWO TABLES ARE MAINTAINED. EACH TABLE HAS AN ENTRY FOR EACH
 R0894 MAJOR MODE THAT CAN BE STARTED FROM THE KEYBOARD. THE ENTRIES ARE PUT
 R0895 INTO THE TABLE WITH THE ENTRY FOR THE HIGHEST MAJOR MODE COMING FIRST,

R0896 TO THE LOWEST MAJOR MODE WHICH IS THE LAST ENTRY IN EACH TABLE.

R0897 THE FCADRM TABLE CONTAINS THE FCADR OF THE STARTING JOB OF
 R0898 THE MAJOR MODE. FOR EXAMPLE.

A0899				FCADRM1	FCADR	P79	START OF P 79
A0900					FCADR	P0010	START OF P 10
A0901					FCADR	P01	START OF P 01

R0902 NOTE, THE FIRST ENTRY MUST BE LABELED FCADRM1.
 R0903

0904	REF	1		04,2403	71526 0	FCADRM1	FCADR	P79
0905	REF	1		04,2404	71274 0		FCADR	P78
0906	REF	1		04,2405	26207 0		FCADR	P76
0907	REF	1		04,2406	72731 1		FCADR	P75
0908	REF	1		04,2407	72547 1		FCADR	P74
0909	REF	1		04,2410	72220 1		FCADR	P73
0910	REF	1		04,2411	72031 0		FCADR	P72
0911	REF	1		04,2412	62144 1		FCADR	LANDJUNK
0912	REF	1		04,2413	64776 0		FCADR	P63LM
0913	REF	1		04,2414	33314 1		FCADR	P57
0914	REF	1		04,2415	32050 0		FCADR	P0052
0915	REF	1		04,2416	31427 1		FCADR	P51
0916	REF	1		04,2417	75436 1		FCADR	P47LM
0917	REF	1		04,2420	75410 0		FCADR	P42LM
0918	REF	1		04,2421	75272 1		FCADR	P41LM
0919	REF	1		04,2422	75147 1		FCADR	P40LM
0920	REF	1		04,2423	71521 1		FCADR	P39
0921	REF	1		04,2424	71271 0		FCADR	P38

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0922	REF	1	04,2425	72725 1	FCADR	P35
0923	REF	1	04,2426	72545 0	FCADR	P34
0924	REF	1	04,2427	72216 1	FCADR	P33
0925	REF	1	04,2430	72027 1	FCADR	P32
0926	REF	1	04,2431	72450 0	FCADR	P31
0927	REF	1	04,2432	72000 1	FCADR	P30
0928	REF	1	04,2433	50404 1	FCADR	PR0G25
0929	REF	1	04,2434	50000 1	FCADR	PR0G22
0930	REF	1	04,2435	51505 0	FCADR	PR0G21
0931	REF	1	04,2436	50000 1	FCADR	PR0G20
0932	REF	1	04,2437	60061 0	FCADR	P12LM
0933	REF	1	04,2440	77655 1	FCADR	P06

R0934 THE PREMM TABLE CONTAINS THE E-BANK, MAJOR MODE, AND PRIORITY
R0935 INFORMATION. IT IS IN THE FOLLOWING FORM.

R0936 PPP PPE EEM MMM MMM

R0937 WHERE THE 7 M BITS CONTAIN THE MAJOR MODE NUMBER
R0938 3 E BITS CONTAIN THE E-BANK NUMBER
R0939 5 P BITS CONTAIN THE PRIORITY AT WHICH THE JOB IS
R0940 TO BE STARTED

R0941 FOR EXAMPLE.

A0942	PREMM1	OCT	67213	PRIORITY	33
A0943				E-BANK	5
A0944				MAJOR MODE	11
A0945		OCT	25437	PRIORITY	12
A0946				E-BANK	6
A0947				MAJOR MODE	31

R0948 NOTE. THE FIRST ENTRY MUST BE LABELED PREMM1

0949	04,2441	27717 0	PREMM1	OCT	27717	MM 79	EBANK 7	PRIO 13
0950	04,2442	27716 1		OCT	27716	MM 78	EBANK 7	PRIO 13
0951	04,2443	27714 0		OCT	27714	MM 76	EBANK 7	PRIO 13
0952	04,2444	27713 1		OCT	27713	MM 75	EBANK 7	PRIO 13
0953	04,2445	27712 0		OCT	27712	MM 74	EBANK 7	PRIO 13
0954	04,2446	27711 0		OCT	27711	MM 73	EBANK 7	PRIO 13
0955	04,2447	27710 1		OCT	27710	MM 72	EBANK 7	PRIO 13
0956	04,2450	27704 1		OCT	27704	MM 68	EBANK 7	PRIO 13
0957	04,2451	27677 1		OCT	27677	MM 63	EBANK 7	PRIO 13
0958	04,2452	27271 0		OCT	27271	MM 57	EBANK 5	PRIO 13
0959	04,2453	27264 1		OCT	27264	MM 52	EBANK 5	PRIO 13
0960	04,2454	27263 0		OCT	27263	MM 51	EBANK 5	PRIO 13
0961	04,2455	27657 0		OCT	27657	MM 47	EBANK 7	PRIO 13
0962	04,2456	27652 0		OCT	27652	MM 42	EBANK 7	PRIO 13
0963	04,2457	27651 0		OCT	27651	MM 41	EBANK 7	PRIO 13
0964	04,2460	27650 1		OCT	27650	MM 40	EBANK 7	PRIO 13
0965	04,2461	27647 1		OCT	27647	MM 39	EBANK 7	PRIO 13
0966	04,2462	27646 0		OCT	27646	MM 38	EBANK 7	PRIO 13

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0967	04.2463	27643 0	OCT	27643	MM 35	EBANK 7	PRI0 13
0968	04.2464	27642 1	OCT	27642	MM 34	EBANK 7	PRI0 13
0969	04.2465	27641 1	OCT	27641	MM 33	EBANK 7	PRI0 13
0970	04.2466	27640 0	OCT	27640	MM 32	EBANK 7	PRI0 13
0971	04.2467	27637 0	OCT	27637	MM 31	EBANK 7	PRI0 13
0972	04.2470	27636 1	OCT	27636	MM 30	EBANK 7	PRI0 13
0973	04.2471	27631 0	OCT	27631	MM 25	EBANK 7	PRI0 13
0974	04.2472	27626 0	OCT	27626	MM 22	EBANK 7	PRI0 13
0975	04.2473	27625 0	OCT	27625	MM 21	EBANK 7	PRI0 13
0976	04.2474	27624 1	OCT	27624	MM 20	EBANK 7	PRI0 13
0977	04.2475	27614 1	OCT	27614	MM 12	EBANK 7	PRI0 13
0978	04.2476	27006 1	OCT	27006	MM 06	EBANK 4	PRI0 13

R0979 NOTE. THE FOLLOWING CONSTANT IS THE NUMBER OF ENTRIES IN EACH OF
 R0980 ---- THE ABOVE LISTS--(IE, THE NUMBER OF MAJOR MODES (EXCEPT POO)
 R0981 THAT CAN BE CALLED FROM THE KEYBOARD MINUS ONE)

0982	04.2477	00035 1	NOV37MM	DEC	29	MM'S -1	
0983	REF 1	04.2500	00002 0	DNLA0MM1	ADRES	RENDEZVU	P79
0984	REF 2 LAST 235	04.2501	00002 0		ADRES	RENDEZVU	P78
0985	REF 3 LAST 235	04.2502	00002 0		ADRES	RENDEZVU	
0986	REF 4 LAST 235	04.2503	00002 0		ADRES	RENDEZVU	P75
0987	REF 5 LAST 235	04.2504	00002 0		ADRES	RENDEZVU	P74
0988	REF 6 LAST 235	04.2505	00002 0		ADRES	RENDEZVU	P73
0989	REF 7 LAST 235	04.2506	00002 0		ADRES	RENDEZVU	P72
0990	REF 1	04.2507	00004 0		ADRES	DESASCNT	P68
0991	REF 2 LAST 235	04.2510	00004 0		ADRES	DESASCNT	P63
0992	REF 1	04.2511	00005 1		ADRES	LUNRSALN	P57
0993	REF 1	04.2512	00000 1		ADRES	COSTALIN	P52
0994	REF 2 LAST 235	04.2513	00000 1		ADRES	COSTALIN	P51
0995	REF 1	04.2514	00003 1		ADRES	OR8MANUV	P47
0996	REF 2 LAST 235	04.2515	00003 1		ADRES	OR8MANUV	P42
0997	REF 3 LAST 235	04.2516	00003 1		ADRES	OR8MANUV	P41
0998	REF 4 LAST 235	04.2517	00003 1		ADRES	OR8MANUV	P40
0999	REF 8 LAST 235	04.2520	00002 0		ADRES	RENDEZVU	P39
1000	REF 9 LAST 235	04.2521	00002 0		ADRES	RENDEZVU	P38
1001	REF 10 LAST 235	04.2522	00002 0		ADRES	RENDEZVU	P35
1002	REF 11 LAST 235	04.2523	00002 0		ADRES	RENDEZVU	P34
1003	REF 12 LAST 235	04.2524	00002 0		ADRES	RENDEZVU	P33
1004	REF 13 LAST 235	04.2525	00002 0		ADRES	RENDEZVU	P32
1005	REF 14 LAST 235	04.2526	00002 0		ADRES	RENDEZVU	P31LM
1006	REF 15 LAST 235	04.2527	00002 0		ADRES	RENDEZVU	P30
1007	REF 16 LAST 235	04.2530	00002 0		ADRES	RENDEZVU	P25
1008	REF 2 LAST 235	04.2531	00005 1		ADRES	LUNRSALN	P22
1009	REF 17 LAST 235	04.2532	00002 0		ADRES	RENDEZVU	P21
1010	REF 18 LAST 235	04.2533	00002 0		ADRES	RENDEZVU	P20
1011	REF 3 LAST 235	04.2534	00004 0		ADRES	DESASCNT	P12
1012	REF 3 LAST 235	04.2535	00000 1		ADRES	COSTALIN	P06
1013	REF 16 LAST 228	4755		DNLA0POO =	ZERO		
1014		0000		COSTALIN =	0		

L FRESH START AND RESTART

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1015          0001      AGSUPDAT = 1
1016          0002      RENDEZVU = 2
1017          0003      ORDMANUV = 4
1018          0004      DESASCNT = 4
1019          0005      LUNRSALN = 5
1020          13.2026      BANK 13
1021  REF      2 LAST 46 13.2000  SETLOC INTINIT
1022          13.2026      BANK

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1023  REF      2 LAST 46 TO 46: 2 2* COUNT* 33/INTIN
1024  REF      2 LAST 110 E3.1554  EBANK= KRECTCSH

```

R1025 THIS ROUTINE DOES THE POD INTEGRATION

```

1026          13.2026 43014 0 STATEUP SET BCF EXTRAPOLATE CM STATE VECTOR
1027  REF      1      13.2027 01474 1 VINTFLAG
1028  REF      1      13.2030 04347 0 SURFFLAG ALSO 6X6 W-MATRIX IF LM ON LUNAR
1029  REF      1      13.2031 26036 0 DOINT SURFACE AND W-MATRIX VALID
1030          13.2032 43014 0 BCF SET FOR RENDEZVOUS NAVIGATION.
1031  REF      1      13.2033 02756 1 RENDEWFLG
1032  REF      2 LAST 236 13.2034 26036 0 DOINT
1033  REF      1      13.2035 01476 0 DIMOFLAG
1034          13.2036 45014 0 DOINT CLEAR CALL
1035  REF      1      13.2037 01667 1 PRECIFLG ENGAGES 4-TIME STEP LOGIC IN INTEGRATION
1036  REF      1      13.2040 27134 1 INTEGRV WHEN MODREG = 0

1037          13.2041 71214 0 BON DLOAD
1038  REF      2 LAST 236 13.2042 04307 1 SURFFLAG
1039  REF      1      13.2043 26063 0 NO-INT
1040  REF      3 LAST 111 13.2044 01571 0 TETCSH
1041  REF      3 LAST 207 13.2045 34041 0 STCALL TDECI
1042  REF      2 LAST 229 13.2046 27414 0 INTSTALL
1043          13.2047 45014 0 CLEAR CALL EXTRAPOLATE LM STATE VECTOR
1044  REF      2 LAST 236 13.2050 01674 0 VINTFLAG
1045  REF      1      13.2051 26644 0 SETIFLGS
1046          13.2052 77614 1 BCF ALSO 9X9 W-MATRIX IF W IS VALID
1047  REF      2 LAST 236 13.2053 02756 1 RENDEWFLG
1048  REF      1      13.2054 26060 0 DOINT2
1049          13.2055 43014 0 SET SET
1050  REF      2 LAST 236 13.2056 01476 0 DIMOFLAG
1051  REF      1      13.2057 01475 0 D6UR9FLG
1052          13.2060 45014 0 DOINT2 SET CALL
1053  REF      2 LAST 236 13.2061 01467 0 PRECIFLG DISENGAGE 4 TIME STEP LOGIC IN INTEG.
1054  REF      2 LAST 236 13.2062 27134 1 INTEGRV
1055          13.2063 77614 1 NO-INT CLRGO
1056  REF      3 LAST 208 13.2064 01236 1 NOOFLAG
1057  REF      1      13.2065 26632 1 ENDINT

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P1058 THISVINT IS CALLED BY MIDTDAV1 AND2

1059			13,2066	43414 1	THISVINT CLEAR	RVO
1060	REF	0	LAST	236	13,2067	01674 0 VINTFLAG

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P0001 RESTART TABLES

R0002 -----

R0003 THERE ARE TWO FORMS OF RESTART TABLES FOR EACH GROUP. THEY ARE KNOWN AS THE EVEN RESTART TABLES AND THE ODD
 R0005 RESTART TABLES. THE ODD TABLES HAVE ONLY ONE ENTRY OF THREE LOCATIONS WHILE THE EVEN TABLES HAVE TWO ENTRIES
 R0007 EACH USING THREE LOCATIONS. THE INFORMATION AS TO WHETHER IT IS A JOB, WAITLIST, OR A LONGCALL IS GIVEN BY THE
 R0009 WAY THINGS ARE PUT INTO THE TABLES.

R0010 A JOB HAS ITS PRIORITY STORED IN PROTTAB OF THE CORRECT PHASE SPOT -- A POSITIVE PRIORITY INDICATES A
 R0012 FINDVAC JOB. A NEGATIVE PRIORITY A NOVAC. THE 2CADR OF THE JOB IS STORED IN THE CADRTAB.
 R0014 FOR EXAMPLE,

A0015 5.7SPOT OCT 23000
 A0016 2CADR SOMEJOB

R0017 A RESTART OF GROUP 5 WITH PHASE SEVEN WOULD THEN CAUSE SOMEJOB TO BE RESTARTED AS A FINDVAC WITH PRIORITY 23.

A0019 5.5SPOT OCT -23000
 A0020 2CADR ANYJOB

R0021 HERE A RESTART OF GROUP 5 WITH PHASE 7 WOULD CAUSE ANYJOB TO BE RESTARTED AS A NOVAC WITH PRIORITY 23.
 R0023 A LONGCALL HAS ITS GENADR OF ITS 2CADR STORED NEGATIVELY AND ITS BBCON STORED POSITIVELY. IN ITS PROTTAB IS
 R0025 PLACED THE LOCATION OF A DP REGISTER THAT CONTAINS THE DELTA TIME THAT LONGCALL HAD BEEN ORIGINALLY STARTED
 R0027 WITH. EXAMPLE,

A0028 3.6SPOT GENADR DELTAT
 A0029 -GENADR LONGTASK
 A0030 BBCON LONGTASK

A0031 OCT 31000
 A0032 2CADR JOBAGAIN

R0033 THIS WOULD START UP LONGTASK AT THE APPROPRIATE TIME, OR IMMEDIATELY IF THE TIME HAD ALREADY PASSED. IT SHOULD
 R0035 BE NOTED THAT IF DELTAT IS IN A SWITCHED E BANK, THIS INFORMATION SHOULD BE IN THE BBCON OF THE 2CADR OF THE
 R0037 TASK. FROM ABOVE, WE SEE THAT THE SECOND PART OF THIS PHASE WOULD BE STARTED AS A JOB WITH A PRIORITY OF 31.

R0039 WAITLIST CALLS ARE IDENTIFIED BY THE FACT THAT THEIR 2CADR IS STORED NEGATIVELY. IF PROTTAB OF THE PHASE SPOT
 R0041 IS POSITIVE, THEN IT CONTAINS THE DELTA TIME. IF PROTTAB IS NEGATIVE THEN IT IS THE -GENADR OF AN ERASABLE
 R0043 LOCATION CONTAINING THE DELTA TIME, THAT IS, THE TIME IS STORED INDIRECTLY. IT SHOULD BE NOTED AS ABOVE, THAT
 R0045 IF THE TIME IS STORED INDIRECTLY, THE BBCON MUST CONTAIN THE NECESSARY E BANK INFORMATION IF APPLICABLE. WITH
 R0047 WAITLIST WE HAVE ONE FURTHER OPTION. IF -0 IS STORED IN PROTTAB, IT WILL CAUSE AN IMMEDIATE RESTART OF THE
 R0049 TASK. EXAMPLES,

A0050 OCT 77777 THIS WILL CAUSE AN IMMEDIATE RESTART
 A0051 -2CADR ATASK OF THE TASK ATASK:

A0052 DEC 200 IF THE TIME OF THE 2-SECONDS SINCE DUMMY
 A0053 -2CADR DUMMY WAS PUT ON WAITLIST IS UP, IT WILL BEGIN
 A0054 IN 10 MS. OTHERWISE IT WILL BEGIN WHEN
 A0055 IT NORMALLY WOULD HAVE BEGUN.

L RESTART TABLES

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A0056
A0057-GENADR DTIME
-2CADR TASKTASKWHERE DTIME CONTAINS THE DELTA TIME
OTHERWISE THIS IS AS ABOVE

R0058 ***** NOW THE TABLES THEMSELVES *****

0059
0060
0061

REF 1

01,2002
01,2000
01,2002BANK 01
SETLOC RESTART
BANK0062
0063
A006401,2000
01,2001PRDTTAB EQUALS 12000
CADRTAB EQUALS 12001USED TO FIND THE PRIORITY OR DELTATIME
THIS AND THE NEXT RELATIVE LOC CONTAIN
RESTART 2CADR

0065 REF 1

01,2002

0 0010 0

SIZETAB

COUNT* 14/45TAB

TABLES IN BANK 1.

0066 REF 1

01,2003

0 0020 0

TC

1.25POT -12006

0067 REF 1

01,2004

0 0010 0

TC

1.35POT -12004

0068 REF 1

01,2005

0 0023 0

TC

2.35POT -12004

0069 REF 1

01,2006

0 0010 0

TC

3.25POT -12006

0070 REF 1

01,2007

0 0053 1

TC

3.35POT -12004

0071 REF 1

01,2010

0 0057 0

TC

4.25POT -12006

0072 REF 1

01,2011

0 0067 0

TC

4.35POT -12004

0073 REF 1

01,2012

0 0142 0

TC

5.25POT -12006

0074 REF 1

01,2013

0 0166 0

TC

5.35POT -12004

0075 REF 1

01,2014

0 0010 0

TC

6.25POT -12006

0076 REF 1

01,2015

0 0171 0

TC

6.35POT -12004

0077 REF 1

01,2016

21000 1

1.25POT

GCT

21001

A DUMMY EXAMPLE TO BE REPLACED AS SOON

0078

0074

05155 0

EBANK=

STATE

AS THERE IS A LEGITIMATE 1.25POT

0079 REF 29 LAST 213

01,2017

05155 0

2CADR

ENDOFJOB

0080 REF 3 LAST 232

01,2020

04060 0

DEC

100

0081

01,2021

00144 0

EBANK=

STATE

0082 REF 30 LAST 239

0074

05261 1

2CADR

TASKOVER

0083 REF 3 LAST 166

01,2022

05261 1

2CADR

TASKOVER

0083

01,2023

04060 0

R0084

ANY MORE GROUP 1. EVEN RESTART VALUES SHOULD GO HERE

0085 REF 2 LAST 147

01,2024

76300 0

1.35POT

-GENADR

SAVET-30

0086 REF 2 LAST 147

E7,1515

0

-EBANK=

DVCNTR

0087 REF 1

01,2025

75431 0

-2CADR

ULLGTASK

0087 REF 1

01,2026

03710 1

R0088

ANY MORE GROUP 1. ODD RESTART VALUES SHOULD GO HERE

0089 REF 2 LAST 239

01,2016

2.25POT

EQUALS

1.25POT

R0090

ANY MORE GROUP 2. EVEN RESTART VALUES SHOULD GO HERE

0091 REF 1

01,2027

02630 0

2.35POT

-GENADR

GOODSECS

0092 REF 1

01,2030

75173 0

-GENADR

STATEINT

0093 REF 3 LAST 236

E3,1554

0

-EBANK=

RRECTCSM

0094 REF 2 LAST 239

01,2031

26063 0

BBCON

STATEINT

L RESTART TABLES

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0095				01.2032	05000 1	2.5SPOT	OCT	05000	
0096	REF	4	LAST	239	E3.1554		EBANK=	RECTCSM	
0097	REF	1			01.2033	02613 1	2CADR	STATINT1	
0097	REF	1			01.2034	26063 0			
0098					01.2035	02734 0	2.7SPOT	DEC	1500
0099	REF	3	LAST	187	E7.1456		EBANK=	LOSCOUNT	
0100	REF	1			01.2036	75535 0	-2CADR	P20LEMC1	
0100	REF	1			01.2037	27710 1			

0101					01.2040	14000 1	2.11SPOT	OCT	14000
0102	REF	3	LAST	146	E7.1762		EBANK=	P21TIME	
0103	REF	1			01.2041	02416 0	2CADR	P25LEM1	
0103	REF	1			01.2042	50067 0			
0104					01.2043	10000 0	2.13SPOT	OCT	10000
0105	REF	4	LAST	240	E7.1456		EBANK=	LOSCOUNT	
0106	REF	1			01.2044	02217 1	2CADR	RELINUS	
0106	REF	1			01.2045	54067 1			
0107					01.2046	26000 0	2.15SPOT	OCT	26000
0108	REF	5	LAST	240	E7.1456		EBANK=	LOSCOUNT	
0109	REF	1			01.2047	02653 0	2CADR	R22FSTF	
0109	REF	1			01.2050	50067 0			
0110					01.2051	77777 0	2.17SPOT	OCT	77777
0111	REF	1			E7.1700		EBANK=	VGPREV	
0112	REF	1			01.2052	75440 0	-2CADR	REDG2.17	
0112	REF	1			01.2053	03710 1			
0113					01.2054	00031 0	2.21SPOT	DEC	25
0114	REF	3	LAST	239	E7.1515		EBANK=	DVENTR	
0115	REF	1			01.2055	75771 1	-2CADR	R10.R11	
0115	REF	1			01.2056	35710 1			
RO115	ANY MORE GROUP 2.000 RESTART VALUES SHOULD GO HERE.								

0117	REF	3	LAST	239	01.2016		3.2SPOT	EQUALS	1.2SPOT
RO118	ANY MORE GROUP 3.EVEN RESTART VALUES SHOULD GO HERE								

0119	REF	1			01.2057	76355 0	3.3SPOT	-GENADR	ZOJTIME
0120	REF	4	LAST	240	E7.1515		EBANK=	DVENTR	
0121	REF	1			01.2060	75755 1	-2CADR	ZOOM	
0121	REF	1			01.2061	41710 1			
01212					01.2062	20000 0	3.5SPOT	OCT	20000
01214	REF	3	LAST	200	E7.1453		EBANK=	TTDGO	
01216	REF	1			01.2063	02540 1	2CADR	S40.13	
01216	REF	1			01.2064	56067 0			
RO122	ANY MORE GROUP 3.000 RESTART VALUES SHOULD GO HERE								

0123					01.2065	04704 0	4.2SPOT	DEC	2500
0124	REF	4	LAST	240	E7.1453		EBANK=	TTDGO	
0125	REF	1			01.2066	75425 0	-2CADR	TIG-5	
0125	REF	1			01.2067	03710 1			
0126					01.2070	77777 0	OCT	77777	
0127	REF	5	LAST	240	E7.1453		EBANK=	TTDGO	

L RESTART TABLES

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0128	REF	1		01.2071	75435 1		-2CADR	REDD4.2
0128	REF	1		01.2072	03710 1			
0129	ANY MORE GROUP 4. EVEN RESTART VALUES SHOULD GO HERE							
0130				01.2073	25000 0	4.3SPOT	DCT	25000
0131	REF	5	LAST 240	E7.1515			EBANK	DVCNTR
0132	REF	1		01.2074	03540 0		2CADR	GOABORT
0132	REF	1		01.2075	64067 1			
0133				01.2076	00062 0	4.5SPOT	DEC	50
0134	REF	6	LAST 240	E7.1453			EBANK	TTOGD
0135	REF	1		01.2077	75215 0		-2CADR	ULLAGOFF
0135	REF	1		01.2100	03710 1			
0136				01.2101	00764 1	4.7SPOT	DEC	500
0137	REF	6	LAST 241	E7.1515			EBANK	DVCNTR
0138	REF	1		01.2102	75374 0		-2CADR	TIG-0
0138	REF	1		01.2103	03710 1			
0139	REF	3	LAST 194	01.2104	76260 1	4.11SPOT	GENADR	TGD +1
0140	REF	7	LAST 241	E7.1515			EBANK	DVCNTR
0141	REF	1		01.2105	74235 0		-2CADR	ENGUFTSK
0141	REF	1		01.2106	03710 1			
0142				01.2107	12000 1	4.13SPOT	DCT	12000
0143	REF	2	LAST 139	E7.1462			EBANK	TRKMKCNT
0144	REF	1		01.2110	03223 1		2CADR	POSTBURN
0144	REF	1		01.2111	74067 0			
0145				01.2112	00764 1	4.15SPOT	DEC	500
0146	REF	7	LAST 241	E7.1453			EBANK	TTOGD
0147	REF	1		01.2113	75501 1		-2CADR	TIG-30
0147	REF	1		01.2114	03710 1			
0148				01.2115	77777 0	4.17SPOT	DCT	77777
0149	REF	8	LAST 241	E7.1515			EBANK	DVCNTR
0150	REF	2	LAST 240	01.2116	75425 0		-2CADR	TIG-5
0150				01.2117	03710 1			
0151				01.2120	13000 0	4.21SPOT	DCT	13000
0152	REF	3	LAST 124	E5.1730			EBANK	STAP
0153	REF	1		01.2121	03020 0		2CADR	R51.1 +1
0153	REF	1		01.2122	80065 1			
0154				01.2123	77777 0	4.23SPOT	DCT	77777
0155	REF	9	LAST 241	E7.1515			EBANK	DVCNTR
0156	REF	1		01.2124	75351 1		-2CADR	IGNITION
0156	REF	1		01.2125	03710 1			
0157	REF	3	LAST 239	01.2126	01477 1	4.25SPOT	GENADR	SAVET-30
0158	REF	1		01.2127	75537 1		-GENADR	TIG-35
0159	REF	4	LAST 241	E7.1477			EBANK	SAVET-30
0160	REF	2	LAST 241	01.2130	74067 0		BBCON	TIG-35
0161				01.2131	52777 1	4.27SPOT	DCT	52777
0162	REF	10	LAST 241	E7.1515			EBANK	DVCNTR
0163	REF	1		01.2132	02073 1		2CADR	P70A
0163	REF	1		01.2133	42067 0			

L RESTART TABLES

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0164				01.2134	52777 1	4.31SPOT	DCT	52777
0165	REF	11	LAST	241	E7.1515		EBANK=	DVCNTR
0166	REF	1			01.2135	02076 1	-2CADR	R71A
0166	REF	-1			01.2136	42067 0		
0167					01.2137	46777 1	4.33SPOT	DCT 46777
0168	REF	12	LAST	242	E7.1515		EBANK=	DVCNTR
0169	REF	-2	LAST	224	01.2140	02024 0	-2CADR	GOPODFIX
0169					01.2141	10067 1		
0170					01.2142	46777 1	4.35SPOT	DCT 46777
0171	REF	13	LAST	242	E7.1515		EBANK=	DVCNTR
0172	REF	1			01.2143	05665 1	-2CADR	GOPODDDD
0172	REF	1			01.2144	04067 1		
0173					01.2145	52777 1	4.37SPOT	DCT 52777
0174	REF	1			E7.1455		EBANK=	WHICH
0175	REF	1			01.2146	02571 0	-2CADR	CONFALL
0175	REF	-1			01.2147	74067 0		
R0176	ANY MORE 4.000 RESTART VALUES SHOULD GO HERE.							

0177					01.2150	22000 1	5.2SPOT	DCT 22000
0178	REF	14	LAST	242	E7.1515		EBANK=	DVCNTR
0179	REF	1			01.2151	02461 0	-2CADR	HURDLIZE
0179	REF	-1			01.2152	46067 1		
0180					01.2153	00310 0	DEC	200
0181	REF	15	LAST	242	E7.1515		EBANK=	DVCNTR
0182	REF	1			01.2154	74163 0	-2CADR	REREADAC
0182	REF	-1			01.2155	01710 0		

0183					01.2156	00310 0	5.4SPOT	DEC 200
0184	REF	16	LAST	242	E7.1515		EBANK=	DVCNTR
0185	REF	2	LAST	242	01.2157	74163 0	-2CADR	REREADAC
0185					01.2160	01710 0		

0186					01.2161	20000 0	DCT	20000
0187	REF	17	LAST	242	E7.1515		EBANK=	DVCNTR
0188	REF	1			01.2162	02206 1	-2CADR	SERVIGER
0188	REF	-1			01.2163	66067 0		
R0189	ANY MORE GROUP 5. EVEN RESTART VALUES SHOULD GO HERE							

0190					01.2164	00310 0	5.3SPOT	DEC 200
0191	REF	18	LAST	242	E7.1515		EBANK=	DVCNTR
0192	REF	3	LAST	242	01.2165	74163 0	-2CADR	REREADAC
0192					01.2166	01710 0		

0193					01.2167	77777 0	5.5SPOT	DCT 77777
0194	REF	19	LAST	242	E7.1515		EBANK=	DVCNTR
0195	REF	1			01.2170	74324 1	-2CADR	REDD5.5
0195	REF	-1			01.2171	01710 0		

0196					01.2172	77777 0	5.7SPOT	DCT 77777
0197	REF	20	LAST	242	E7.1515		EBANK=	DVCNTR

L RESTART TABLES

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0198	REF	1		01,2173	74361 0	-2CADR	BIBIBIAS
0198	REF	1		01,2174	01710 0		
R0199	ANY MORE GROUP 5.000 RESTART VALUES SHOULD GO HERE						

0200	REF	4	LAST	240	01,2016	6.2SPOT	EQUALS 1.2SPOT
0201					01,2175	00144 0	6.3SPOT DEC 100
0202	REF	6	LAST	202	F7,1441		EBANK= TIG
0203	REF	1			01,2176	75060 0	-2CADR CLDKTASK
0203	REF	1			01,2177	03710 1	

0204					01,2200	30000 1	6.5SPOT OCT 50000
0205	REF	2	LAST	112	E3,1706		EBANK= TERPHM
0206	REF	1			01,2201	03601 0	2CADR TIMEDIDR
0206	REF	1			01,2202	10063 0	
0207					01,2203	17000 1	6.7SPOT OCT 17000
0208	REF	2	LAST	240	F7,1700		EBANK= VGPPEV
0209	REF	1			01,2204	03350 1	2CADR REDF6.7
0209	REF	1			01,2205	74067 0	

PROTECT INCREMENTING OF TIME2, TIME1 BY
P27(UPDATE PROGRAM) VIA V70 OR V73.

L AOTMARK

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0001				12.2000		BANK	12	
0002	REF	1		07.2000		SETLOC	AOTMARK1	
0003				07.2000		BANK		
0004	REF	2	LAST	145	E7.1551	EBANK*	XYMARK	
0005	REF	1				COUNT*	13/MARK	
0006				07.2000	0 0004 0	AOTMARK	INHINT	
0007	REF	2	LAST	222	07.2001	11'312-1	CCS	MARKSTAT
0008				07.2002	0 2004 1		TC	+2
0009	REF	1		07.2003	0 2006 0		TC	EXTVBCNK
0010	REF	1		07.2004	0 5652 0		TC	PODDDD
0011				07.2005	00105-0		DC1	00105
0013	REF	2	LAST	169	07.2006	3 6242 0	EXTVBCNK	CAP
0014	REF	2	LAST	222	07.2007	7 1044 1		SIX
0015	REF	50	LAST	231	07.2010	10 000 0	MASK	EXTVBACT
0016	REF	1		07.2011	1 2044 1		CCS	A
							TCF	MARKABORT
0017	REF	20	LAST	184	07.2012	3 4752 0	CAP	BIT2
0018	REF	3	LAST	244	07.2013	27 044 1	AGS	EXTVBACT
0019	REF	3	LAST	222	07.2014	10 400 1	CCS	VAC1USE
0020	REF	1		07.2015	1 2031 0		TCF	MARKVACFND
0021	REF	2	LAST	221	07.2016	10 454 0	CCS	VAC2USE
0022	REF	2	LAST	244	07.2017	1 2031 0	TCF	MARKVACFND
0023	REF	2	LAST	221	07.2020	10 530 0	CCS	VAC3USE
0024	REF	3	LAST	244	07.2021	1 2031 0	TCF	MARKVACFND
0025	REF	2	LAST	221	07.2022	10 604 1	CCS	VAC4USE
0026	REF	4	LAST	244	07.2023	1 2031 0	TCF	MARKVACFND
0027	REF	2	LAST	221	07.2024	10 660 0	CCS	VAC5USE
0028	REF	5	LAST	244	07.2025	1 2031 0	TCF	MARKVACFND
0029	REF	1		07.2026	52 134 0		DXCH	RUP3
00292	REF	1		07.2027	0 5716 1		TC	BALLOUT1
0030				07.2030	01207 0		UCT	01207
0031	REF	3	LAST	187	07.2031	6 4752 0	MARKVACFND	AD
0032	REF	3	LAST	244	07.2032	55 312 1	TS	MARKSTAT
								STORE VAC ADR IN LOW 9 OF MARKSTAT
0033	REF	17	LAST	235	07.2033	3 4755 1	CAP	ZERO
0034	REF	4	LAST	244	07.2034	51 312 0	INDEX	MARKSTAT
0035				07.2035	53 777 0		TS	0 -
								ZERO IN VACUSE REG TO SHOW VAC OCCUPIED
0036	REF	2	LAST	181	07.2036	3 5025 0	CAP	PRI015
0037	REF	2	LAST	211	07.2037	0 5105 0	TC	FINDVAL
0038	REF	3	LAST	244	E7.1551		EBANK*	XYMARK
0039	REF	1		07.2040	02063 0		ZCADR	GETDAT
0039	REF	1		07.2041	16067 1			
0040				07.2042	0 0003 1		RELINT	
0041	REF	1		07.2043	1 4631 0		TCF	SWRETURN

L AUTMARK

0042	REF	2	LAST	244	07.2044	52 134 0	MKABORT	DXCH	BUF2	
00422	REF	2	LAST	244	07.2045	0 5716 1		TC	BAILDUT1	CONFLICT WITH EXTENDED VERB
0043					07.2046	01211 1		OCT	G1211	
0044	REF	18	LAST	244	07.2047	3 4755 1	MKRELEAS	CAF	ZFRD	
0045	REF	5	LAST	244	07.2050	57 312 0		XCH	MARKSTAT	SET MARKSTAT TO ZERO
0046	REF	1			07.2051	7 5004 1		MASK	LUW	PICK UP VAC AREA ADP
0047	REF	51	LAST	244	07.2052	10 000 0		CGS	A	
0048	REF	52	LAST	245	07.2053	50 000 1		INDEX	A	
0049					07.2054	54 000 0		TS	0	SHOW MKVAC AREA AVAILABLE
0050	REF	9	LAST	227	07.2055	3 4753 1		CAF	DNE	
0051	REF	10	LAST	230	07.2056	0 4674 0		TC	IBNKCALL	
0052	REF	1			07.2057	17665 1		CADR	GOLDEND	GO WAKE UP CALLING JOB

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L ADT MARK

00521	REF	19	LAST	245	07,2060	3 4755 1	KILLADT	CAF	ZERO	
00522	REF	4	LAST	244	07,2061	55'044 1		TS	EXTVBACT	TERMINATE ADT MARK-ALLOW EXT VBACT
00523	REF	2	LAST	217	07,2062	0 6001 0		TC	GOTUPOOH	
0053	REF	6	LAST	245	07,2063	4 1312 1	GETDAT	CS	MARKSTAT	SET BIT12 TO DISCOURAGE MARKRUPT
00531	REF	17	LAST	221	07,2064	7 4740 1		MASK	BIT12	BIT12 RESET AT GETMARK
00532	REF	7	LAST	246	07,2065	27'312 1		ADS	MARKSTAT	
00533	REF	1			07,2066	3 2330 0		CAF	VOIN71	DISPLAY DETENT AND STAR CODE
0054	REF	9	LAST	225	07,2067	0 4616 1		TC	BANKCALL	
0055	REF	2	LAST	207	07,2070	20334 1		CADR	GOMARKF	
0056	REF	1			07,2071	1 2060 1		TCF	KILLADT	V34-DOES GOTUPOOH
0057	REF	1			07,2072	1 2074 1		TCF	DODAT	V33-PROCEED-USE THIS STAR FOR MARKS
0058	REF	2	LAST	244	07,2073	1 2063 1	ENTERDAT	TCF	GETDAT	ENTER-REDISPLAY STAR CODE
0069	REF	1			07,2074	3 7744 1	DODAT	CAF	HIGH	PICK DETENT CODE FROM BITS7-9 IF AUTCODE
0070	REF	2	LAST	196	07,2075	7 0735 1		MASK	AUTCODE	AND SEE IF CODE 1 TO 6
0071					07,2076	0 0006 1		EXTEND		
0072	REF	16	LAST	164	07,2077	7 4743 1		MP	BIT9	
0073	REF	4	LAST	244	07,2100	55'551 0		TS	XYMARK	STORE DETENT
0074					07,2101	0 0006 1		EXTEND		
0075	REF	3	LAST	246	07,2102	6 2063 0		BZMF	GETDAT	COAS CALIBRATION CODE-NO GOOD HERE
0076	REF	1			07,2103	6 5660 1		AD	NEG7	SEE IF DETENT 7 FOR COAS
0077					07,2104	0 0006 1		EXTEND		
0078	REF	1			07,2105	1 2107 1		BZF	CODE7	
00785	REF	1			07,2106	1 2123 1		TCF	CODE1TO6	
0079	REF	1			07,2107	3 2331 1	CODE7	CAF	VO6N87*	CODE 7, COAS SIGHTING, GET OPTIC AXIS
0080	REF	10	LAST	246	07,2110	0 4616 1		TC	BANKCALL	AZ AND EL OF SIGHTING DEVICE FROM ASTRO
0081	REF	3	LAST	246	07,2111	20334 1		CADR	GOMARKF	
0082	REF	2	LAST	246	07,2112	1 2060 1		TCF	KILLADT	V34-DOES GOTUPOOH
0083					07,2113	1 2115 1		TCF	+2	PROCEED
0084	REF	2	LAST	246	07,2114	1 2107 1		TCF	CODE7	ON ENTER, RECYCLE
00841					07,2115	0 0006 1		EXTEND		
0085	REF	2	LAST	108	07,2116	3 1350 0		DEA	AZ	PICK UP AZ AND EL IN SP 15 COMP
0086	REF	1			07,2117	50 120 1		INDEX	FIXLOC	
0087					07,2120	52 011 0		DXCH	RD	STORE IN RD AND 90 OF LOCAL VAC
0095	REF	20	LAST	246	07,2121	3 4755 1		CAF	ZERO	BACKUP SYSTEM TO BE USED
0096	REF	1			07,2122	1 2137 1		TCF	COASCODE	ZERO APPARENT ROTATION
0097	REF	5	LAST	246	07,2123	51'551 1	CODE1TO6	INDEX	XYMARK	INDEX ACT POSITION BY DET CODE
0098	REF	1			07,2124	3 1411 1		CA	ADTEL -1	
0099	REF	2	LAST	246	07,2125	50 120 1		INDEX	FIXLOC	
0100					07,2126	54 011 0		TS	RD	STORE ELEVATION IN VAC+90
0101	REF	6	LAST	246	07,2127	51'551 1		INDEX	XYMARK	INDEX DET CODE 1,2 OR 3

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L AUTMARK

0102	REF	2	LAST	154	07,2130	3 1403 1	CA	ADTAZ -1	
0103	REF	3	LAST	246	07,2131	50 120 1	INDEX	FIXLOC	
0104					07,2132	54 010 1	TS	80	STORE AZIMUTH IN VAC+80
0105	REF	3	LAST	247	07,2133	3 1405 1	CA	ADTAZ +1	COMPENSATION FOR APPARENT ROTATION OF
0106					07,2134	0 0006 1	EXTEND		ADT FIELD OF VIEW IN LEFT AND RIGHT
0107	REF	4	LAST	247	07,2135	5 0120 1	INDEX	FIXLOC	DETENTS IS STORED IN VAC +100 IN SP
0108					07,2136	20 010 1	MSU	80	PRECISION ONES COMPLEMENT
0109	REF	5	LAST	247	07,2137	50 120 1	COASCORDE INDEX	FIXLOC	
0110					07,2140	54 012 0	TS	100	ROT ANGLE
0111	REF	4	LAST	229	07,2141	0 6037 0	TC	INTERPRET	COMPUTE X AND Y PLANE VECTORS

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P0112 THE OPTAXIS SUBROUTINE COMPUTES THE X AND Y MARK PLANE VEC'S AND
 R0113 AND ROTATES THEM THRU THE APPARENT FIELD OF VIEW ROTATION UNIQUE TO AOT
 R0114 OPTAXIS USES OANB TO COMPUTE THE OPTIC AXIS
 R0115 INPUT-AZIMUTH ANGLE IN SINGLE PREC AT CDU SCALE IN 8D OF JOB VAC
 R0116 ELEVATION ANGLE IN SINGLE PREC AT CDU SCALE IN 9D OF JOB VAC
 R0117 ROTATION ANGLE IN SINGLE PREC IS COMP SCALED BY PI IN 10D OF VAC
 R0118 OUTPUT-OPTIC AXIS VEC IN NB COORDS IN SCAXIS
 R0119 X-MARK PLANE 1/4VEC IN NB COORDS AT 18D OF JOB VAC
 R0120 Y-MARK PLANE 1/4VEC IN NB COORDS AT 12D OF JOB VAC

0121		07,2142	77624 1	OPTAXIS CALL	GO COMPUTE OA AND X AND Y PLANE VEC'S
0122	REF 1	07,2143	10536 0	OANB	
0123		07,2144	70535 0	SLOAD SR1	LOAD APP ROTATION IN ONES COMP
0124		07,2145	00013 0	10D	RESCALE BY 2PI
0125		07,2146	73406 1	PUSH SIN	1/2SIN(ROT) 0-1
0126		07,2147	71525 0	PDDL COS	
0127		07,2150	74206 0	PUSH VXSC	1/2COS(ROT) 2-3
0128		07,2151	00023 0	18D	
0129		07,2152	74325 0	PDDL VXSC	1/4COS(ROT)UYP 4-9
0130		07,2153	00001 0	0	
0131		07,2154	00031 0	24D	1/4SIN(ROT)UXP
0132		07,2155	45445 0	BVSU STADR	UP 4-9
0133		07,2156	63762 1	STDDL 12D	YPNB=1/4(COS(ROT)UYP-SIN(ROT)UXP)
0134		07,2157	65361 0	VXSC PDDL	UP 2-3 UP 0-1 FOR EXCHANGE
0135		07,2160	00031 0	24D	1/4COS(ROT)UXP PUSH 0-5
0137		07,2161	53361 0	VXSC VAD	1/4SIN(ROT)UYP
0138		07,2162	00023 0	18D	UP 0-5
01381		07,2163	77626 0	STADR	
0139		07,2164	53754 1	STOVL 18D	XPNB=1/4(COS(ROT)UXP+SIN(ROT)UYP)
0140	REF 1	07,2165	24007 0	LOGZEROS	INITIALIZE AVE STAR VEC ACCUMULATOR
0141	REF 8 LAST 124	07,2166	02715 0	STORE STARAD +6	
0142		07,2167	77776 1	EXIT	
0143	REF 1	07,2170	1 2202 1	TCF GETMKS	

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R0144 THE OANB SUBROUTINE COMPUTES THE OPTIC AXIS OF THE SIGHTING INSTRUMENT
 R0145 FROM AZIMUTH AND ELEVATION INPUT FROM THE ASTRONAUT.
 R0146 INPUT- AZIMUTH ANGLE IN SINGLE PREC 2S COMP IN 9D OF VAC
 R0147 ELEVATION ANGLE IN SINGLE PREC 2S COMP IN 9D OF VAC
 R0148 OUTPUT-OPTIC AXIS IN NB COORDS. IN SCAXIS
 R0149 X-PLANE 1/2VEC IN NB COORDS AT 24D OF VAC
 R0150 Y-PLANE 1/2VEC IN NB COORDS AT 18D OF VAC

01501			05.3402		BANK 05	
01502	REF	1	04.2000		SETLOC	AOTMARK2
01504			04.2536		BANK	
01506	REF	1			COUNT*	11/MARK
0151			04.2536	44001 0	OANB	SETPR STQ
0152			04.2537	00001 0		
0153	REF	2	04.2540	02736 1		GCTH STORE RETURN
0154			04.2541	47135 0	SLOAD	RTB
0155			04.2542	00012 1		9D PICK UP SP ELV
0156	REF	1	04.2543	21576 0		CDULOGIC
0157			04.2544	71406 0	PUSH	CGS
0158			04.2545	73525 1	PDDL	SIN 1/2COS(ELV) PD 0-1
01581			04.2546	77626 0	STADR	
0159	REF	4	04.2547	60012 1	STOVL	SCAXIS OAX=1/2SIN(ELV)
0160			04.2550	00011 1		8D PICK UP AZ SP
0161			04.2551	77634 0	RTB	
0162	REF	2	04.2552	21576 0		CDULOGIC
0163			04.2553	71406 0	PUSH	COS
0164			04.2554	00025 0	STORE	20D STORE UYP(Y) 20-21
0165			04.2555	73525 1	PDDL	SIN 1/2COS(AZ) PD 2-3
0166			04.2556	57406 1	PUSH	DCOMP PUSH 1/2SIN(AZ) 4-5
0167			04.2557	14027 1	STOVL	22D STORE UYP(Z) 22-23
0168	REF	2	04.2560	24007 0		LOGZEROS
0169			04.2561	14023 0	STOVL	18D STORE UYP(X) 18-19 UP 4-5
0170			04.2562	72405 0	DMP	SL1
0171			04.2563	00001 0		0
0172	REF	5	04.2564	17767 1	STOVL	SCAXIS +2 OAY=1/2COS(ELV) SIN(AZ)
0173			04.2565	72405 0	DMP	SL1 UP 2-3
0174			04.2566	77626 0	STADR	UP 0-1
0175	REF	6	04.2567	50006 1	STOVL	SCAXIS +4 OAZ=1/2COS(ELV) COS(AZ)
0176			04.2570	00023 0		18D LOAD UYP-VEC
0177			04.2571	53435 0	VXV	UNIT
0178	REF	7	04.2572	03765 0		SCAXIS UXP-VEC=UYP X-OA
0179			04.2573	00031 0	STORE	24D STORE UXP
0180			04.2574	77650 1	GCTH	
0181	REF	3	04.2575	02736 1		GCTH

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PO182 SURFSTAR COMPUTES A STAR VECTOR IN SM COORDINATES FOR LUNAR
 RO183 SURFACE ALIGNMENT AND EXITS TO AVEIT TO AVERAGE STAR VECTORS.
 RO184 GIVEN X-MARK PLANE 1/4 VEC IN NB AT 180 OF LOCAL VAC
 RO185 Y-MARK PLANE 1/4 VEC IN NB AT 120 OF LOCAL VAC
 RO186 CURSOR SP 2COMP AT POSITION 1 OF INDEXED MARKVAC
 RO187 SPIRAL SP 2COMP AT POSITION 3 OF INDEXED MARKVAC
 RO188 CDUY.Z.X AT POSITIONS 0.2.4 OF INDEXED MARKVAC

0189 15,2000 BANK 15
 0190 REF 1 15,2000 SETLOC R505
 0191 15,2000 BANK
 0192 REF 1 COUNT# 55/R50

01921		15,2000	77773 1	SURFSTAR VLOAD*		
01922		15,2001	00001 0		0,1	POT X-MARK COUS IN COUSPUT FOR TRG*NB5M
01923	REF 4	15,2002	00767 1	STORE	COUSPUT	
0193		15,2003	47133 0	SLOAD*	RTB	
0194		15,2004	00002 0		1,1	PICK UP YROT
0195	REF 3	15,2005	21576 0		COULOGIC	
0196		15,2006	00031 0	STORE	240	STORE CURSOR FOR SPIRAL COMP (REVS)
01961		15,2007	77654 0	BZE		
01962	REF 1	15,2010	16171 1		YZCHK	IF YROT ZERO-SEE IF SROT ZERO
0197		15,2011	71406 0	JUSTZY	PUSH	LOS
0198		15,2012	73525 1	PDDL	SIN	1/2COS(YROT) 0-1
0199		15,2013	65361 0	VXSC	PDDL	UP 0-1 1/8SIN(YROT)UXP 0-5
0200		15,2014	00023 0		180	
0201		15,2015	52361 1	VXSC	VSU	UP 0-5
02011		15,2016	00015 0		120	UYP
0202		15,2017	47256 0	UNIT	VXV	
0203	REF 8	15,2020	03765 0		SCAXIS	
0204		15,2021	41456 0	UNIT	PUSH	
0205		15,2022	47133 0	SLOAD*	RTB	
0206		15,2023	00004 0		3,1	PICK UP SPIRAL
0207	REF 4	15,2024	21576 0		COULOGIC	
0208		15,2025	00033 1	STORE	260	STORE SPIRAL (REVS)
0209		15,2026	43225 0	DSU	DA0	
0210		15,2027	00031 0		140	
0211	REF 1	15,2030	32047 0		ABOUTONE	
0212		15,2031	77605 1	DMP		
0213	REF 1	15,2032	32466 1		DP1/12	
0214		15,2033	00033 1	STORE	260	SEP=(360 + SPIRAL - CURSOR)/12
0215		15,2034	74356 1	SIN	VXSC	UP 0-5
0216		15,2035	65372 1	VSL1	PDDL	1/2SIN(SEP)(UPP X OA) 0-5
0217		15,2036	00033 1		260	
0218		15,2037	74346 0	COS	VXSC	
0219	REF 9	15,2040	03765 0		SCAXIS	
0220		15,2041	53372 1	VSL1	VAD	UP 0-5
0221		15,2042	45056 0	JUSTJA	UNIT	CALL
0222	REF 1	15,2043	47664 0		TRG*NB5M	
0224		15,2044	34031 1	STCALL	240	STAR VEC IN SM
0225	REF 1	15,2045	16276 0		AVEIT	GO AVERAGE

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0226			15.2046	37777 1	ABOUTUNE 2DEC	.99999999	
0226			15.2047	37775 0			
0227	REF	1	15.2465		DP1/12	EQUALS DEG30	.08333333
0228			07.2171		BANK	7	
0229	REF	2 LAST 244	07.2000		SETLOC	AOTMARK1	
0230			07.2171		BANK		
0231	REF	2 LAST 244 TO	249:	121 121*	COUNT#	\$/MARK	
02311			07.2171	53133 0	YZCHK	SLOAD* BZE	YROT ZERO AND IF SROT ZERO FORCE STAF
02312			07.2172	00004 0		3.1	ALONG OPTIC AXIS
02313	REF	1	07.2173	16177 1		YSZERO	
02314			07.2174	52145 0	DLQAD	GOTO	
02315			07.2175	00031 0		240	
02316	REF	1	07.2176	32011 0		JUSTZY	SROT NOT ZERO-CONTINUE NORMALLY
02317			07.2177	52175 0	YSZERO	VLOAD	GOTO
02318	REF	10 LAST 250	07.2200	03765 0		SCAXIS	
02319	REF	1	07.2201	32042 0		JUSTOA	

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P0232 THE GETMKS ROUTINE INITIALIZES THE SIGHTING MARK PROCEDURE

0233	REF	21	LAST	246	07,2202	3 4755 1	GETMKS	CAF	ZERO	INITIALIZE MARK TO REGISTER AND MARK CNT
0234	REF	7	LAST	246	07,2203	55'551 0		TS	XYMARK	
0235	REF	2	LAST	145	07,2204	55'550 1		TS	MARKCNTR	
0236	REF	2	LAST	245	07,2205	3 5004 0		CAF	LOW9	ZERO BITS10 TO 15 RETAINING MKVAC ADDR
0237	REF	8	LAST	246	07,2206	7 1312 1		MASK	MARKSTAT	
0238	REF	9	LAST	252	07,2207	55'312 1		TS	MARKSTAT	
0241	REF	1			07,2210	3 2621 0		CAF	MKVBS4*	DISPLAY VBS4 INITIALLY
0242	REF	11	LAST	246	07,2211	0 4616 1	PASTIT	TC	BANKCALL	
0243	REF	1			07,2212	20345 1		CADR	GDMARK4	
0244	REF	3	LAST	246	07,2213	1 2060 1		TCF	KILLADT	VBS4-DCES GOTOP00H
0245	REF	1			07,2214	1 2216 1		TCF	MARKCHEX	VBS3-PRDCEED. GOT MARKS. COMPUTE LOS
0246	REF	4	LAST	246	07,2215	1 2063 1		TCF	GETDAT	ENTER-RECYCLE TO V01N71
0251	REF	10	LAST	252	07,2216	4 1312 1	MARKCHEX	CS	MARKSTAT	SET BIT12 TO DISCOURAGE MARKRUPT
0252	REF	18	LAST	246	07,2217	7 4740 1		MASK	BIT12	
0253	REF	11	LAST	252	07,2220	27'312 1		ADS	MARKSTAT	
0254	REF	3	LAST	252	07,2221	7 5004 1		MASK	LOW9	
0255	REF	8	LAST	252	07,2222	55'551 0		TS	XYMARK	JAM MARK VAC ADDR IN XYMARK FOR AVESTAR
0256	REF	22	LAST	252	07,2223	3 4755 1		CAF	ZERO	
0257	REF	2	LAST	145	07,2224	55'552 0		TS	MKDEX	SET MKDEX ZERO FOR LOS VEC CNTR
0258	REF	12	LAST	252	07,2225	3 1312 0		CA	MARKSTAT	
0259	REF	1			07,2226	7 5015 1		MASK	PRIO3	SEE IF LAST MK PAIR COMPLETE
0260	REF	17	LAST	232	07,2227	54 001 1		TS	L	
0261	REF	2	LAST	252	07,2230	3 5015 0		CAF	PRIO3	BITS10 AND 11
0262					07,2231	0 0006 1		EXTEND		
0263	REF	8	LAST	216	07,2232	06 001 0		RXOR	LCHAN	
0264					07,2233	0 0006 1		EXTEND		
0265	REF	1			07,2234	1 2241 0		BZF	AVESTAR	LAST PAIR COMPLETE-GO COMPUTE LOS
0266	REF	3	LAST	252	07,2235	11'550 1	CNTCHK	CCS	MARKCNTR	NO PAIR SHOWING-SEE IF PAIR IN HOLD
0267					07,2236	1 2240 1		TCF	+2	PAIR BURIED-DECREMENT COUNTER
0268	REF	1			07,2237	1 2325 0		TCF	MKALARM	NO PAIR-ALARM
0269	REF	4	LAST	252	07,2240	55'550 1		TS	MARKCNTR	STORE DECREMENTED COUNTER
0270	REF	19	LAST	252	07,2241	3 4740 0	AVESTAR	CAF	BIT12	INITIALIZE MKDEX FOR STAR LOS COUNTER
0271	REF	3	LAST	252	07,2242	27'552 0		ADS	MKDEX	MKDEX WAS INITIALIZED ZERO IN MARKCHEX
0272	REF	5	LAST	252	07,2243	4 1550 1		CS	MARKCNTR	
0273					07,2244	0 0006 1		EXTEND		
0274	REF	3	LAST	244	07,2245	7 6242 1		MP	SIX	GET C(L) = - 6 MARKCNTR
0275	REF	9	LAST	252	07,2246	4 1551 0		CS	XYMARK	
0276	REF	18	LAST	252	07,2247	6 0001 0		AD	1	ADD - MARK VAC ADDR SET IN MARKCHEX
0277	REF	6	LAST	247	07,2250	50 120 1		INDEX	FIXLOC	
0278	REF	1			07,2251	54 046 1		TS	A:	JAM - COLL ADDR OF X-MARK IN XI
0279	REF	7	LAST	252	07,2252	3 0120 1		CA	FIXLOC	SET PD POINTER TO ZERO
0280	REF	1			07,2253	54 166 1		TS	PUSHLOC	
0281	REF	5	LAST	247	07,2254	0 6037 0		TC	INTERPT	

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0282				07,2255	76614 0	BON	VLOAD*	
0283	REF	3	LAST	236	07,2256	04307 1	SURFLAG	IF ON SURFACE COMPUTE VEC AT SURFSTAR
0284	REF	1			07,2257	32000 0	SURFSTAR	
0285					07,2260	00002 0	1.1	PUT Y-MARK CDUS IN CDUSPOT FOR TAG-NBSM
0286	REF	5	LAST	250	07,2261	24767 1	STOVL	CDUSPOT
0287					07,2262	00015 0	12D	LOAD Y-PLANE VECTOR IN N8
0288					07,2263	77624 1	CALL	
0289	REF	2	LAST	250	07,2264	47664 0		CONVERT IT TO STABLE MEMBER
0290					07,2265	76606 0	PUSH	VLOAD*
0291					07,2266	00001 0	0.1	PUT X-MARK CDUS IN CDUSPOT FOR TAG-NBSM
0292	REF	6	LAST	253	07,2267	24767 1	STOVL	CDUSPOT
0293					07,2270	00023 0	18D	LOAD X-PLANE VECTOR IN N8
0294					07,2271	77624 1	CALL	
0295	REF	3	LAST	253	07,2272	47664 0		CONVERT IT TO STABLE-MEMBER
0296					07,2273	53435 0	VXV	UNIT
0297					07,2274	77626 0	STADR	UNIT(XPSM *-YPSM)
0298					07,2275	77746 1	STORE	24D
0301					07,2276	63325 1	SLOAD	PDVL
0302	REF	4	LAST	252	07,2277	03553 1	HKDEX	N(NUMBER OF VECs) IN 0-1
0303					07,2300	00031 0	24D	LOAD CURRENT VECTOR
0304					07,2301	70322 0	VSR3	V/SL
0305					07,2302	00001 0	0	
0306					07,2303	14031 0	STOVL	24D
0307					07,2304	00001 0	0	VEC/N
0308					07,2305	56225 1	DSU	DDV
0309	REF	1			07,2306	16623 1	DP1/4	(N-1)/N
0310					07,2307	53361 0	VXSC	VAD
0311	REF	9	LAST	248	07,2310	02715 0	STARAD +6	ADD VEC TO PREVIOUSLY AVERAGED VECTOR
0312					07,2311	00031 0	24D	(N-1)/N-AVESTVEC + VEC/N
0313	REF	10	LAST	253	07,2312	02715 0	STORE	STARAD +6
0314	REF	4	LAST	196	07,2313	02767 0	STORE	STARSAV2
0315					07,2314	77776 1	EXIT	
0316	REF	6	LAST	252	07,2315	11550 1	LCS	MARKCNT
0317	REF	2	LAST	252	07,2316	1 2240 1	TCF	AVESTAR -1
0318	REF	5	LAST	231	07,2317	3 4756 1	ENDMARKS	CAF FIVE
0319					07,2320	0 0004 0	INHINT	
0320	REF	7	LAST	187	07,2321	0 5203 0	TC	WAITLIST
0321	REF	10	LAST	252	07,2322	02047 0	EBANK	XYMARK
0322	REF	1			07,2323	16067 1	2CADR	HKFE EAS
0323	REF	1			07,2324	0 5472 0	TC	ENDMARK
0324	REF	11	LAST	227	07,2325	0 5567 0	HKALARM	ALARM
0325					07,2326	00111 0	GCT	111
0326	REF	2	LAST	248	07,2327	1 2202 1	TCF	GETMKS
0327					07,2330	00307 0	VOIN71	VN 171
0328					07,2331	01527 0	VO6N87*	VN 687

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P0329 MARKRUPT IS ENTERED FROM INTERRUPT LEAD-INS AND PROCESSES CHANNEL 16
 R0330 CAUSED BY X,Y MARK OR MARK REJECT OR BY THE RATE OF DESCENT SWITCH

0331	REF	2	LAST	155	07,2332	54 016 1	MARKRUPT	TS	BANKRUPT	
0332	REF	1			07,2333	3 0033 1	CA	EDUY	STORE LDUS AND TIME NOW-THEN SEE IF	
0333	REF	5	LAST	137	07,2334	54 063 0	TS	ITEMP3	WE NEED THEM	
0334	REF	4	LAST	188	07,2335	3 0034 0	CA	CDJ7		
0335	REF	3	LAST	95	07,2336	54 064 1	TS	ITEMP4		
0336	REF	5	LAST	195	07,2337	3 0032 0	CA	EDUX		
0337	REF	2	LAST	95	07,2340	54 065 0	TS	ITEMP5		
0338					07,2341	0 0006 1	EXTEND			
0339	REF	7	LAST	204	07,2342	3 0025 0	DCA	TIME2		
0340	REF	4	LAST	137	07,2343	52 062 1	DXCH	ITEMP1		
0341	REF	20	LAST	233	07,2344	56 002 0	XCH	Q		
0342	REF	2	LAST	155	07,2345	54 012 0	TS	GRUPT		
0343	REF	1			07,2346	3 2624 0	CAF	DCT34	SEE IF X OR Y MARK OR MKREJECT	
0344					07,2347	0 0006 1	EXTEND			
0345	REF	2	LAST	218	07,2350	02 016 1	RAND	NAVKEYIN		
0346	REF	53	LAST	245	07,2351	10 000 0	CCS	A		
0347					07,2352	1 2354 0	TCF	*2	ITS A LIVE ONE-SEE IF ITS WANTED	
0348	REF	1			07,2353	1 2404 1	TCF	SOMEKEY	ITS SOME OTHER KEY	
0349	REF	20	LAST	252	07,2354	3 4740 0	CAF	BIT12	ARE WE ASKING FOR A MARK	
0350	REF	13	LAST	252	07,2355	7 1312 1	MASK	MARKSTAT		
0351	REF	54	LAST	254	07,2356	10 000 0	CCS	A		
0352	REF	8	LAST	190	07,2357	0 5270 1	TC	RESUME	DONT WANT MARK OR MKREJECT-DO NOTHING	
0353	REF	14	LAST	254	07,2360	11 312 1	CCS	MARKSTAT	ARE MARKS BEING ACCEPTED	
0354	REF	1			07,2361	1 2365 1	TCF	FINDKEY	THEY ARE-WHICH ONE IS IT	
0355	REF	12	LAST	253	07,2362	0 5567 0	TC	ALARM	MARKS NOT BEING ACCEPTED-OR ALARM	
0356					07,2363	00112 0	DCT	112		
0357	REF	9	LAST	254	07,2364	0 5270 1	TC	RESUME		
0358	REF	15	LAST	228	07,2365	3 4747 1	FINDKEY	CAF	BIT5	SEE IF MARK REJECT
0359					07,2366	0 0006 1	EXTEND			
0360	REF	3	LAST	254	07,2367	02 016 1	RAND	NAVKEYIN		
0361	REF	55	LAST	254	07,2370	10 000 0	CCS	A		
0362	REF	1			07,2371	1 2461 1	TCF	MKREJ	ITS A MARK REJECT	
0363	REF	18	LAST	232	07,2372	3 4750 1	CAF	BIT4	SEE IF Y MARK	
0364					07,2373	0 0006 1	EXTEND			
0365	REF	4	LAST	254	07,2374	02 016 1	RAND	NAVKEYIN		
0366	REF	56	LAST	254	07,2375	10 000 0	CCS	A		
0367	REF	1			07,2376	1 2422 0	TCF	YMKRUPT	ITS A Y-MARK	
0368	REF	13	LAST	88	07,2377	3 4751 0	CAF	BIT3	SEE IF X MARK	
0369					07,2400	0 0006 1	EXTEND			
0370	REF	5	LAST	254	07,2401	02 016 1	RAND	NAVKEYIN		

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0371	REF	57	LAST	254	07,2402	10 000 0		CCS	A		
0372	REF	1			07,2403	1 2416 1		TCF	XMKRUPT	ITS A X MARK	
0373	REF	1			07,2404	3 4776 0	SOMEKEY	CAF	GCT140	NOT MARK OR MKREJECT-SEE IF DESCENT BITS	
0374					07,2405	0 0006 1		EXTEND			
0375	REF	6	LAST	254	07,2406	02 016 1		RAND	NAVKEYIN		
0376					07,2407	0 0006 1		EXTEND			
0377					07,2410	1 2413 1		BZF	+3	IF NO BITS	
0378	REF	6	LAST	230	07,2411	0 4635 0		TC	POSTJUMP	IF DESCENT BITS	
0379	REF	1			07,2412	40115 0		CADR	DESCRITS		
0380	REF	13	LAST	254	07,2413	0 5567 0		TC	ALARM	NO INBITS IN CHANNEL 16	
0381					07,2414	00113 1		DCT	113		
0382	REF	10	LAST	254	07,2415	0 5270 1		TC	RESUME		
0383	REF	23	LAST	252	07,2416	3 4755 1	XMKRUPT	CAF	ZERO		
0384	REF	13	LAST	168	07,2417	54 070 1		TS	RUPTRG1	SET X MARK STORE INDEX TO ZERO	
0385	REF	17	LAST	220	07,2420	3 4742 1		CAF	BIT10		
0386					07,2421	1 2425 1		TCF	+4		
0387	REF	10	LAST	245	07,2422	3 4753 1	YMKRUPT	CAF	ONE		
0388	REF	14	LAST	255	07,2423	54 070 1		TS	RUPTRG1	SET Y MARK STORE INDEX TO ONE	
0389	REF	16	LAST	232	07,2424	3 4741 1		CAF	BIT11		
0390	REF	11	LAST	253	07,2425	55 551 0		TS	XYMARK	SET MARK IDENTIFICATION	
03901	REF	1			07,2426	0 2514 0		TC	MARKTYPE	SEE IF SURFACE MARK	
03902	REF	1			07,2427	1 2521 1		TCF	SURFSTOR	SURFACE MARK-JUST STORE CDUS	
0391	REF	25	LAST	216	07,2430	3 4736 1		CAF	BIT14	GOT A MARK-SEE IF MARK PAIR MADE	
0392	REF	15	LAST	254	07,2431	7 1312 1		MASK	MARKSTAT		
0393					07,2432	0 0006 1		EXTEND			
0394	REF	1			07,2433	1 2444 0		BZF	VERIFYMK	NOT A PAIR, NORMAL PROCEDURE	
0395	REF	7	LAST	253	07,2434	4 1550 1		CS	MARKCTR	GOT A PAIR, SEE IF ANOTHER CAN BE MADE	
0396	REF	3	LAST	212	07,2435	6 4751 0		AD	FOUR	IF SO, INCREMENT POINTER, CLEAR BITS 10, 11	
0397					07,2436	0 0006 1		EXTEND			
0398	REF	1			07,2437	6 2454 0		BZNF	5MKALARM	HAVE FIVE MARK PAIRS-DONT ALLOW MARK	
0399	REF	8	LAST	255	07,2440	25 550 0		INCR	MARKCTR	OK FOR ANOTHER PAIR, INCR POINTER	
0400	REF	1			07,2441	4 7711 0		CS	PP145	CLEAR BITS 10, 11, 14 FOR NEXT PAIR	
0401	REF	16	LAST	255	07,2442	7 1312 1		MASK	MARKSTAT		
0402	REF	17	LAST	255	07,2443	55 312 1		TS	MARKSTAT		
0403	REF	12	LAST	255	07,2444	3 1551 1	VERIFYMK	CA	XYMARK		
0404	REF	18	LAST	255	07,2445	7 1312 1		MASK	MARKSTAT		
0405	REF	58	LAST	255	07,2446	10 000 0		CCS	A		
0406					07,2447	1 2451 1		TCF	+2	THIS MARK NOT DESIRED	
0407	REF	1			07,2450	1 2526 0		TCF	VACSTOR	MARK DESIRED - STORE CDUS	
0408	REF	14	LAST	255	07,2451	0 5567 0		TC	ALARM		
0409					07,2452	00114 0		DCT	114		
0410	REF	11	LAST	255	07,2453	0 5270 1		TC	RESUME	RESUME-DISPLAY UNCHANGED-WAIT FOR ACTION	

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0411	REF	15	LAST	255	07,2454	0 5567 0	SHKALARM TC	ALARM	ATTEMPTING TO MAKE MORE THAN 5 HK PAIRS
0412					07,2455	00107 1	OCT	107	
04121	REF	2	LAST	255	07,2456	0 2514 0	TC	MARKTYPE	SEE IF SURFACE MARK
04122	REF	1			07,2457	1 2627 1	TCF	DSPV6N79	IT IS
0413	REF	12	LAST	255	07,2460	0 5270 1	TC	RESUME	DONT CHANGE DISPLAY-DO NOTHING

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0414	REF	3	LAST	256	07,2461	0	2514	0	MKREJ	TC	MARKTYPE	SEE IF SURFACE
04141	REF	1			07,2462	1	2507	0		TCF	SURFREJ	SURFACE-JUST CHECK MARK COUNTER
04142	REF	3	LAST	252	07,2463	3	5015	0		CAF	PRIO3	INFLIGHT-SEE IF MARKS MADE
0415	REF	19	LAST	255	07,2464	7	1312	1		MASK	MARKSTAT	
0416	REF	59	LAST	255	07,2465	10	000	0		CCS	A	
0417	REF	1			07,2466	1	2472	0		TCF	REJECT	MARKS MADE-REJECT ONE
0418	REF	16	LAST	256	07,2467	0	5567	0	REJALM	TC	ALARM	NO MARK TO REJECT-BAD PROCEDURE-ALARM
0419					07,2470		00115	1		DCT	115	
0420	REF	13	LAST	256	07,2471	0	5270	1		TC	RESUME	DESIRED ACTION DISPLAYED
0421	REF	5	LAST	227	07,2472	4	4355	1	REJECT	CS	PRIO30	ZERO BIT14, SHOW FEJ..SEE IF MARK SINCE
0422	REF	20	LAST	257	07,2473	7	1312	1		MASK	MARKSTAT	LAST REJECT
0423	REF	18	LAST	219	07,2474	6	4737	0		AD	BIT13	
0424	REF	21	LAST	257	07,2475	57	312	0		XCH	MARKSTAT	
0425	REF	19	LAST	257	07,2476	7	4737	1		MASK	BIT13	
0426	REF	60	LAST	257	07,2477	10	000	0		CCS	A	
0427	REF	1			07,2500	1	2505	1		TCF	REJECT2	ANOTHER REJECT SET BIT 10+11 TO ZERO
0428	REF	13	LAST	255	07,2501	4	1551	0		CS	XYMARK	MARK MADE SINCE REJECT-REJECT-MARK IN 10
0429	REF	22	LAST	257	07,2502	7	1312	1	RENEWMK	MASK	MARKSTAT	
0430	REF	23	LAST	257	07,2503	55	312	1		TS	MARKSTAT	
0431	REF	1			07,2504	1	2577	1		TCF	REMARK	GO REQUEST NEW MARK ACTION
0432	REF	4	LAST	257	07,2505	4	5015	1	REJECT2	CS	PRIO3	ON SECOND REJECT-DISPLAY VB53 AGAIN
0433	REF	1			07,2506	1	2502	0		TCF	RENEWMK	
04331	REF	9	LAST	255	07,2507	11	550	1	SURFREJ	CCS	MARKCNTR	IF MARK DECREMENT COUNTER
04332					07,2510	1	2512	1		TCF	+2	
04333	REF	1			07,2511	1	2467	1		TCF	REJALM	NO MARKS TO REJECT-ALARM
04334	REF	10	LAST	257	07,2512	55	550	1		TS	MARKCNTR	
04335	REF	14	LAST	257	07,2513	0	5270	1		TC	RESUME	

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R0434

R0435 MARKTYPE TESTS TO SEE IF LEM ON LUNAR SURFACE. IF IT IS RETURN TO LOC+1

0436	REF	1		07,2514	4 0104 0	MARKTYPE	CS	FLAGEDB	SURFFLAG*****TEMPORARY*****
0437	REF	18	LAST 232	07,2515	7 4744 0		MASK	BIT8	
0438	REF	61	LAST 257	07,2516	10 000 0		CCS	A	
0439	REF	21	LAST 254	07,2517	24 002 0		INCR	Q	IF SURFACE MARK RETURN TO LOC +1
0440	REF	22	LAST 258	07,2520	0 0002 0		TC	Q	IF INFIGHT MARK RETURN TO LOC +2
04401	REF	24	LAST 255	07,2521	3 4755 1	SURFSTOR	CAF	ZERO	FOR SURFACE MARK ZERO MARK KIND INDEX
04402	REF	15	LAST 255	07,2522	54 070 1		TS	RUPTREG1	
04403	REF	24	LAST 257	07,2523	4 1312 1		CS	MARKSTAT	SET BITS10,11 TO SHOW SURFACE MARK
04404	REF	5	LAST 257	07,2524	7 5015 1		MASK	PR103	FOR MARKCHEX
04405	REF	25	LAST 258	07,2525	27 312 1		ADS	MARKSTAT	
0441	REF	4	LAST 252	07,2526	3 5004 0	VACSTOR	CAF	LOWY	
0442	REF	26	LAST 258	07,2527	7 1312 1		MASK	MARKSTAT	STORE MARK VAC ADR IN RUPTREG2
0443	REF	6	LAST 171	07,2530	54 071 0		TS	RUPTREG2	
0444				07,2531	0 0006 1		EXTEND		
0445	REF	5	LAST 254	07,2532	3 0062 0		DCA	ITEMP1	PICK UP MARKTIME
0446	REF	1		07,2533	53 562 0		DXCH	TSIGHT	STORE LAST MARK TIME
0447	REF	11	LAST 257	07,2534	3 1550 0		CA	MARKCNTR	6 X MARKCNTR FOR STORE INDEX
0448				07,2535	0 0006 1		EXTEND		
0449	REF	4	LAST 252	07,2536	7 6242 1		MP	SIX	
0450	REF	19	LAST 252	07,2537	56 001 0		XCH	1	GET INDEX FROM LOW ORDER PART
0451	REF	7	LAST 258	07,2540	6 0071 1		AD	RUPTREG2	SET CDU STORE INDEX TO MARKVAC
04511	REF	16	LAST 258	07,2541	26 070 1		ADS	RUPTREG1	INCREMENT VAC PICKUP BY MARK FOR FLIGHT
0452	REF	5	LAST 253	07,2542	55 552 0		TS	MARKEX	STORE HERE IN CASE OF SURFACE MARK
0453	REF	6	LAST 254	07,2543	3 0063 1		CA	ITEMP3	
0454	REF	17	LAST 258	07,2544	50 070 0		INDEX	RUPTREG1	
0455				07,2545	54 000 0		TS	0	STORE CDUY
0456	REF	4	LAST 254	07,2546	3 0064 0		CA	ITEMP4	
0457	REF	18	LAST 258	07,2547	50 070 0		INDEX	RUPTREG1	
0458				07,2550	54 002 1		TS	2	STORE CDUZ
0459	REF	3	LAST 254	07,2551	3 0065 1		CA	ITEMP5	
0460	REF	19	LAST 258	07,2552	50 070 0		INDEX	RUPTREG1	
0461				07,2553	54 004 1		TS	4	STORE CDUX
04611	REF	4	LAST 257	07,2554	0 2514 0		TC	MARKTYPE	IF SURFACE MARK-JUST DO SURFJOB
04612	REF	1		07,2555	1 2604 0		TCF	SURFJOB	
0462	REF	20	LAST 257	07,2556	3 4737 0		CAF	BIT13	CLEAR BIT13 TO SHOW MARK MADE
0463	REF	14	LAST 257	07,2557	6 1551 1		AD	XYMARK	SET MARK ID IN MARKSTAT
0464				07,2560	4 0000 0		CD4		
0465	REF	27	LAST 258	07,2561	7 1312 1		MASK	MARKSTAT	
0466	REF	15	LAST 258	07,2562	6 1551 1		AD	XYMARK	
0467	REF	28	LAST 258	07,2563	55 312 1		TS	MARKSTAT	
0468	REF	6	LAST 258	07,2564	7 5015 1		MASK	PR103	SEE IF X, Y MARK MADE
0469	REF	20	LAST 258	07,2565	54 001 1		TS	1	

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0470	REF	7	LAST	258	07,2566	3 5015 0
0471					07,2567	0 0006 1
0472	REF	9	LAST	252	07,2570	06 001 0
0473	REF	62	LAST	258	07,2571	10 000 0
0474	REF	2	LAST	257	07,2572	1 2577 1
0475	REF	29	LAST	258	07,2573	4 1312 1
0476	REF	26	LAST	255	07,2574	7 4736 0
0477	REF	30	LAST	259	07,2575	27 312 1
0478	REF	3	LAST	259	07,2576	1 2577 1

CA PRI03

EXTEND

RXOR LCHAN

LCS A

TCF REMARK

CS MARKSTAT

MASK BIT14

ADS MARKSTAT

TCF REMARK

NOT PAIR YET. DISPLAY MARK ACTION

MARK PAIR COMPLETE-SET BIT14

GO DISPLAY V54

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AOTMARK

0481	REF	8	LAST	259	07,2577	3 5015 0	REMARK	CAF	PRIC3	BITS 10 AND 11
0482	REF	31	LAST	259	07,2600	7 1312 1		MASK	MARKSTAT	
0483					07,2601	0 0006 1		EXTEND		
0484	REF	29	LAST	227	07,2602	7 4746 1		MP	BIT6	SHIFT MARK IDS TO BE 0 TO 3 FOR INDEX
0485	REF	6	LAST	258	07,2603	55 552 0		TS	MKDEX	STORE VERB INDEX
0486	REF	3	LAST	244	07,2604	3 5025 0	SURFJOB	CAF	PRIC15	
0487	REF	3	LAST	192	07,2605	0 5072 1		TC	NOVAC	ENTER JOB TO CHANGE DISPLAY TO
0488	REF	16	LAST	258	07,1551			ERANK	XYMARK	REQUEST NEXT ACTION
0489	REF	1			07,2606	02611 0		ZCADP	CHANGEVB	
0489	REF	1			07,2607	16067 1				
0490	REF	15	LAST	257	07,2610	0 5270 1		TC	RESUME	
0491	REF	5	LAST	258	07,2611	0 2514 0	CHANGEVB	TC	MARKTYPE	
0492	REF	2	LAST	256	07,2612	1 2627 1		TCF	DSRV6N79	SURFACE-DISPLAY V 06 N 79
0493	REF	7	LAST	260	07,2613	51 552 1		INDEX	MKDEX	INFLIGHT-PICK UP MARK VB INDEX
0494	REF	1			07,2614	3 2616 1		CAF	MKVB54	
04941	REF	1			07,2615	0 2211 1		TC	PASTIT	PASTE UP NEXT MK VERB DISPLAY

R0496 THE FOUR MKVBS ARE INDEXED-THEIR ORDER CANNOT BE CHANGED

0497					07,2616	15507 1	MKVB54	VN	5471	MAKE X OR Y MARK
0498					07,2617	15307 1	MKVB53	VN	5371	MAKE Y MARK
0499					07,2620	15107 0	MKVB52	VN	5271	MAKE X MARK
0500					07,2621	15507 1	MKVB54*	VN	5471	MAKE X OR Y MARK
0501					07,2622	04000 0	DP1/8	2DEC	.125	
0501					07,2623	00000 1				
0502					07,2624	00034 0	DCT34	DCT	34	
0503					07,2625	01507 1	V06N71	VN	671	
05031					07,2626	01517 0	V06N79*	VN	679	

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P0504 ROUTINE TO REQUEST CURSOR AND SPIRAL MEASUREMENTS
0505 REF 1

COUNT* 44/R59

0506	REF	1		07,2627	3 2626 1	DSPV6N79	CAF	VD6N79*	CURSOR-SPIRAL DISPLAY
0507	REF	12	LAST	252	07,2630	0 4616 1	TE	BANKCALL	
0508	REF	4	LAST	246	07,2631	20334 1	CADA	GOMARKF	
0509	REF	4	LAST	252	07,2632	1 2060 1	TCF	KILLADT	V34-DOES GOTOPDBH
0510	REF	1			07,2633	1 2641 1	TCF	SURFEND	V33-PROCEED, END MARKING
0511	REF	30	LAST	260	07,2634	3 4746 0	CAF	BIT6	IF V32(OCT40) IN MPAC DO RECYCLE
05111	REF	32	LAST	228	07,2635	7 0154 0	MASK	MPAC	OTHERWISE IT IS LOAD VB ENTER SD
05112	REF	63	LAST	259	07,2636	10 000 0	CCS	A	RE-DISPLAY V06H79
05113	REF	1			07,2637	1 2645 0	TCF	SURFAGAN	V832-RECYCLE
05114	REF	3	LAST	260	07,2640	1 2627 1	TCF	DSPV6N79	ENTER
0512	REF	27	LAST	259	07,2641	4 4736 0	SURFEND	CS	BIT14
0513	REF	32	LAST	260	07,2642	7 1312 1	MASK	MARKSTAT	SET BIT14 TO SHOW MARK END
05131	REF	28	LAST	261	07,2643	6 4736 1	AD	BIT14	
0514	REF	33	LAST	261	07,2644	55 1312 1	TS	MARKSTAT	
0515	REF	1			07,2645	3 1236 1	SURFAGAN	CA	CURSOR
0516	REF	8	LAST	260	07,2646	51 552 1	INDEX	MKDEX	HOLDS VAC AREA POINTER FOR SURF MARKING
0517					07,2647	54 001 1	TS	1	STORE CURSOR SP 2COMP
0518	REF	1			07,2650	3 1240 0	CA	SPIRAL	
0519	REF	9	LAST	261	07,2651	51 552 1	INDEX	MKDEX	
0520					07,2652	54 003 0	TS	3	STORE SPIRAL
0521	REF	34	LAST	261	07,2653	4 1312 1	LS	MARKSTAT	IF BIT 14 SET-END MARKING
0522	REF	29	LAST	261	07,2654	7 4736 0	MASK	BIT14	
0523					07,2655	0 0006 1	EXTEND		
0524	REF	2	LAST	252	07,2656	1 2216 1	BZF	MARKCHEX	
0525	REF	12	LAST	258	07,2657	3 1550 0	CA	MARKCNTR	THIS IS RECYCLE-SEE IF 5 MARKS ALREADY
0526	REF	11	LAST	255	07,2660	6 4753 1	AD	ONE	
0527					07,2661	4 0000 0	COM		
0528	REF	6	LAST	253	07,2662	6 4756 1	AD	FIVE	
0529					07,2663	0 0006 1	EXTEND		
0530	REF	2	LAST	255	07,2664	6 2454 0	BZMF	5MKALARM	CANT RECYCLE-TO-MANY-MARKS-ALARM
0531	REF	13	LAST	261	07,2665	25 550 0	INCH	MARKCNTP	OF FDP RECYCLE-INCR COUNTER
0532	REF	3	LAST	253	07,2666	1 2205 0	TCF	GETMKS +3	GO-DISPLAY MARK VB

L EXTENDED VERBS

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VERB	REF	LAST	INDEX	MPAC	VERB-40 IS IN MPAC
0001			07,2667	BANK 7	
0002	REF 1		43,2000	SETLOG EXTVERBS	
0003			43,2000	BANK	
0004	REF 3	LAST 196	E5,1737	EBANK= UGC	
0005	REF 1			COUNT* 14/EXTVE	
0006	FAN-OUT				
0007	REF 33	LAST 261	43,2000	GOEXTVB	VERB-40 IS IN MPAC
0008	REF 1		43,2001	TC	FAN AS BEFORE.
0009	REF 1		43,2002	LST2FAN	VB40 ZERO (USED WITH NOUN 20 OR 72 ONLY)
0010	REF 1		43,2003	TC	VB41 COARSE ALIGN (USED WITH NOUN 20 OR 72 ONLY)
0011					
0012	REF 1		43,2004	TC	VB42 FINE ALIGN IMU
0013	REF 1		43,2005	TC	VB43 LOAD IMU ATTITUDE ERROR METERS.
0014	REF 1		43,2006	TC	VB44 TERMINATE CONTINUOUS DESIGNATE
0015	REF 1		43,2007	TC	VB45 SPARE
0016	REF 2	LAST 262	43,2010	TC	VB46 SPARE
0017	REF 1		43,2011	TC	VB47 AGS INITIALIZATION
0018	REF 1		43,2012	TC	VB48 LOAD A/P DATA
0019	REF 1		43,2013	TC	VB49 START AUTOMATIC ATTITUDE MANEUVER
0020	REF 1		43,2014	TC	VB50 PLEASE PERFORM
0021	REF 3	LAST 262	43,2015	TC	VB51 SPARE
0022	REF 2	LAST 262	43,2016	TC	VB52 PLEASE MARK X - RETICLE.
0023	REF 3	LAST 262	43,2017	TC	VB53 PLEASE MARK Y - RETICLE.
0024	REF 4	LAST 262	43,2020	TC	VB54 PLEASE MARK X OR Y - RETICLE
0025	REF 1		43,2021	TC	VB55 ALIGN TIME
0026	REF 1		43,2022	TC	VB56 TERMINATE TRACKING - P20 + P25
0027	REF 1		43,2023	TC	VB57 PERMIT LANDING RADAR UPDATES
0028	REF 1		43,2024	TC	VB58 INHIBIT LANDING RADAR UPDATES
0029	REF 4	LAST 262	43,2025	TC	VB59 SPARE
0030	REF 1		43,2026	TC	VB60 COMMAND LR TO POSITION 2.
0031	REF 1		43,2027	TC	VB61 DISPLAY DAP ATTITUDE ERROR
0032	REF 1		43,2030	TC	VB62 DISPLAY TOTAL ATTITUDE ERROR
0033	REF 1		43,2031	TC	VB63 SAMPLE RADAR ONCE PER SECOND
0034	REF 1		43,2032	TC	VB64 CALCULATE DISPLAY S-BAND ANT ANGLES
0035	REF 1		43,2033	TC	VB65 DISABLE U.V JETS DURING OPS BURNS.
0036	REF 1		43,2034	TC	VB66 ATTACHED MOVE THIS TO OTHER STATE
0037	REF 1		43,2035	TC	VB67 W MATRIX MONITOR
0038	REF 5	LAST 262	43,2036	TC	VB68 SPARE
0039	REF 1		43,2037	TC	VB69 FORCE A HARDWARE RESTART
0040	REF 1		43,2040	TC	VB70 UPDATE LIFTOFF TIME.
0041	REF 1		43,2041	TC	VB71 UNIVERSAL UPDATE - BLOCK ADDRESS.
0042	REF 1		43,2042	TC	VB72 UNIVERSAL UPDATE - SINGLE ADDRESS.
0043	REF 1		43,2043	TC	VB73 UPDATE AGC TIME (OCTAL).
0044	REF 1		43,2044	TC	VB74 INITIALIZE DOWN-TELEMETRY PROGRAM FOR ERASABLE DUMP.
0045					
0046	REF 1		43,2045	TC	VB75 ENABLE U.V JETS DURING DPS BURNS.

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0047	REF	1		43,2046	0 3001 0	TC	MINIMP	VB76 MINIMUM IMPULSE MODE
0048	REF	1		43,2047	0 3006 1	TC	NOMINIMP	VB77 RATE COMMAND MODE
0049	REF	1		43,2050	0 2404 0	TC	F77	VB78 START LR SPURIOUS RETURN TEST
0050	REF	1		43,2051	0 2617 0	TC	F77END	VB79 TERMINATE LR SPURIOUS RETURN TEST
0051	REF	1		43,2052	0 3051 0	TC	LEMVEC	VB80 UPDATE LEM STATE VECTOR
0052	REF	1		43,2053	0 3054 0	TC	CSMVEC	VB81 UPDATE CSM STATE VECTOR
0053	REF	1		43,2054	0 2746 0	TC	VB8PERF	VB82 REQUEST ORBIT PARAM DISPLAY (R20)
0054	REF	1		43,2055	0 2756 1	TC	VB8PERF	VB83 REQUEST REND PARAM DISPLAY (R31)
0055	REF	6	LAST 262	43,2056	0 2120 0	TC	ALM/END	VB84 SPARE
0056	REF	1		43,2057	0 3227 0	TC	VERB85	VB85 DISPLAY RR LOS AZ AND ELEV
0057	REF	7	LAST 263	43,2060	0 2120 0	TC	ALM/END	VB86 SPARE
0058	REF	8	LAST 263	43,2061	0 2120 0	TC	ALM/END	VB87 SPARE
0059	REF	9	LAST 263	43,2062	0 2120 0	TC	ALM/END	VB88 SPARE
0060	REF	1		43,2063	0 2764 0	TC	VB8PERF	VB89 ALIGN XRPZ LEM AXIS ALONG LOS (R63)
0061	REF	1		43,2064	0 2773 0	TC	VB8PERF	VB90 OUT OF PLANE RENDEZVOUS DISPLAY
0062	REF	1		43,2065	0 3100 0	TC	GDSHG/SUM	VB91 DISPLAY BANK SUM.
0063	REF	1		43,2066	0 3064 0	TC	SYSTEST	VB92 OPERATE IMU PERFORMANCE TEST.
0064	REF	1		43,2067	0 3073 0	TC	WMATRXNG	VB93 CLEAR RENOVFLG
0065	REF	10	LAST 263	43,2070	0 2120 0	TC	ALM/END	VB94 SPARE
0066	REF	1		43,2071	0 3061 0	TC	UPDATOFF	VB95 NO STATE VECTOR UPDATE ALLOWED
0067	REF	1		43,2072	0 3206 0	TC	VERB96	VB96 INTERRUPT INTEGRATION AND GO TO PDB
0068	REF	5	LAST 262	43,2073	0 2361 1	TC	COLDADLV	VB97 PLEASE VERIFY ENGINE FAILURE
0069	REF	11	LAST 263	43,2074	0 2120 0	TC	ALM/END	VB98 SPARE
0070	REF	6	LAST 263	43,2075	0 2361 1	TC	COLDADLV	VB99 PLEASE ENABLE ENGINE

ROC71 END OF EXTENDED VERB FAN

0072	REF	5	LAST 246	43,2076	11 044 1	TESTXACT	CCS	EXTVBACT	ARE EXTENDED VERBS BUSY
0073	REF	12	LAST 263	43,2077	0 2120 0		TC	ALM/END	YES, TURN ON OPERATOR LIGHT
0074	REF	2	LAST 222	43,2100	3 0100 0		CA	FLACWRB4	ARE PRIORITY DISPLAYS USING DSKY
0075	REF	1		43,2101	7 2127 0		MASK	0024100	
00751	REF	64	LAST 261	43,2102	10 000 0		CCS	A	
00752	REF	13	LAST 263	43,2103	0 2120 0		TC	ALM/END	YES
0076	REF	2	LAST 231	43,2104	3 6007 0		CAF	DCT24	SET-BITS 3 AND 5
0077	REF	6	LAST 263	43,2105	55 044 1	SETXTACT	TS	EXTVBACT	NO. SET FLAG TO SHOW EXT VERB DISPLAY SYSTEM BUSY

A0078

0079	REF	23	LAST 258	43,2106	3 0002 0		CA	0	
0080	REF	34	LAST 262	43,2107	54 155 1		TS	MPAC +1	
0081	REF	4	LAST 244	43,2110	4 4752 1		CS	TWO	BLANK EVERYTHING EXCEPT RR AND VERB
0082	REF	1		43,2111	0 4154 0		TC	4V30B	
0083				43,2112	0 2113 0		TC	+1	
0084	REF	35	LAST 263	43,2113	0 0155 0		TC	MPAC +1	
0085	REF	2	LAST 231	43,2114	0 4364 1	XACTALM	TC	FALTON	TURN ON OPERATOR ERROR LIGHT.
0086	REF	6	LAST 208	43,2115	0 5472 0		TC	ENDEXT	RELEASE MARK AND EXT. VERB DISPLAY SYS.
0087	REF	7	LAST 263	5472		TERMEXTV		EQUALS ENDEXT	

L EXTENDED VERBS

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0088	REF	8	LAST	263	5472	ENDEXTVB EQUALS ENDEXT			
0089	REF	25	LAST	258	43,2116	3	4755	1	XACTO
0090	REF	1			43,2117	0	2105	1	TC
									ZERI- SETXTACT
									RELEASE MARK AND EXT. VERB DISPLAY SYS.
0091	REF	3	LAST	263	43,2120	0	4364	1	ALM/END
0092	REF	7	LAST	255	43,2121	0	4635	0	TC
0093	REF	2	LAST	227	43,2122		21050	1	TC
									FALTON PLSTJUMP
									TURN ON OPERATOR ERROR LIGHT
									PINBRNCH
0094	REF	6	LAST	231	43,2123	3	1011	0	CHKPODH
0095					43,2124	0	0006	1	CA
0096	REF	1			43,2125	1	6742	1	EXTEND
0097	REF	14	LAST	263	43,2126	0	2120	0	BZF
									TC
									ALM/END
00971					43,2127		24100	0	OC24100
									OCT
									24100
									CHECK FOR POD OR PCO-

L EXTENDED VERBS

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P0098 VBZERO VERB 40 DESCRIPTION
 P0099
 R0100 1. REQUIRE NOUN 20 (ICDU ANGLES) OR NOUN 72 (RCDU ANGLES).
 R0101 2. FOR N20, CHECK IMUCADR IN AN EFFORT TO AVOID A 1210 RESTART.
 R0102 FOR N72, CHECK IF EITHER RADAR IS IN USE.
 R0103 3. EXECUTE THE CDU ZERO.
 R0104 4. STALL UNTILL THE ZERO IS DONE.
 R0105 5. DON'T DIFFERENTIATE BETWEEN A BAD OR GOOD RETURN.
 R0106 6. EXIT, RE-ESTABLISHING THE INTERRUPTED DISPLAY (IF ANY).

0110	REF	1		43,2130	0 2174 1	VBZERO	TC	OP/INERT	
0111	REF	1		43,2131	0 2133 1		TC	IMUZEROK	RETURN HERE IF NOUN = ICPU(20)
0112	REF	1		43,2132	0 2142 1		TC	RRZEROK	RETURN HERE IF NOUN = RCDU(72)
0113	REF	1		43,2133	0 2375 1	IMUZEROK	TC	CKMEDCAD	
01131	REF	13	LAST 261	43,2134	0 4616 1		TC	BANKCALL	KEYBOARD REQ FOR ISS-CDUZERO
0114	REF	2	LAST 208	43,2135	16714 1		CADR	IMUZERD	
0115	REF	14	LAST 265	43,2136	0 4616 1		TC	BANKCALL	STALL
0116	REF	2	LAST 208	43,2137	17716 1		CADR	IMUSTALL	
0117				43,2140	0 2141 1		TC	+1	
0118	REF	1		43,2141	0 2121 1		TC	GOPIN	IMUZERO
0120	REF	1		43,2142	0 2642 0	RRZEROK	TC	RDRUSECK	
01202	REF	15	LAST 265	43,2143	0 4616 1		TC	BANKCALL	
0121	REF	1		43,2144	52343 1		CADR	RRZERO	
0122	REF	16	LAST 265	43,2145	0 4616 1	RWAITK	TC	BANKCALL	
0123	REF	1		43,2146	17714 0		CADR	RADSTALL	
0124				43,2147	1 2150 0		TCF	+1	
0125	REF	2	LAST 265	43,2150	0 2121 1		TC	GOPIN	RRZERO

P0126 LRPDS2K VERB 60 DESCRIPTION
 P0127 COMMAND LANDING RADAR TO POSITION 2
 P0129 1. EXIT WITH OP ERROR IF SOMEONE IS USING EITHER RADAR.
 R0130 2. ALARM WITH CODE 523 IF POS 2 IS NOT INDICATED WITHIN
 R0131 THE PRESCRIBED TIME.
 P01311 3. RE-ESTABLISH THE DISPLAYS.

0132	REF	2	LAST 265	43,2151	0 2642 0	LRPDS2K	TC	RDRUSECK	
01322	REF	17	LAST 265	43,2152	0 4616 1		TC	BANKCALL	COMMAND LR TO POSITION 2
0133	REF	1		43,2153	53471 0		CADR	LRPOS2	
0134	REF	18	LAST 265	43,2154	0 4616 1		TC	BANKCALL	
01341	REF	2	LAST 265	43,2155	17714 0		CADR	RADSTALL	
01342	REF	1		43,2156	0 2160 1		TC	LRP2ALM	
01343	REF	3	LAST 265	43,2157	0 2121 1		TC	GOPIN	
01345	REF	17	LAST 257	43,2160	0 5567 0	LRP2ALM	TC	ALARM	
01346				43,2161	00523 0		DET	523	
01347	REF	4	LAST 265	43,2162	0 2121 1		TC	GOPIN	

L EXTENDED VERBS

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R0135 V61 VERB 61. DISPLAY DAP ATTITUDE ERRORS ON FDAI ATTITUDE ERROR NEEDLES.

0137	REF	10	LAST	231	43.2163	0 5516 0	DAPATTER	TC	DOWNFLAG
0138	REF	1			43.2164	00013 0	ADRES		NEEDLFLG
0139	REF	5	LAST	265	43.2165	0 2121 1	TC		GOPIH

R0140 V62 VERB 62. DISPLAY TOTAL ATTITUDE ERRORS ON FDAI ATTITUDE ERROR NEEDLES.

0142	REF	1			43.2166	0 5504 0	TOTATTER	TC	UPFLAG
0143	REF	2	LAST	266	43.2167	00013 0	ADRES		NEEDLFLG
0144	REF	6	LAST	266	43.2170	0 2121 1	TC		GOPIH

R0145

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PO146 VBCOARK VERB 41 DESCRIPTION
 RO147 COARSE ALIGN IMU OR RADAR
 RO148 1. REQUIRE NOUN 20 OR NOUN 72 OR TURN ON OPERATOR ERROR.
 RO149 2. REQUIRE EXT VERB DISPLAY SYS AVAILABLE OR TURN ON OPERATOR ERROR LIGHT AND GO TO PINBRCH.
 RO151 CASE 1 NOUN 20 (ICDU ANGLES)
 RO152 3. SET EXT VERB DISPLAY ACTIVE FLAG.
 RO153 4. DISPLAY FLASHING V25,N22 (LOAD NEW ICDU ANGLES).
 RO154 RESPONSES
 RO155 A. TERMINATE
 RO156 1. RELEASE EXT VERB DISPLAY SYSTEM
 RO157 B. PROCEED
 RO158 1. COARSE ALIGN TO THE EXISTING THETAD'S (ICDRK2).
 RO168 C. ENTER
 RO169 1. COARSE ALIGN TO THE LOADED THETAD'S (ICDRK2).
 RO170 ICDRK2
 RO171 1. RE-DISPLAY VERB 41.
 RO172 2. EXECUTE IMUCDARS (IMU COARSE ALIGN).
 RO173 3. EXECUTE IMUSTALL (ALLOW TIME FOR DATA TRANSFER).
 RO174 4. RELEASE EXT VERB DISPLAY SYSTEM.
 RO175 CASE 2 NOUN 72 (RCDU ANGLES)
 RO1755 EXIT WITH DP ERROR IF SOMEONE IS USING EITHER RADAR.
 RO176 5. DISPLAY FLASHING V24,N73 (LOAD NEW RR TFUNION ANGLE AND NEW SHAFT ANGLE).
 RO178 RESPONSES
 RO179 A. TERMINATE
 RO180 1. RELEASE EXT VERB DISPLAY SYS.
 RO181 B. PROCEED OR ENTER
 RO182 1. EXECUTE AURLOKON (ASK OPERATOR FOR LOCK-ON REQUIREMENTS).
 RO184 2. RE-DISPLAY VERB 41.
 RO185 3. SCHEDULE RKDESK2 WITH PRIORITY 20.
 RO186 4. RELEASE EXT VERB DISPLAY SYS.
 RO187 AURLOKON
 RO188 1. FLASH V04 N12 R1 = 00006 R2 = 00002
 RO189 RESPONSES
 RO190 A. TERMINATE
 RO194 B. PROCEED
 RO195 1. RESET LOCK-ON SWITCH
 RO1951 2. SET CONTINUOUS DESIGNATE FLAG
 RO1952 3. DISABLE R25
 RO196 C. V22 E 1 E, R1 = 00001, PROCEED
 RO197 1. SET LOCK-ON SWITCH
 O198 REF 2 LAST 265 43,2171 0 2174 1 VBCOARK TC OP/INERT
 O199 REF 1 43,2172 0 2205 1 TC IMUCOARK RETURN HERE IF NOUN = ICDU(20)
 O200 REF 1 43,2173 0 2227 1 TC PRODSHKK RETURN HERE IF NOUN = RCDU(72)
 RO201 RETURNS TO L+1 IF IMU OR L+2 IF PR.
 O202 REF 3 LAST 263 43,2174 4 6007 1 OP/INERT CS OCT24
 O203 REF 2 LAST 222 43,2175 6 1002 1 AD NOUNREG
 O204 43,2176 0 0006 1 EXTEND

L EXTENDED VERBS

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0205	REF	2	LAST	264	43,2177	1 6742 1	BZF	TCQ	IF = 20.
0207	REF	1			43,2200	6 2204 0	AD	RRIMUDIF	-52
0208					43,2201	0 0006 1	EXTEND		
0209	REF	2	LAST	157	43,2202	1 6737 0	BZF	G+1	
0210	REF	15	LAST	264	43,2203	0 2120 0	TC	ALH/END	ILLEGAL.
0211					43,2204	77713 1	RRIMUDIF	DEC	-52
0212	REF	2	LAST	265	43,2205	0 2375 1	IMUCOARK	TC	CKMODCAD
0214	REF	1			43,2206	0 2076 1	TC	TESTXACT	COARSE ALIGN FROM KEYBOARD.
0215	REF	1			43,2207	3 2225 0	CAF	VNLODCDU	CALL FOR THETA LOAD
0216	REF	19	LAST	265	43,2210	0 4616 1	TC	BANKCALL	
0217	REF	1			43,2211	20334 1	CADR	GOXDSPF	
0218	REF	1			43,2212	0 5472 0	TC	TERMEXTV	
0219					43,2213	1 2214 0	TCF	+1	
0220	REF	1			43,2214	3 2226 0	ICORR2	CAF	IMUCOARV
0221	REF	20	LAST	268	43,2215	0 4616 1	TC	BANKCALL	RE-DISPLAY COARSE ALIGN VERB.
0222	REF	2	LAST	207	43,2216	20620 1	CADR	EXDSPRET	
0223	REF	21	LAST	268	43,2217	0 4616 1	TC	BANKCALL	CALL MODE SWITCHING PROG
0224	REF	1			43,2220	17000 1	CADR	IMUCOARS	
0225	REF	22	LAST	268	43,2221	0 4616 1	TC	BANKCALL	STALL
0226	REF	3	LAST	265	43,2222	17716 1	CADR	IMUSTALL	
0227	REF	1			43,2223	0 5472 0	TC	ENDEXTVB	
0228	REF	2	LAST	268	43,2224	0 5472 0	TC	ENDEXTVB	
0229					43,2225	06226 1	VNLODCDU	VN	2522
0230					43,2226	12200 0	IMUCOARV	VN	4106

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P0231 DESIGNATE TO DESIRED GIMBAL ANGLES.

0232	REF	3	LAST	265	43,2227	0 2642 0	RRDESMBK	TC	RDRUSECK	
0234	REF	2	LAST	268	43,2230	0 2076 1		TC	TESTXACT	
0235	REF	3	LAST	228	43,2231	3 4745 0		CA	RNDVZBIT	IS P20 RUNNING?
0236	REF	18	LAST	231	43,2232	7 0074 0		MASK	FLAGWRDO	
0237	REF	65	LAST	263	43,2233	10 000 0		CCS	A	
0238	REF	1			43,2234	1 2114 0		TCF	XACTALM	OPERATOR ERROR IF IN P20
0239	REF	1			43,2235	4 2321 1		CS	DET42000	TERMINATE PRESENT DESIGNATION
0240					43,2236	0 0004 0		INHINT		RELINT DONE IN GOXDSPF
0241	REF	18	LAST	220	43,2237	7 0110 0		MASK	RADMODES	
0242	REF	19	LAST	269	43,2240	54 110 0		TS	RADMODES	
0243	REF	1			43,2241	3 2260 1		CAF	VNLDRCDU	ASK FOR GIMBAL ANGLES.
0244	REF	23	LAST	268	43,2242	0 4616 1		TC	BANKCALL	
0245	REF	2	LAST	268	43,2243	20334 1		CADR	GOXDSPF	
0246	REF	2	LAST	268	43,2244	0 5472 0		TC	TERMEXTV	
0247					43,2245	1 2241 0		TCF	-4	V33
0248	REF	24	LAST	269	43,2246	0 4616 1		TC	BANKCALL	ASK OP FOR LOCK ON REQUIREMENTS.
0249	REF	1			43,2247	46000 0		CADR	AURLOKON	
0250	REF	1			43,2250	3 2226 0		CAF	OPTCOARV	RE-DISPLAY OUR OWN VERB
0251	REF	25	LAST	269	43,2251	0 4616 1		TC	BANKCALL	
0252	REF	3	LAST	268	43,2252	20620 1		CADR	EXDSPRET	
0253	REF	1			43,2253	3 4736 1		CAF	PRIB20	
0254	REF	3	LAST	244	43,2254	0 5105 0		TC	FINDVAC	
0255	REF	6	LAST	240	E7,1456			EBANK	LOSCOUNT	
0256	REF	1			43,2255	02261 0		2CAGR	RRDESK2	
0256	REF	1			43,2256	66107 1				
0257	REF	3	LAST	269	43,2257	1 5472 1		TCF	TERMEXTV	FREES DISPLAY.
0258					43,2260	06111 0	VNLDRCDU VN	2473		
0259	REF	2	LAST	268	43,2226		OPTCOARV	EQUALS	IMUCOARV	DIFFERENT NOUNS.
0260	REF	26	LAST	269	43,2261	0 4616 1	RRDESK2	TC	BANKCALL	
0261	REF	1			43,2262	52475 0		CADR	RRDESMB	
0262					43,2263	0 2264 0		TC	+1	DUMMY NEEDED SINCE DESRETRN DOES INCR
02621	REF	9	LAST	221	43,2264	3 0167 1		CA	PRIORITY	
02622	REF	5	LAST	258	43,2265	7 5004 1		MASK	LOW9	
02623	REF	66	LAST	269	43,2266	10 000 0		CCS	A	
02624	REF	67	LAST	269	43,2267	50 000 1		INDEX	A	
02625	REF	68	LAST	269	43,2270	54 000 0		TS	A	RELEASE THIS JOBS VAC AREA.
02626					43,2271	4 0000 0		CON		INSURE ENDDFJOB DOES A NOVAC END (BZHF).
02627	REF	10	LAST	269	43,2272	26 167 0		ADS	PRIORITY	
0263	REF	27	LAST	269	43,2273	0 4616 1		TC	BANKCALL	WAIT FOR COMPLETION OF DESIGNATE
0264	REF	3	LAST	265	43,2274	17714 0		CADR	RADSTALL	

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0265					43,2275	0 2277 1		TC	+2	BADEND-NO LOCKON OR OUT OF LIMITS
0266	REF	4	LAST	239	43,2276	0 5155 0		TC	ENDOFJOB	GOODEND-LOCKON ACHIEVED
0267	REF	18	LAST	265	43,2277	0 5567 0		TC	ALARM	
0268					43,2300	00503 1		UCT	503	TURN ON ALARM LIGHT -503 DESIGNATE FAIL
0269	REF	5	LAST	270	43,2301	0 5155 0		TC	ENDOFJOB	
0270	REF	20	LAST	269	43,2302	10 110 0	RKDFSEND	CCS	RADMODES	TERMINATE CONTINUOUS DESIGNATE ONLY
0271	REF	7	LAST	266	43,2303	1 2121 0		TCF	GOPIN	
0272	REF	8	LAST	270	43,2304	1 2121 0		TCF	GOPIN	
0273					43,2305	1 2306 1		TCF	+1	
0274	REF	2	LAST	269	43,2306	4 2321 1		CS	OCT41000	BEGDES GOES TO ENDRADAR
0275					43,2307	0 0004 0		INHINT		RELINT DONE IN DOWNFLAG
0276	REF	21	LAST	270	43,2310	7 0110 0		MASK	RADMODES	
0277	REF	22	LAST	270	43,2311	54 110 0		TS	RADMODES	
02771	REF	3	LAST	230	43,2312	0 6011 1		TC	CLRADM00	
02773	REF	1			43,2313	3 4777 1		CAF	1SEC	
02774	REF	28	LAST	269	43,2314	0 4616 1		TC	BANKCALL	
02775	REF	3	LAST	208	43,2315	01735 1		CADR	DELAYJOB	
0278	REF	11	LAST	266	43,2316	0 5516 0		TC	DOWNFLAG	ENABLE R25 GIMBAL MONITOR
0279	REF	1			43,2317	00126 1		ADRES	NORRMON	
0280	REF	9	LAST	270	43,2320	1 2121 0		TCF	GOPIN	
0281					43,2321	41000 1	OCT41000	OLT	41000	CONTINUOUS DESIGNATE - DESIGNATE

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02812					23,2000		BANK	23	
02814	REF	1			23,2000		SETLOC	EXTVB1	
02816					23,2000		BANK		
02818	REF	1					COUNT*	\$\$/EXTVB	
0282	REF	1			23,2000	0 4645 1	AURLKON	TC	MAKECADR
0283	REF	2	LAST	103	23,2001	55'113 1	TS		DESRET
0284	REF	5	LAST	263	23,2002	3 4752 0	CAF		TWD
0285	REF	1			23,2003	55'052 0	TS		OPTIONX +1
0286	REF	5	LAST	258	23,2004	3 6242 0	CAF	SIX	OPTION CODE FOR V04N12
02862	REF	2	LAST	271	23,2005	55'051 0	TS		OPTIONX
02864	REF	1			23,2006	3 2037 1	-5	CAF	V04N1272
02866	REF	29	LAST	270	23,2007	0 4616 1	TC		R2 00001 LOCK-ON
02868	REF	1			23,2010	20353 0	CADR	GOMARKFR	
02869	REF	9	LAST	264	23,2011	1 5472 1	TCF	ENDEXT	V34
0287					23,2012	1 2017 1	TCF	+5	V33
0288					23,2013	1 2006 1	TCF	-5	V32
0289	REF	14	LAST	254	23,2014	3 4751 0	CAF	BIT3	
0290	REF	1			23,2015	0 5464 1	TC	BLANKET	
0291	REF	6	LAST	270	23,2016	0 5155 0	TC	ENDOFJOB	
0292	REF	3	LAST	271	23,2017	3 1052 1	+5	CA	OPTIONX +1
0293	REF	21	LAST	244	23,2020	7 4752 1	MASK	BIT2	
0294	REF	69	LAST	269	23,2021	10 000 0	CCS	A	
0295	REF	1			23,2022	1 2026 0	TCF	NOLOKON	
0296	REF	2	LAST	266	23,2023	0 5504 0	TC	UPFLAG	
0297	REF	1			23,2024	00012 1	ADRES	LKDHSW	
0298	REF	1			23,2025	1 2034 0	TCF	AURLKON1	
0299	REF	12	LAST	270	23,2026	0 5516 0	NOLOKON	TC	DOWNFLAG
02991	REF	2	LAST	271	23,2027	00012 1	ADRES	LKDHSW	IF NO LOCK-ON, SET BIT15 OF RADMODES TO INDICATE THAT CONTINUOUS DESIGNATION IS WANTED (TO BE TERMINATED BY V44.)
02992	REF	3	LAST	271	23,2030	0 5504 0	TC	UPFLAG	
02993	REF	1			23,2031	00264 1	ADRES	CDPSFLAG	
0302	REF	4	LAST	271	23,2032	0 5504 0	TC	UPFLAG	SET NO RP ANGLE MONITOR FLAG.
0303	REF	2	LAST	270	23,2033	00126 1	ADRES	NORMON	(DISABLE R25 RR GIMBAL MONITOR IN T4RUPT
0304					23,2034	0 0003 1	AURLKON1	PELINT	
0305	REF	3	LAST	271	23,2035	3 1113 0	CA	DESRET	
0306	REF	1			23,2036	1 4640 0	TCF	BANKJUMP	
03064					23,2037	01014 0	V04N1272	VN	412
03065					23,2040	77757 1	-LOKONFG	UCT	-20
03066					43,2322		BANK	-43	
03067	REF	2	LAST	262	43,2000		SETLOC	EXTVERBS	
03068					43,2322		BANK		
03069	REF	2	LAST	262 TO 271	210	210*	COUNT*	\$\$/EXTVB	
0307	REF	5	LAST	271	43,2322	0 5504 0	LRON	TC	UPFLAG PERMIT INCORPORATION OF LR DATA V57

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0308	REF	1			43,2323	00254 1
0309	REF	10	LAST	270	43,2324	1 2121 0

ADRES	LRINH
TCF	GOPIN

0310	REF	13	LAST	271	43,2325	0 5516 0	LROFF
0311	REF	2	LAST	272	43,2326	00254 1	
0312	REF	11	LAST	272	43,2327	1 2121 0	

TC	DUMPFLAG
ADRES	LRINH
TCF	GOPIN

INHIBIT INCORPORATION OF LR DATA V58

031297 REF 4 LAST 262 E5,1737

EBANK= HGC

L EXTENDED VERBS

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PO313 IMUFINEX VERB 42 DESCRIPTION
 R0314 FINE ALIGN IMU
 R0315 1. REQUIRE EXT VERB DISPLAY AVAILABLE AND SET BUSY FLAG OR TURN ON OPER ERROR AND GO TO PINBRVCH.
 R0317 2. DISPLAY FLASHING V25.N93....LOAD DELTA GYRD ANGLES....
 R0318 RESPONSES
 R0319 A. TERMINATE
 R0320 1. RELEASE EXT VERB DISPLAY SYSTEM.
 R0321 B. PROCEED OR ENTER
 R0322 1. RE-DISPLAY VERB 42
 R0323 2. EXECUTE IMUFINEX (IMU FIVE ALIGN MODE SWITCHING).
 R0324 3. EXECUTE IMUSTALL (ALLOW FOR DATA TRANSFER)
 R0325 A. FAILED
 R0326 1. RELEASE EXT VERB DISPLAY SYSTEM.
 R0327 B. GOOD
 R0328 1. EXECUTE IMUPULSE (TORQUE PIGS).
 R0329 2. EXECUTE IMUSTALL AND RELEASE EXT VERB DISPLAY SYSTEM.

0331	REF	3	LAST	268	43,2330	0	2375	1	IMUFINEX	TC	CKMDCAD	
0332	REF	3	LAST	269	43,2331	0	2076	1		TC	TESTXALT	FINE ALIGN WITH GYRO TORQUING.
0333	REF	1			43,2332	3	2357	1		CAF	VNLDGYR	CALL FOR LOAD OF GYRO COMMANDS
0334	REF	30	LAST	271	43,2333	0	4616	1		TC	BANKCALL	
0335	REF	3	LAST	269	43,2334	20334	1			CADR	GOXDSPF	
0336	REF	4	LAST	269	43,2335	0	5472	0		TC	TEREXTV	
0337					43,2336	0	2337	1		TC	+1	PROCEED WITHOUT A LOAD
0338	REF	1			43,2337	3	2360	0		CAF	IMUFINEX	RE-DISPLAY OUR OWN VERB
0339	REF	31	LAST	273	43,2340	0	4616	1		TC	BANKCALL	
0340	REF	4	LAST	269	43,2341	20620	1			CADR	EXDSPRET	
0341	REF	32	LAST	273	43,2342	0	4616	1		TC	BANKCALL	CALL MODE SWITCH PROG
0342	REF	1			43,2343	17210	1			CADR	IMUFINEX	
0343	REF	33	LAST	273	43,2344	0	4616	1		TC	BANKCALL	HIBERNATION
0344	REF	4	LAST	268	43,2345	17716	1			CADR	IMUSTALL	
0345	REF	3	LAST	268	43,2346	0	5472	0		TC	ENDEXTVB	
0346	REF	1			43,2347	3	2356	0	FINEK2	CAF	LGYROBIN	PINBALL LEFT COMMANDS IN DGC REGISTERS
0347	REF	34	LAST	273	43,2350	0	4616	1		TC	BANKCALL	
0348	REF	1			43,2351	17323	0			CADR	IMUPULSE	
0349	REF	35	LAST	273	43,2352	0	4616	1		TC	BANKCALL	WAIT FOR PULSES TO GET OUT.
0350	REF	5	LAST	273	43,2353	17716	1			CADR	IMUSTALL	
0351	REF	4	LAST	273	43,2354	0	5472	0		TC	ENDEXTVB	
0352	REF	5	LAST	273	43,2355	0	5472	0		TC	ENDEXTVB	
0353	REF	5	LAST	272	43,2356	02737	0		LGYROBIN	ECADR	GDC	
0354					43,2357	06335	1		VNLDGYR	VN	2593	
0355					43,2360	12400	0		IMUFINEX	VN	4700	
R0356					GOLOADLV	VERB 50						
R0357					AND OTHER PLEASE							

L EXTENDED VERBS

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R0358

DO SOMETHING VERBS

R0359

PLEASE PERFORM, MARK, CALIBRATE, ETC.

R0360

1. PRESSING ENTER ON DISK INDICATES REQUESTED ACTION HAS BEEN PERFORMED, AND THE PROGRAM DOES THE

R0362

SAME RECALL AS A COMPLETED LOAD.

R0363

2. THE EXECUTION OF A VERB 33 (PROCEED WITHOUT DATA) INDICATES THE REQUESTED ACTION IS NOT DESIRED.

0365 REF 1 40.2000 SBANK= PINSUPER FOR LOADLV1 AND SHOWSUM CADR'S.

0366 REF 1 43.2361 0 4433-1 GULOADLV TC FLASHOFF

0367 REF 1 43.2362 3 4201 0 CAF PINSUPBT

0368 43.2363 0 0006 1 EXTEND

0369 REF 3 LAST 228 43.2364 01 007 1 WRITE SUPERBNK

0370 REF 8 LAST 264 43.2365 0 4635 0 TC POSTJUMP

0371 REF 1 43.2366 62001 1 CADR LOADLV1

R0372 VERB 47 - AGS INITIALIZATION - R47.

R0373 SEE LOG SECTION AGS INITIALIZATION FOR OTHER PERTINENT REMARKS.

0374 REF 4 LAST 273 43.2367 0 2076 1 V47TXACT TC TESTXACT NO OTHER EXTVERB.

0375 REF 1 43.2370 3 4740 0 CAF PRI04

0376 REF 4 LAST 269 43.2371 0 5105 0 TC FINDVAC

0377 REF 14 LAST 208 43.1600 EBANK= AGSBUFF

0378 REF 1 43.2372 02005 0 2CADR AGSINIT

0378 REF 1 43.2373 64064 1

0379 REF 7 LAST 271 43.2374 0 5155 0 TC ENDDFJOB

0380 REF 4 LAST 106 43.2375 3 1304 1 CKMODCAD CA MODECADR

0381 43.2376 0 0006 1 EXTEND

0382 REF 3 LAST 268 43.2377 1 6742 1 BZF TCQ

0383 REF 16 LAST 268 43.2400 0 2120 0 TC ALW/END SOMEBODY IS USING MODECADR SO EXIT

L EXTENDED VERBS

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PO384	ALINTIME	VERB 55	DESCRIPTION
RO385	REQUIRE POD OR POD--.		
RO386	1. SET EXT VERB DISPLAY BUSY FLAG.		
RO387	2. DISPLAY FLASHING V25.N24 (LOAD DELTA TIME FOR AGC CLOCK.		
RO388	3. REQUIRE EXECUTION OF VERB 23.		
RO389	4. ADD DELTA TIME, RECEIVED FROM INPUT REGISTER, TO THE COMPUTER TIME.		
RO391	5. RELEASE EXT VERB DISPLAY SYSTEM.		
0393	REF	5 LAST 274 43,2401 0 2076 1	ALINTIME TC TESTXACT
03931	REF	9 LAST 274 43,2402 0 4635 0	TC POSTJUMP NO ROOM IN 43
03932	REF	1 43,2403 64002 1	CADR R33
03933		42,2002	BANK 42
03934	REF	2 LAST 46 42,2000	SETLOC 58AND
03935		42,2002	BANK
03936	REF	1	COUNT# 33/R33
03937	REF	1 42,2002 3 5021 1 R33	CAP PRIOT
03938	REF	1 42,2003 0 5146 1	TC PPIUCHNG
0394	REF	1 42,2004 3 2034 1	CAP VNLODDT
0395	REF	36 LAST 273 42,2005 0 4616 1	TC BANKCALL
0396	REF	4 LAST 273 42,2006 20334 1	CADR GOXDSPF
0397	REF	10 LAST 271 42,2007 0 5472 0	TC ENDEXT
0398	REF	11 LAST 275 42,2010 0 5472 0	TC ENDEXT
0399	REF	1 42,2011 4 2033 1	CS DEC23
0400	REF	36 LAST 263 42,2012 6 0154 1	AD MPAC
0401		42,2013 0 0006 1	EXTEND
0402	REF	1 42,2014 1 2016 0	BZF UPDATIME
0403	REF	12 LAST 275 42,2015 0 5472 0	TC ENDEXT
0404		42,2016 0 0004 0	UPDATIME INHINT
0405	REF	26 LAST 264 42,2017 3 4755 1	CAP ZERO
0406	REF	37 LAST 275 42,2020 54 156 1	TS MPAC +2
0407	REF	21 LAST 258 42,2021 54 001 1	TS L
0408	REF	8 LAST 254 42,2022 52 025 1	DXCH TIME2
0409	REF	38 LAST 275 42,2023 52 155 1	DXCH MPAC
0410	REF	2 LAST 102 42,2024 53 052 0	DXCH DSPTM2 +1
0411	REF	39 LAST 275 42,2025 20 155 1	DAS MPAC
0412	REF	1 42,2026 0 7257 0	TC TPAGREE
0413	REF	40 LAST 275 42,2027 52 155 1	DXCH MPAC
0414	REF	9 LAST 275 42,2030 20 025 1	DAS TIME2
0415		42,2031 0 0003 1	RELINT
0416	REF	13 LAST 275 42,2032 0 5472 0	UPDTMEND TC ENDEXT
0417		42,2033 00027 1 DEC23	DEC 23
0418		42,2034 06230 0 VNLODDT	VN 2524

V25N24 FOR LOAD DELTA TIME

L EXTENDED VERBS

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P0419 SET UP FOR RADAR SAMPLING.

04191				42,2035				BANK	42	
04192	REF	3	LAST	271	43,2000			SETLOC	EXTVERBS	
04193					43,2404			BANK		
0420	REF	1			E4,1600			EBANK	= RSTACK	
0421	REF	1						COUNT*	45/R0477	
04211	REF	4	LAST	269	43,2404	0 2642 0	R77	TC	RDRUSECK	TRY TO AVOID THE 1210.
042111	REF	5	LAST	220	43,2405	3 0077 1		CA	FLAGWRD3	IS R04 RUNNING?
042112	REF	1			43,2406	7 4743 1		MASK	R04FLBIT	
042113	REF	70	LAST	271	43,2407	10 000 0		CCS	A	
042114	REF	17	LAST	274	43,2410	0 2120 0		TC	ALM/ENC	YES.
04214	REF	6	LAST	271	43,2411	0 5504 0		TC	UPFLAG	
04215	REF	1			43,2412	00117 0		ADRES	R77FLAG	
04216	REF	1			43,2413	1 2420 1		TCF	R04Z	
0422	REF	5	LAST	276	43,2414	0 2642 0	R04	TC	RDRUSECK	TRY TO AVOID THE 1210.
0423	REF	6	LAST	275	43,2415	0 2076 1		TC	TESTACT	
0424	REF	7	LAST	276	43,2416	0 5504 0		TC	UPFLAG	
0425	REF	3	LAST	229	43,2417	00063 1		ADRES	R04FLAG	SET R04FLAG FOR ALARMS
0426	REF	1			43,2420	3 4741 1	R04Z	CAF	EBANK4	
0427	REF	5	LAST	220	43,2421	54 003 0		TS	FBANK	
0428	REF	1			43,2422	3 2640 1		CAF	15EC+1	SAMPLE ONCE PER SECOND
0429	REF	1			43,2423	55 755 0		TS	RSAMPDT	
0430	REF	27	LAST	275	43,2424	3 4755 1		CAF	ZERO	
0431	REF	2	LAST	119	43,2425	55 754 1		TS	RTSTLOC	
0432	REF	1			43,2426	55 756 0		TS	RAILCNT	ZERO BAD SAMPLE COUNTER
0433					43,2427	0 0004 0		INHINT		
0434	REF	1			43,2430	4 2641 1		CS	LRPOSCAL	INITIALIZE
0435	REF	23	LAST	270	43,2431	7 0110 0		MASK	RADMODES	BIT9 LR RANGE LOW SCALE =0
0436	REF	24	LAST	276	43,2432	54 110 0		TS	RADMODES	BIT6 LR POS 1 =0
0437	REF	2	LAST	276	43,2433	3 2641 0		CAF	LRPOSCAL	BIT3 RR RANGE LOW SCALE =1
0438					43,2434	0 0006 1		EXTEND		
0439	REF	4	LAST	219	43,2435	02 033 0		FAND	CHANG3	
0440	REF	25	LAST	276	43,2436	26 110 0		ADS	RADMODES	
0441					43,2437	0 0003 1		RELINT		
04411	REF	6	LAST	276	43,2440	4 0077 0		CS	FLAGWRD3	CHECK R04FLAG R04 =1 R77 =0
04412	REF	2	LAST	276	43,2441	7 4743 1		MASK	R04FLBIT	
04413	REF	71	LAST	276	43,2442	10 000 0		CCS	A	
04414	REF	1			43,2443	1 2575 0		TCF	R04K	
0442	REF	12	LAST	261	43,2444	3 4753 1		CAF	ONE	INDICATES RENDEZVOUS DESIRED
0443	REF	4	LAST	271	43,2445	55 052 0		TS	OPTIONX +1	
0444	REF	15	LAST	271	43,2446	3 4751 0	R04A	CAF	BIT3	OPTION CODE FOR V04N12

EXTENDED VERBS

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04442	REF	5	LAST	276	43.2447	55'051 0	TS	OPTIONX	
04444	REF	1			43.2450	3 2635 0	CAF	V04N12X	
0445	REF	37	LAST	275	43.2451	0 4616 1	TC	BANKCALL	R2 00001 PENDEZVROS RADAR
0446	REF	2	LAST	271	43.2452	20353 0	CADR	GMARKFF	00002 LANDING RADAR
0447	REF	1			43.2453	1 2603 1	TCF	R04END	V34
0448					43.2454	1 2461 1	TCF	+5	V33
0449	REF	1			43.2455	1 2450 0	TCF	R04A +2	R2
04491	REF	16	LAST	276	43.2456	3 4751 0	CAF	BIT3	
04492	REF	2	LAST	271	43.2457	0 5464 1	TC	BLANKET	
04493	REF	8	LAST	274	43.2460	0 5155 0	TC	ENDOFJDB	
0450	REF	6	LAST	277	43.2461	3 1052 1	CA	OPTIONX +1	SAVE DESIRED OPTION RR =1 LR =2
0451	REF	2	LAST	119	43.2462	55'751 1	TS	RTSTDEX	
0452	REF	6	LAST	271	43.2463	3 6242 0	CAF	SIX	RR OR LR DESIRED
0453	REF	3	LAST	277	43.2464	7 1751 1	MASK	RTSTDEX	
0454	REF	72	LAST	276	43.2465	10 000 0	ECS	A	
0455	REF	1			43.2466	1 2577 1	TCF	R04L	LANDING RADAR
0456	REF	1			43.2467	55'753 0	TS	RTSTBASE	FOR RR BASE = 0. MAX = 1
0457	REF	22	LAST	271	43.2470	3 4752 0	CAF	BIT2	IS RR AUTO MODE DISCRETE PRESENT
0458					43.2471	0 0006 1	EXTEND		
0459	REF	5	LAST	276	43.2472	02 033 0	RAND	CHAN33	
0460					43.2473	0 0006 1	EXTEND		
0461	REF	1			43.2474	1 2505 1	BZF	R04C	YES
0462	REF	1			43.2475	3 2637 1	CAF	R04P04	REQUEST SELECTION OF RR AUTO MODE
04621	REF	2	LAST	102	43.2476	55'045 0	TS	DSPTM1	
04622	REF	1			43.2477	3 2636 0	CAF	V50N25X	
0463	REF	38	LAST	277	43.2500	0 4616 1	TC	BANKCALL	
0464	REF	2	LAST	252	43.2501	20345 1	CADR	GMARK4	
0465	REF	2	LAST	277	43.2502	1 2603 1	TCF	R04END	V34
0466	REF	1			43.2503	1 2470 1	TCF	R04B	V33
0467					43.2504	1 2475 1	TEF	-7	E
0468	REF	30	LAST	261	43.2505	3 4736 1	CAF	BIT14	ENABLE RR AUTO TRACKER
0469					43.2506	0 0006 1	EXTEND		
0470	REF	17	LAST	220	43.2507	05 012 1	WOR	CHAN12	
0471	REF	6	LAST	271	43.2510	3 4752 0	CAF	TWO	
0472	REF	1			43.2511	55'752 1	TS	RTSTHAX	FOR SEQUENTIAL STORAGE
0473	REF	8	LAST	253	43.2512	0 5203 0	TC	WAITLIST	
0474	REF	2	LAST	276	E4.1600		EBANK	RSTACK	
0475	REF	1			43.2513	02003 0	2CADR	RADSAMP	
0475	REF	1			43.2514	52104 0			
0476					43.2515	0 0003 1	REFINT		
04761	REF	7	LAST	276	43.2516	4 0077 0	CS	FLAGRDB	CHECK R04FLAG R04 =1 R77 =0
04762	REF	3	LAST	276	43.2517	7 4743 1	MASK	R04FLBIT	

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04763	REF	73	LAST	277	43.2520	10 000 0	CCS	A		
04764	REF	12	LAST	272	43.2521	1 2121 0	TCF	GOPIN	R77	
0477	REF	7	LAST	277	43.2522	3 6242 0	CAF	SIX	RR OR LR	
0478	REF	4	LAST	277	43.2523	7 1751 1	MASK	RTSTDEX		
0479	REF	74	LAST	278	43.2524	10 000 0	CCS	A		
0480	REF	1			43.2525	1 2542 1	TCF	R04LR	LR	
0481	REF	1			43.2526	3 2631 1	CAF	V16N72	DISPLAY RR CDB ANGLES (1/SEC)	
0482	REF	39	LAST	277	43.2527	0 4616 1	TC	BANKCALL	R1 + XXX.XX DEG	TRONNION
0483	REF	5	LAST	261	43.2530	20334 1	CADR	GOMARKF	R2 + XXX.XX DEG	SHAFT
0484	REF	3	LAST	277	43.2531	1 2603 1	TCF	R04END	V34	R3 BLANK
0485					43.2532	1 2534 0	TCF	+2	V33	
0486	REF	1			43.2533	1 2526 0	TCF	R04RR	V32	
0487	REF	1			43.2534	3 2632 1	CAF	V16N78	DISPLAY PR RANGE AND RANGE RATE (1/SEC)	
0488	REF	40	LAST	278	43.2535	0 4616 1	TC	BANKCALL	R1 +- XXX.XX NM	RANGE
0489	REF	6	LAST	278	43.2536	20334 1	CADR	GOMARKF	R2 +- XXXXX. FPS	RANGE RATE
0490	REF	4	LAST	278	43.2537	1 2603 1	TCF	R04END	V34	R3 BLANK
0491	REF	1			43.2540	1 2556 1	TCF	R04Y	V33	
0492	REF	2	LAST	278	43.2541	1 2526 0	TCF	R04RR	V32	
0493	REF	1			43.2542	3 2633 0	CAF	V16N66	DISPLAY LR RANGE AND POSITION (1/SEC)	
0494	REF	41	LAST	278	43.2543	0 4616 1	TC	BANKCALL	R1 +- XXXXX. FT	LR RANGE
0495	REF	7	LAST	278	43.2544	20334 1	CADR	GOMARKF	R2 + 0000X.	POS. NO.
0496	REF	5	LAST	278	43.2545	1 2603 1	TCF	R04END	V34	R3 BLANK
0497					43.2546	1 2550 1	TCF	+2	V33	
0498	REF	2	LAST	278	43.2547	1 2542 1	TCF	R04LR	V32	
0499	REF	1			43.2550	3 2634 1	CAF	V16N67	DISPLAY LR VELX. VELY. VELZ (1/SEC)	
0500	REF	42	LAST	278	43.2551	0 4616 1	TC	BANKCALL	R1 +- XXXXX. FPS	LR V(X)
0501	REF	8	LAST	278	43.2552	20334 1	CADR	GOMARKF	R2 +- XXXXX. FPS	LR V(Y)
0502	REF	6	LAST	278	43.2553	1 2603 1	TCF	R04END	V34	R3 +- XXXXX. FPS
0503	REF	2	LAST	278	43.2554	1 2556 1	TCF	R04Y	V33	
0504	REF	3	LAST	278	43.2555	1 2542 1	TCF	R04LR	V32	
0505	REF	28	LAST	276	43.2556	3 4755 1	CAF	ZERO	TO TERMINATE SAMPLING	
0506	REF	2	LAST	276	43.2557	551755 0	TS	ASAMPDT		
0507	REF	1			43.2560	3 5000 1	CAF	2 SEC	WAIT FOR LAST RADARUPT.	
0508	REF	43	LAST	278	43.2561	0 4616 1	TC	BANKCALL		
0509	REF	4	LAST	270	43.2562	01735 1	CADR	DELAYJOB		
0510	REF	2	LAST	276	43.2563	3 2640 1	CAF	1 SEC+1	SAMPLE ONCE PER SECOND	
0511	REF	3	LAST	278	43.2564	551755 0	TS	ASAMPDT		
0512	REF	29	LAST	278	43.2565	3 4755 1	CAF	ZERO	FOR STORING RESULTS	
0513	REF	3	LAST	276	43.2566	551754 1	TS	RTSTLOC		
0514	REF	8	LAST	278	43.2567	3 6242 0	CAF	SIX		
0515	REF	5	LAST	278	43.2570	7 1751 1	MASK	RTSTDEX		
0516	REF	75	LAST	278	43.2571	10 000 0	CCS	A		
0517	REF	13	LAST	276	43.2572	4 4753 0	CS	ONE	WAS LR	
0518	REF	7	LAST	277	43.2573	6 4752 0	AD	TWO	WAS RR	

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0519	REF	1		43,2574	1 2462 1	TCF	R04X -1	
05191	REF	1		43,2575	3 4766 1	R04K	CAF	250MS+1
05192	REF	4	LAST 278	43,2576	55 755 0		TS	RSAMPDT
0520	REF	8	LAST 278	43,2577	3 4752 0	R04L	CAF	TWO
0521	REF	2	LAST 277	43,2600	55 753 0		TS	RTSTBASE
0522	REF	9	LAST 278	43,2601	3 6242 0		CAF	SIX
0523	REF	2	LAST 277	43,2602	1 2511 1		TCF	R04C +4
0524	REF	30	LAST 278	43,2603	3 4755 1	R04END	CAF	ZERO
0525	REF	5	LAST 279	43,2604	55 755 0		TS	RSAMPDT
0526	REF	19	LAST 258	43,2605	3 4744 1		CAF	R178
0527	REF	44	LAST 278	43,2606	0 4616 1		TC	BANKCALL
0528	REF	5	LAST 278	43,2607	01735 1		CADR	DELAYJOB
0529				43,2610	0 0004 0		INHINT	
0530	REF	31	LAST 277	43,2611	4 4736 0		CS	R1714
0531				43,2612	0 0006 1		EXTEND	
0532	REF	18	LAST 277	43,2613	03 012 1		WAND	CHAN12
0533	REF	14	LAST 272	43,2614	0 5516 0		TC	DOWNFLAG
0534	REF	4	LAST 276	43,2615	00063 1		ADRES	R04FLAG
0535	REF	14	LAST 275	43,2616	0 5472 0		TC	ENDEXT
05351	REF	2	LAST 276	43,2617	3 4741 1	R77END	CAF	EBANK4
05352	REF	6	LAST 276	43,2620	54 003 0		TS	EBANK
05353	REF	31	LAST 279	43,2621	3 4755 1		CAF	ZERI
05354	REF	6	LAST 279	43,2622	55 755 0		TS	RSAMPDT
05355	REF	31	LAST 261	43,2623	3 4746 0		CAF	R176
05356	REF	45	LAST 279	43,2624	0 4616 1		TC	BANKCALL
05357	REF	6	LAST 279	43,2625	01735 1		CADR	DELAYJOB
05358	REF	15	LAST 279	43,2626	0 5516 0		TC	DOWNFLAG
053591	REF	2	LAST 276	43,2627	00117 0		ADRES	R77FLAG
053592	REF	13	LAST 278	43,2630	1 2121 0		TCF	GOPIN
0536				43,2631	04110 0	V16N72	VN	1672
0537				43,2632	04116 0	V16N78	VN	1676
0538				43,2633	04102 0	V16N66	VN	1666
0539				43,2634	04103 1	V16N67	VN	1667
05395				43,2635	01014 0	V04N12X	VN	412
05396				43,2636	14431 1	V50N25X	VN	5025
0540				43,2637	00201 1	201R04	OCT	00201
0541				43,2640	00145 1	1SEC+1	DEC	101
0542	REF	1		4766		250MS+1	EQUALS	CALLCODE
0543				43,2641	00444 0	LRPOSCAL	OCT	444

SAMPLE 4 LR COMPONENTS PER SECOND.

FOR LR BASE = 2. MAX = 3

 ZERO RSAMPDT
 TO TERMINATE SAMPLING
 WAIT 1.28 SECONDS FOR POSSIBLE
 PENDING RUPT.

DISABLE RP AUTO TRACKER

SIGNAL END OF R04.

TO TERMINATE SAMPLING

 WAIT 320 MS FOR POSSIBLE
 PENDING RUPT.

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054301	REF	8	LAST	277	43,2642	4 0077 0	RDRUSECK	CS	FLAGWRD3	IS R29 ON?
054302	REF	2	LAST	220	43,2643	7 4741 0		MASK	NR29FBIT	
054303	REF	76	LAST	278	43,2644	10 000 0		CCS	A	
054304	REF	18	LAST	276	43,2645	0 2120 0		TC	ALM/END	YES
054305	REF	10	LAST	220	43,2646	3 0101 1		CA	FLAGWRD5	IS R77 RUNNING?
054306	REF	2	LAST	220	43,2647	7 4741 0		MASK	R77FLBIT	
054307	REF	77	LAST	280	43,2650	10 000 0		CCS	A	
054308	REF	19	LAST	280	43,2651	0 2120 0		TC	ALM/END	YES.
05431	REF	3	LAST	228	43,2652	4 0103 1		CS	FLAGWRD7	IS SERVICER RUNNING AND HENCE POSSIBLY
054315	REF	2	LAST	228	43,2653	7 4746 1		MASK	V37FLBIT	R12 USING THE LR?
05432	REF	78	LAST	280	43,2654	10 000 0		CCS	A	
054325	REF	1			43,2655	1 2662 0		TCF	CHECKRR	NO
05433	REF	2	LAST	229	43,2656	4 0107 0		CS	FLAGWRD11	YES, IS R12 ON?
054335	REF	2	LAST	229	43,2657	7 4735 0		MASK	LRBYBIT	
05434	REF	79	LAST	280	43,2660	10 000 0		CCS	A	
054345	REF	20	LAST	280	43,2661	0 2120 0		TC	ALM/END	YES
05435	REF	9	LAST	231	43,2662	4 0075 1	CHECKRR	CS	FLAGWRD1	IS THE TRACK FLAG SET AND HENCE POSSIBLY
054355	REF	1			43,2663	7 4747 0		MASK	TRACKBIT	P20 USING THE RR?
05436	REF	80	LAST	280	43,2664	10 000 0		CCS	A	
054365	REF	1			43,2665	1 2672 1		TCF	CHECKP22	NO, CHECK FOR P22.
054366	REF	19	LAST	269	43,2666	3 0074 1	CKRNOBIT	CA	FLAGWRD0	YES, BUT IS IT P25?
054367	REF	4	LAST	269	43,2667	7 4745 1		MASK	RNDVZBIT	
054368	REF	81	LAST	280	43,2670	10 000 0		CCS	A	
054369	REF	21	LAST	280	43,2671	0 2120 0		TC	ALM/END	
054372	REF	7	LAST	264	43,2672	4 1011 1	CHECKP22	CS	ADOREG	
054373	REF	1			43,2673	6 2677 0		AD	DEC2	
054374					43,2674	0 0006 1		EXTEND		
054375	REF	22	LAST	280	43,2675	1 2120 1		B7F	ALM/END	
054376	REF	24	LAST	263	43,2676	0 0002 0		TC	0	
054377					43,2677	00026 0	DEC22	DEC	22	
0544	REF	3	LAST	271	TD 275:	50 260*		COUNT*	33/EXTVR	
0545	REF	1			43,2700	0 2123 0	VB64	TC	CHKPD0H	DEMAND PROGRAM 00.
0546	REF	7	LAST	276	43,2701	0 2076 1		TC	TESTXACT	IF DISPLAY SYS. NOT BUSY, MAKE IT BUSY.
0547	REF	2	LAST	274	43,2702	3 4740 0		CAF	PRID4	
0548	REF	5	LAST	274	43,2703	0 5105 0		TC	FINOVAC	
0549	REF	3	LAST	118	E4,1600			EBANK=	ALPHA30	
0550	REF	1			43,2704	03606 1		ECADR	S-BANDANT	CALC., DISPLAY S-BAND ANTENNA ANGLES.
0550	REF	1			43,2705	64104 0				
0551	REF	9	LAST	277	43,2706	0 5155 0		TC	ENDOFJOB	

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PO552	IMUATTCK	VERB 43	DESCRIPTION
R0553	LOAD IMU ATTITUDE ERROR METERS		
R0554	1. REQUIRE PGO OR FRESH START.		
R0555	2. REQUIRE COARSE ALIGN ENABLE AND ZERO ICDU BITS OFF.		
R0556	3. REQUIRE THAT NEEDLES BE OFF.		
R0557	4. REQUEST LOAD OF N22 (VALUES TO BE DISPLAYED).		
R0558	5. ON PROCEED OR ENTER RE-DISPLAY V43 AND SEND PULSES.		
0559	REF 2	LAST 280	43,2707 0 2123 0 IMUATTCK TC CHKPODH VB 76 - LOAD IMU ATT. ERROR METERS
0560	REF 3	LAST 180	43,2710 3 4763 1 CAF BITS4&5 SEE IF COARSE ALIGN ENABLE AND ZERO ICDU
0561			43,2711 0 0006 1 EXTEND CDUS BITS ARE ON
0562	REF 19	LAST 279	43,2712 02 012 0 RAND CHAN12
0563	REF 82	LAST 280	43,2713 10 000 0 CCS A
0564	REF 23	LAST 280	43,2714 1 2120 1 TCF ALM/END NOT ALLOWED IF IMU COARSE OR ICDU ZERO ON
0565	REF 1		43,2715 3 4355 0 CAF BIT13-14 BOTH BITS 13 AND 14 MUST BE 1
0566			43,2716 0 0006 1 EXTEND INDICATING THE MODE SELECTED IS OFF.
0567	REF 1		43,2717 06 031 0 RXOR CHAN31
0568	REF 2	LAST 281	43,2720 7 4355 1 MASK BIT13-14
0569			43,2721 0 0006 1 EXTEND
0570			43,2722 1 2724 0 BZF +2 NEEDLES IS OFF.
0571	REF 24	LAST 281	43,2723 1 2120 1 TCF ALM/END EXIT. NEEDLES IS ON.
0572	REF 8	LAST 280	43,2724 0 2076 1 TC TESTXACT
0573	REF 2	LAST 268	43,2725 3 2225 0 CAF VNLODEDU
0574	REF 46	LAST 279	43,2726 0 4616 1 TC BANKCALL
0575	REF 5	LAST 275	43,2727 20334 1 CAOR GOXDSPF
0576	REF 15	LAST 279	43,2730 0 5472 0 TC ENDEXT V34
0577			43,2731 0 2732 0 TC +1
0578	REF 1		43,2732 3 2745 0 CAF V45R REDISPLAY OUR VERB.
0579	REF 47	LAST 281	43,2733 0 4616 1 TC BANKCALL
0580	REF 5	LAST 273	43,2734 20620 1 CAOR EXDSPRET
0581	REF 32	LAST 279	43,2735 3 4746 0 CAF BIT6
0582			43,2736 0 0006 1 EXTEND
0583	REF 20	LAST 281	43,2737 05 012 1 WOK CHAN12 ENABLE ERROR COUNTERS.
0584	REF 9	LAST 279	43,2740 3 4752 0 CAF TWO
0585	REF 9	LAST 277	43,2741 0 5203 0 TC WAITLIST PUT OUT COMMANDS IN .32 SECONDS.
0586	REF 4	LAST 99	0321 EBANK THETAD
0587	REF 1		43,2742 02035 0 2CADR ATTCK2
0587	REF 1		43,2743 64100 1
0588	REF 16	LAST 281	43,2744 1 5472 1 TCF ENDEXT
0589			42,2035 BANK 42
0590	REF 1		42,2000 SETLOC PINBALL3 SOMETHING IN B42.
0591			42,2035 BANK
0592	REF 1		COUNT+ 35/EXTVH

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0593 REF 10 LAST 281 42,2035 3 4752 0 ATTCK2 CAP TWO PUT OUT COMMANDS.
 0594 REF 25 LAST 280 42,2036 54 002 1 +1 TS 0 CDU WILL LIMIT EXCESS DATA.
 0595 REF 83 LAST 281 42,2037 50 000 1 INDEX A
 0596 REF 5 LAST 281 42,2040 3 0321 1 CA THETAD
 0597 42,2041 0 0006 1 EXTEND
 0598 REF 1 42,2042 7 2053 1 MP ATTSCALE
 0599 REF 26 LAST 282 42,2043 50 002 0 INDEX 0
 0600 REF 2 LAST 174 42,2044 56 050 1 XCH CDUXCHD
 0601 REF 27 LAST 282 42,2045 10 002 1 CCS 0
 0602 REF 2 LAST 281 42,2046 1 2036 1 TCF ATTCK2 +1

0603 REF 1 42,2047 3 7740 0 CAP 13,14,15
 0604 42,2050 0 0006 1 EXTEND
 0605 REF 6 LAST 220 42,2051 05 014 1 WOR CHAN14
 0606 REF 4 LAST 239 42,2052 1 5261 0 TCF TASKOVER LEAVE ERROR COUNTERS ENABLED.

06061 42,2053 03146 1 ATTSCALE DEC 0.1

0607 07,2667 BANK 7
 0608 REF 4 LAST 276 43,2000 SETLOC EXTVERBS
 0609 43,2745 BANK

0610 REF 4 LAST 280 TO 281: 37 297* COUNT# 14/EXTVE

0611 43,2745 12600 1 V43K VN 4300
 R0612 VB2PERF VEPB 82 DESCRIPTION
 R0613 REQUEST ORBIT PARAMETERS DISPLAY (R30)
 R0614 1. IF AVERAGE G IS OFF:
 R0615 FLASH DISPLAY V04N06. R2 INDICATES WHICH SHIP'S STATE VECTOR IS
 R0616 TO BE UPDATED. INITIAL CHOICE IS THIS SHIP (R2=1). ASTRONAUT
 R0617 CAN CHANGE TO OTHER SHIP BY V22EXE, WHERE X NOT EQ 1.
 R0618 SELECTED STATE VECTOR UPDATED BY THISPREC (OTHPREC).
 R0619 CALLS SR30.1 (WHICH CALLS TFFCONMU + TFFRP/RA) TO CALCULATE
 R0620 RPER (PERIGEE RADIUS), RAPO (APOGEE RADIUS), HPER (PERIGEE
 R0621 HEIGHT ABOVE LAUNCH PAD OR LUNAR LANDING SITE), HAPO (APOGEE
 R0622 HEIGHT AS ABOVE), TPER (TIME TO PERIGEE), TFF (TIME TO
 R0623 INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).
 R0624 FLASH MONITOR V16N44 (HAPO, HPER, TFF). TFF IS -59M59S IF IT WAS
 R0625 NOT COMPUTABLE, OTHERWISE IT INCREMENTS ONCE PER SECOND.
 R0626 ASTRONAUT HAS OPTION TO MONITOR TPER BY KEYING IN N 32 B.
 R0627 DISPLAY IS IN HMS. IS NEGATIVE (AS WAS TFF). AND INCREMENTS
 R0628 ONCE PER SECOND ONLY IF TFF DISPLAY WAS -59M59S.
 R0629

R0630 2. IF AVERAGE G IS ON:
 R0631 CALLS SR30.1 APPROX EVERY TWO SECS. STATE VECTOR IS ALWAYS
 R0632 FOR THIS VEHICLE. VB2 DOES NOT DISTURB STATE VECTOR. RESULTS
 R0633 OF SR30.1 ARE RAPO, RPER, HAPO, HPER, TPER, TFF.
 R0634 FLASH MONITOR V16N44 (HAPO, HPER, TFF).
 R0635 IF MODE IS P11, THEN CALL DELRSPL SO ASTRONAUT CAN MONITOR
 R0636 RESULTS BY N50E. SPLASH COMPUTATION DONE ONCE PER TWO SECS.

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0637	REF	9	LAST	281	43.2746	0 2076 1	V82PERF	TC	TESTXACT	
0638	REF	2	LAST	275	43.2747	3 5021 1	CAF	PRI07	LESS THAN LAMBERT. R30.V82	
0639	REF	2	LAST	275	43.2750	0 5146 1	TC	PRI0CHNG		
0640					43.2751	0 0006 1	EXTEND			
0641	REF	1			43.2752	3 2755 1	DCA	V82CON		
0642	REF	1			43.2753	0 5165 0	TC	SUPDXCHZ	V82CALL IN DIFF SUPERBANK FROM V82PERF	
0643	REF	2	LAST	117	E4.1716		EBANK	HAP0		
0644	REF	1			43.2754	03242 0	V82CON	2CADR	V82CALL	
0644	REF	1			43.2755	44104 1				

R0645	VB83PERF	VERB 83	DESCRIPTION
R0646			REQUEST RENDEZVOUS PARAMETER-DISPLAY (R31)
R0647			1. SET EXT-VERB-DISPLAY-BUSY-FLAG.
R0648			2. SCHEDULE R31CALL-WITH-PRIORITY-5.
R0649			A. DISPLAY
R0650			R1 RANGE
R0651			R2 RANGE-RATE
R0652			R3 -THETA

0653	REF	10	LAST	283	43.2756	0 2076 1	V83PERF	TC	TESTXACT
0654	REF	23	LAST	277	43.2757	3 4752 0	CAF	BIT2	
0655	REF	10	LAST	281	43.2760	0 5203 0	TC	WAITLIST	
0656	REF	1			E7.1611		EBANK	TSTAT	
0657	REF	1			43.2761	03674 1	2CADR	R31CALL	
0657	REF	1			43.2762	60107 1			
0658	REF	10	LAST	280	43.2763	0 5155 0	TC	ENDOFJOB	

R0659 VERB 89 DESCRIPTION RENDEZVOUS FINAL ATTITUDE ROUTINE (R63)

R0660 CALLED BY VERB 89 ENTER DURING P00. PRI0 10 USED. CALCULATES AND
 R0661 DISPLAYS FINAL F0A1 BALL ANGLES TO POINT LM +X OR +Z AXIS AT CSM.

R0662 1. KEY IN V 89 E ONLY IF IN PROG 00. IF NOT IN P00. OPERATOR ERROR AND
 R0663 EXIT-R63, OTHERWISE-CONTINUE.

R0664 2. IF IN P00. DO IMU STATUS CHECK ROUTINE (R02BOTH). IF IMU ON AND ITS
 R0665 ORIENTATION-KNOWN-TO-LGC. CONTINUE.

R0666 3. FLASH DISPLAY V 04 N 06. R2 INDICATES WHICH SPACECRAFT AXIS IS TO
 R0667 BE POINTED-AT-CSM. INITIAL CHOICE IS PREFERRED (+Z) AXIS (R2=1).
 R0668 ASTRONAUT CAN CHANGE TO (+X) AXIS (R2 NOT = 1) BY V 22 E 2 F. CONTINUE
 R0669 AFTER-KEYING-IN-PROCEED.

R0670 4. BOTH VEHICLE STATE VECTORS UPDATED BY CONIC EQS.

R0671 5. HALF MAGNITUDE UNIT LOS VECTOR (IN STABLE MEMBER COORDINATES) AND

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R0672 HALF MAGNITUDE UNIT SPACECRAFT AXIS VECTOR (IN BODY COORDINATES)
 R0673 PREPARED FOR VECPOINT.

R0674 6. GIMBAL ANGLES FROM VECPOINT TRANSFORMED INTO F0A1 BALL ANGLES BY
 R0675 BALLANGS. FLASH DISPLAY V D6 N 18 AND AWAIT RESPONSE.

R0676 7. RECYCLE - RETURN TO STEP 4.

R0677 - TERMINATE - EXIT R63.

R0678 - PROCEED - RESET 3AXISFLG AND CALL R060EM FOR ATTITUDE MANEUVER.

0679	REF	3	LAST	281	43.2764	0 2123 0	V89PERF	TC	CHKPOOH
0680	REF	11	LAST	283	43.2765	0 2076 1		TC	TESTXACT
0681	REF	-1			43.2766	3 4737 0		CAF	PRI010
0682	REF	-6	LAST	280	43.2767	0 5105 0		TC	FINDVAC
0683	REF	-3	LAST	118	E4.1606			EBANK	RONE
0684	REF	-1			43.2770	02022 0		ZCAOR	V89CALL
0684	REF	-1			43.2771	54104 0			
0685	REF	11	LAST	283	43.2772	0 5155 0		TC	ENDOFJOB

R0686 V90PERF VERB 90 DESCRIPTION
 R0687 REQUEST RENDEZVOUS OUT-OF-PLANE DISPLAY (R36)
 R0688 1. SET EXT-VERB DISPLAY BUSY FLAG.
 R0689 2. SCHEDULE R36 CALL WITH PRIORITY 10
 R0690 A. DISPLAY
 R0691 TIME OF EVENT - HOURS , MINUTES , SECONDS
 R0692 Y OUT-OF-PLANE POSITION - NAUTICAL MILES
 R0693 YDOT OUT-OF-PLANE VELOCITY - FEET/SECOND
 R0694 PSI ANGLE BTW LINE OF SIGHT AND FORWARD
 R0695 DIRECTION VECTOR IN HORIZONTAL PLANE - DEGREES

0696	REF	12	LAST	284	43.2773	0 2076 1	V90PERF	TC	TESTXACT
0697	REF	3	LAST	283	43.2774	3 5021 1		CAF	PR107 R36.V90
0698	REF	7	LAST	284	43.2775	0 5105 0		TC	FINDVAC
0699	REF	2	LAST	118	E4.1606			EBANK	RPASS36
0700	REF	1			43.2776	02656 0		ZCAOR	R36
0700	REF	-1			43.2777	10104 0			
0701	REF	12	LAST	284	43.3000	1 5155 1		TCF	ENDOFJOB

R0702 MINIMP VERB 76 DESCRIPTION
 R0703 MINIMUM IMPULSE MODE
 R0704 1. SET MINIMUM IMPULSE RHC MODE FLAG TO 1.

0705					43.3001	0 0004 0	MINIMP	INHINT	
0706	REF	4	LAST	219	43.3002	4 0111 1		LS	DAPROOLS
0707	REF	1			43.3003	7 4745 0		MASK	PULSES
0708	REF	5	LAST	284	43.3004	26 111 1		ADS	DAPROOLS
0709	REF	14	LAST	279	43.3005	1 2121 0		TCF	GOPIN

PULSES = 1 INDICATES MIN IMP MODE
 RETURN VIA PINBRICH

R0710 NDMINIMP VERB 77 DESCRIPTION
 R0711 RATE COMMAND MODE

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R0712 1. SET MINIMUM IMPULSE RHC MODE FLAG TO 0. (ZERO INDICATES NOT MINIMUM IMPULSE MODE.).
 R0714 2. MOVE CDUX,CDUY,CDUZ INTO CDUXD,CDUYD,CDUZD.

0718				43,3006	0 0004 0	NOMINIMP	INHINT		
0719	REF	2	LAST	284	43,3007	4 4735 0	CS	PULSES	
0720	REF	6	LAST	284	43,3010	7 0111 1	MASK	DAPB00LS	
0721	REF	7	LAST	285	43,3011	54 111 1	TS	DAPB00LS	PULSES = 0 NOT IN MINIMUM IMPULSE MODE
0722	REF	11	LAST	245	43,3012	0 4674 0	TC	IBNKCALL	
0723	REF	1			43,3013	40153 1	CADR	ZATTEROR	
0724	REF	15	LAST	284	43,3014	0 2121 1	TC	GOPIN	

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P0738 CREWMANU VERB 49 DESCRIPTION

R0739 START AUTOMATIC ATTITUDE MANEUVER

R0740 1. REQUIRE PROGRAM 00 ACTIVE.

R0741 2. SET EXT VERB DISPLAY BUSY FLAG.

R0742 3. SCHEDULE R62DISP WITH PRIORITY 10.

R0743 4. RELEASE EXT VERB DISPLAY.

R0744 R62DISP

R0745 1. DISPLAY FLASHING VO6,N22.

R0746 RESPONSES

R0747 A. TERMINATE

R0748 1. GO TO GOTOPDOH.

R0749 B. PROCEED

R0750 1. SET 3AXISFLG TO INDICATE MANEUVER IS SPECIFIED BY 3 AXES.

R0752 2. EXECUTE R6DLEM (ATTITUDE MANEUVER).

R0753 C. ENTER

R0754 1. REPEAT FLASHING VO6,N22.

0755	REF	4	LAST	284	43.3015	0 2123 0	CREWMANU TC	CHKPOOH	DEMAND POD
0756	REF	13	LAST	284	43.3016	0 2076 1	TC	TESTXACT	
0757	REF	2	LAST	284	43.3017	3 4737 0	CAF	PRIMO	
0758	REF	8	LAST	284	43.3020	0 5105 0	TC	FINDVAC	
0759	REF	2	LAST	135	F6.1676		EBANK=	RCDU	
0760	REF	1			43.3021	02103 1	2CADR	R62DISP	
0760	REF	1			43.3022	46106 1			
0761	REF	13	LAST	284	43.3023	0 5155 0	TC	ENDOFJOB	

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P0762 TRMTRACK VERB 56 DESCRIPTION
 R0763 TERMINATE TRACKING (P20 AND P25).
 R0764 1. KNOCK DOWN RENDEZVOUS, TRACK, AND UPDATE FLAGS.
 R0765 2. REQUIRE P20 OR P25 NOT RUNNING ALONE OR GO TO GOTOPDOWN (REQUEST PROGRAM 00).
 R0767 3. SCHEDULE V56TOVAC WITH PRIORITY 30.

R0768 V56TOVAC
 R0769 1. EXECUTE INTSTALL (IF INTEGRATION IS RUNNING, STALL UNTIL IT IS FINISHED.).
 R0771 2. ZERO GROUP 2 TO HALT P20.
 R0772 3. TRANSFER CONTROL TO GOPROG2 (SOFTWARE RESTART).

0773	REF	1		43,3024	3 3044 1	TRMTRACK	CA	BITS9+7	IS REND OR P25 FLAG ON
0774	REF	20	LAST	280	43,3025	7 0074 0	MASK	FLAGWRD0	
0775					43,3026	0 0006 1	EXTEND		
0776	REF	16	LAST	285	43,3027	1 2121 0	BZF	GOPIN	NO
0777	REF	16	LAST	279	43,3030	0 5516 0	TC	DOWNFLAG	
0778	REF	1			43,3031	00010 0	ADRES	ENDVZFLG	
0779	REF	17	LAST	287	43,3032	0 5516 0	TC	DOWNFLAG	
0780	REF	1			43,3033	00006 1	ADRES	P25FLAG	
07803	REF	18	LAST	287	43,3034	0 5516 0	TC	DOWNFLAG	ENSURE SEARCH FLAG IS OFF
07806	REF	1			43,3035	00037 0	ADRES	SRCHOPTN	
0781	REF	2	LAST	280	43,3036	3 4747 1	CA	TRACKBIT	IS TRACK FLAG ON?
0782	REF	10	LAST	280	43,3037	7 0075 1	MASK	FLAGWRD1	
0783					43,3040	0 0006 1	EXTEND		
0784	REF	17	LAST	287	43,3041	1 2121 0	BZF	GOPIN	
07841	REF	10	LAST	275	43,3042	0 4635 0	TC	POSTJUMP	
07842	REF	1			43,3043	64054 1	CADR	TRMTRAK1	
078425					43,3044	00500 1	BITS9+7	DCT	500
07843	REF	3	LAST	275	42,2000		SETLOC	SBAND	BANK 42
07844					42,2054		BANK		
07845	REF	2	LAST	281	TC 282:	15 15*	COUNT*	11/EXTVB	
0785	REF	19	LAST	287	42,2054	0 5516 0	TRMTRAK1	TC	DOWNFLAG
0786	REF	1			42,2055	00027 1	ADRES	UPDATEFLG	UPDATE FLAG DOWN
0787	REF	20	LAST	287	42,2056	0 5516 0	TC	DOWNFLAG	
0788	REF	1			42,2057	00031 0	ADRES	TRACKFLG	TRACK FLAG DOWN
0789	REF	21	LAST	287	42,2060	0 5516 0	TC	DOWNFLAG	
0790	REF	2	LAST	231	42,2061	00007 0	ADRES	1405E	
0791	REF	6	LAST	252	42,2062	0 6037 0	TC	INTPRET	
0792					42,2063	77624 1	CALL		
0793	REF	3	LAST	236	42,2064	27414 0		INTSTALL	DONT INTERRUPT INTEGRATION

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0794				42.2065	77776 1	EXIT	
0795	REF	2	LAST	228	42.2066 0 5353 1	TC PHASCHNG	
0796					42.2067 00002 0	UCT 2	KILL GROUP 2 TO HALT P20 ACTIVITY
0797					42.2070 0 0004 0	INHINT	
0798	REF	12	LAST	285	42.2071 0 4674 0	TC IBKCALL	ZERO THE COMMANDED RATES TO STOP
0799	REF	1			42.2072 40165 1	CADR STOPRATE	MANEUVER
0800	REF	13	LAST	288	42.2073 0 4674 0	TC IBKCALL	
0801	REF	1			42.2074 40123 0	CADR RESTORDB	
0802	REF	4	LAST	270	42.2075 0 6011 1	TC CLRADM00	CLEAR BITS 10 + 15 OF RADMODES.
0804	REF	32	LAST	279	42.2076 4 4736 0	CS BIT14	DISABLE LOCKON
0805					42.2077 0 0006 1	EXTEND	
0806	REF	21	LAST	281	42.2100 03 012 1	WAND CHAN12	
0807	REF	11	LAST	287	42.2101 0 4635 0	TC POSTJUMP	
0808	REF	2	LAST	230	42.2102 12770 1	CADR G0PRUG2	CAUSE RESTART.

R0810 DNEEDUMP VERB 74 DESCRIPTION
 R0811 INITIALIZE DOWN-TELEMETRY PROGRAM FOR ERASABLE MEMORY DUMP.
 R0812 1. SET EXT VERB DISPLAY BUSY FLAG.
 R0813 2. REPLACE CURRENT DOWNLIST WITH ERASABLE MEMORY.
 R0814 3. RELEASE EXT VERB DISPLAY.

08145	REF	5	LAST	282	43.2000	SETLOC EXTVERBS	
08146					43.3045	BANK	
08147	REF	5	LAST	282 TO 287:	64 361*	COUNT* 33/EXTVB	
0815					0400	EBANK= 400	
0816	REF	1			43.3045 3 3050 1	DNEDUMP CAF LDNDUMPI	
0817	REF	3	LAST	219	43.3046 54 335 0	TS DNTAGDT0	
0818	REF	18	LAST	287	43.3047 0 2121 1	TC G0PIN	
0819	REF	2	LAST	262	43.3045	V74 EQUALS DNEEDUMP	
0820	REF	1			43.3050 03707 1	LDNDUMPI REMADR DNDUMPI	

R0821 LEMVEC VERB 80 DESCRIPTION
 R0822 UPDATE LEM STATE VECTOR
 R0823 RESET VEHUPFLG TO 0

0825	REF	22	LAST	287	43.3051 0 5516 0	LEMVEC TC DOWNFLAG	
0826	REF	1			43.3052 00026 0	ADRES VEHUPFLG	VB 80 - VEHUPFLG DOWN INDICATES LEM
0827	REF	1			43.3053 0 3056 1	TC NOUPDOWN	
R0828						CSMVEC VERB 81	DESCRIPTION
R0829						UPDATE CSM STATE VECTOR	

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R0830 SET VEHUPFLG TO 1

0832	REF	8	LAST	276	43,3054	0 5504 0	CSMVEC	TC	UPFLAG	
0833	REF	2	LAST	288	43,3055	00026 0		ADRES	VEHUPFLG	VB 81 - VEHUPFLG UP INDICATES LSM
0834	REF	23	LAST	288	43,3056	0 5516 0	NOUPDOWN	TC	DOWNFLAG	
0835	REF	1			43,3057	00030 1		ADRES	NOUPFLAG	
0836	REF	19	LAST	288	43,3060	1 2121 0		TC	GOPIN	

R0842 UPDATOFF VERB95 DESCRIPTION
 R0843 INHIBIT STATE VECTOR UPDATES BY INCORP
 R0844 SET NOUPFLAG TO 1

0845	REF	9	LAST	289	43,3061	0 5504 0	UPDATOFF	TC	UPFLAG	VB 95 SET NOUPFLAG
0846	REF	2	LAST	289	43,3062	00030 1		ADRES	NOUPFLAG	
0847	REF	20	LAST	289	43,3063	0 2121 1		TC	GOPIN	

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P0848 SYSTEST VERB 92 DESCRIPTION

R0849 OPERATE IMU PERFORMANCE TEST.

R0850 1. REQUIRE PROGRAM 00 OF TURN ON OPERATOR ERROR.

R0851 2. SET EXT VERB BUSY FLAG.

0852 REF 2 LAST 127 E5.1417 EBANK= OPLACE

0853 REF 5 LAST 286 43.3064 0 2123 0 SYSTEST TC CHKPODH DEMAND POD

0854 REF 14 LAST 286 43.3065 0 2076 1 TC TESTXACT

0855 REF 1 43.3066 3 7710 0 CAF PRI022

0856 REF 9 LAST 286 43.3067 0 5105 0 TC FINDVAC

0857 REF 3 LAST 290 E5.1417 EBANK= OPLACE

0858 REF 1 37.2000 SBANK= IMUSUPER

0859 REF 1 43.3070 02002 1 ZCADR REDD

0859 REF 1 43.3071 76065 0

0860 REF 14 LAST 286 43.3072 0 5155 0 TC ENDDFJOB

R0861 VERB 93 CLEAR RENDWFLG, CAUSES W-MATRIX TO BE RE-INITIALIZED.

0862 43.3073 0 0004 0 WHATRXNG INHINT

0863 REF 1 43.3074 4 4753 0 CS RENDWBIT

0864 REF 11 LAST 280 43.3075 7 0101 0 MASK FLAGWRD5

0865 REF 12 LAST 290 43.3076 54 101 0 TS FLAGWRD5

0866 REF 21 LAST 289 43.3077 0 2121 1 TC GOPIV

0867 REF 1 43.3100 GUSHOSUM EQUALS SHOWSUM

0868 REF 6 LAST 290 43.3100 0 2123 0 SHOWSUM TC CHKPODH *

0869 REF 15 LAST 290 43.3101 0 2076 1 TC TESTXACT *

0870 REF 4 LAST 284 43.3102 3 5021 1 CAF PRI07 ALLOW OTHER CHARINS.

0871 REF 3 LAST 283 43.3103 0 5146 1 TC PRI0CHNG

0872 REF 1 43.3104 3 4753 1 CAF S+1 *

0873 REF 2 LAST 108 43.3105 55 376 0 TS SKEEP6 * SHOWSUM OPTION

0874 REF 1 43.3106 3 4755 1 CAF S+ZERD *

0875 REF 3 LAST 212 43.3107 55 362 0 TS SNODE * TURN OFF SELF-CHECK

0876 REF 1 43.3110 3 3245 1 CA SELFADRS *

0877 REF 3 LAST 222 43.3111 55 361 0 TS SELFRET *

0878 REF 1 43.3112 0 3522 1 TC STSHOSUM * ENTER ROPECHK

0879 REF 2 LAST 108 43.3113 23 372 0 SDISPLAY LXCH SKEEP2 * BANK # FOR DISPLAY

0880 REF 2 LAST 108 43.3114 23 373 1 LXCH SKEEP3 * BUGGER WORD FOR DISPLAY

0881 REF 1 43.3115 3 3244 0 NDKILL CA ADRS1 *

0882 REF 41 LAST 275 43.3116 54 156 1 TS MPAC +2 *

0883 REF 1 43.3117 3 3130 0 CA VNCON * 0501

0884 REF 48 LAST 281 43.3120 0 4616 1 TC BANKCALL *

0885 REF 6 LAST 281 43.3121 20334 1 CADR GOXDSRF *

0886 43.3122 0 3125 1 TC +3 *

0887 REF 1 43.3123 0 3633 1 TC NXTBNK *

L EXTENDED VERBS

0888	REF	1		43.3124	0 3115 1		TC	NOKILL	*
0889	REF	2	LAST 290	43.3125	3 3245 1		CA	SELFADRS	
0890	REF	2	LAST 108	43.3126	55 371 1		TS	SKEEPI	
0891	REF	17	LAST 281	43.3127	0 5472 0		TC	ENDEXT	*
0892				43.3130	01201 0	VMCON	VN	501	*
0893	REF	3	LAST 290	43.3131	3 1376 1	ENDSUMS	CA	SKEEPI6	*
0894				43.3132	0 0006 1		EXTEND		*
0895	REF	2	LAST 222	43.3133	1 3336 0		BZF	SELFCHK	* ROPECHK, START SELFCHK AGAIN.
0896	REF	2	LAST 290	43.3134	0 3522 1		TC	STSHOSUM	* START SHOWSUM AGAIN.

L EXTENDED VERBS

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15 54

POB97	DAPDISP		VERB 48		DESCRIPTION	
ROB98	LOAD AUTO-PILOT DATA					
ROB99	1. REQUIRE EXT VERB DISPLAY AVAILABLE AND SET BUSY FLAG.					
RO900	2. EXECUTE DAPDATA1, DAPDATA2, AND DAPDATA3.					
RO901	3. RELEASE EXT VERB DISPLAY SYSTEM.					
0902	REF	16	LAST	290	43,3135 0 2070 1	DAPDISP TC TESTXACT
0903	REF	5	LAST	290	43,3136 3 5021 1	CAF PRIOT R03
0904	REF	4	LAST	290	43,3137 0 5146 1	TC PRIDCHNG
0905	REF	12	LAST	288	43,3140 0 4635 0	TC POSTJUMP
0906	REF	1			43,3141 40004 1	CADR DAPDATA1
0907					34,2000	BANK 34
0908	REF	1			20,2000	SETLOC LOADDAP
0909					20,2004	BANK
0910	REF	1				COUNTX 31/R03
0911	REF	2	LAST	210	30,2000	SBANK= LOWSUPER FOR SUBSEQUENT LOW READERS.
0912	REF	1			20,2004 3 2114 1	DAPDATA1 CAF D00LSMSK SET DISPLAY ACCORDING TO DAPB00LS BITS.
0913	REF	8	LAST	285	20,2005 7 0111 1	MASK DAPB00LS LM
0914	REF	1			20,2006 55,343 0	TS DAPDATA1 LM
0927	REF	6	LAST	216	20,2007 4 0106 1	CS FLGWRD10 SET BIT 14 TO BE COMPLEMENT OF APSFLAG.
0928	REF	2	LAST	213	20,2010 7 4737 1	MASK APSFLBIT
0929	REF	84	LAST	282	20,2011 10 000 0	CCS A
0930	REF	33	LAST	288	20,2012 3 4736 1	CAF BIT14
0931	REF	2	LAST	292	20,2013 27,343 0	ADS DAPDATA1
0932	REF	3	LAST	292	20,2014 31,343 1	CHKDATA1 CAF DAPDATA1 IF BITS 13 AND 14 ARE BOTH ZERO, FORCE
0933	REF	3	LAST	281	20,2015 7 4355 1	MASK BIT13-14 A ONE INTO BIT 13.
0934					20,2016 0 0006 1	EXTEND
0935	REF	1			20,2017 1 2034 0	BZF FORCEONE
0936	REF	4	LAST	292	20,2020 31,343 1	CAF DAPDATA1 ENSURE THAT NO ILLEGAL BITS SET BY CLEN.
0937	REF	1			20,2021 7 2113 1	MSKDATA1 MASK DSPLYMSK
0938	REF	5	LAST	292	20,2022 55,343 0	TS DAPDATA1
0939	REF	1			20,2023 3 2112 1	CAF V01446 LM
0940	REF	49	LAST	290	20,2024 0 4616 1	TC BANKCALL
0941	REF	1			20,2025 20353 0	CADR GOXDSPFR
0942	REF	18	LAST	291	20,2026 1 5472 1	TCF ENDEXT V34E TERMINATE
0943	REF	1			20,2027 1 2037 0	TCF DPDATA1 V33E PROCEED
0944	REF	1			20,2030 1 2014 1	TCF CHKDATA1 E NEW DATA CHECK AND REDISPLAY
0945	REF	1			20,2031 3 6242 0	CAF KEVENT BITS 2 & 3: BLANKS R2 & R3.
0946	REF	3	LAST	277	20,2032 0 5464 1	TC BLANKET
0947	REF	15	LAST	290	20,2033 1 5155 1	TCF ENDUPJDD
0948	REF	21	LAST	258	20,2034 3 4737 0	FORCEONE CAF BIT13
0949	REF	6	LAST	292	20,2035 27,343 0	ADS DAPDATA1
0950	REF	1			20,2036 1 2021 1	TCF MSKDATA1
0951					20,2037 0 0004 0	UPDATA1 INHINT
0952	REF	3	LAST	292	20,2040 4 4737 1	CS APSFLBIT INHINT FOR SETTING OF FLAG BITS AND MASS
0953	REF	7	LAST	292	20,2041 7 0106 1	MASK FLGWRD10 ON BASIS OF DISPLAYED DAPDATA1.
0954	REF	22	LAST	275	20,2042 54 001 1	TS L SET APSFLAG TO BE COMPLEMENT OF BIT 14.

L EXTENDED VERBS

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0955 REF 7 LAST 292 20,2043 4 1343 0
 0956 REF 34 LAST 292 20,2044 7 4736 0
 0957 REF 85 LAST 292 20,2045 10 000 0
 0958 REF 4 LAST 292 20,2046 3 4737 0
 0959 REF 23 LAST 292 20,2047 6 0001 0
 0960 REF 8 LAST 292 20,2050 54 106 1
 0961 REF 8 LAST 293 20,2051 4 1343 0
 0962 REF 4 LAST 292 20,2052 7 4355 1
 0963 REF 86 LAST 293 20,2053 10 000 0
 0964 REF 1 20,2054 4 4737 1
 0965 REF 2 LAST 292 20,2055 6 2114 1
 0966 REF 9 LAST 293 20,2056 7 1343 0
 0967 REF 24 LAST 293 20,2057 54 001 1
 0968 REF 3 LAST 293 20,2060 4 2114 0
 0969 REF 9 LAST 292 20,2061 7 0111 1
 0970 REF 25 LAST 293 20,2062 6 0001 0
 0971 REF 10 LAST 293 20,2063 54 111 1
 0972 REF 2 LAST 293 20,2064 7 4737 1
 0973 REF 87 LAST 293 20,2065 10 000 0
 0974 REF 1 20,2066 31 932 1
 0975 REF 7 LAST 204 20,2067 6 1331 1
 0976 REF 3 LAST 105 20,2070 55 244 0
 0977 REF 11 LAST 293 20,2071 30 111 0
 0978 REF 1 20,2072 7 4741 0
 0979 20,2073 0 0006 1
 0980 20,2074 1 2101 1
 0981 REF 18 LAST 217 20,2075 4 4735 0
 0982 REF 11 LAST 287 20,2076 7 0075 1
 0983 REF 12 LAST 293 20,2077 54 075 1
 0984 20,2100 1 2104 1
 0985 REF 13 LAST 293 20,2101 4 0075 1
 0986 REF 19 LAST 293 20,2102 7 4735 0
 0987 REF 14 LAST 293 20,2103 26 075 1
 0988 REF 12 LAST 293 20,2104 3 0111 3
 0989 REF 2 LAST 233 20,2105 7 6245 0
 0990 20,2106 6 0000 1
 0991 REF 2 LAST 212 20,2107 55 325 0
 0992 REF 13 LAST 292 20,2110 0 4635 0
 0993 REF 1 20,2111 02206 1

CS DAPDATR1
 MASK BIT14
 CCS A
 CAF APSFLBIT
 AD L
 TS FLGWRD10
 CS DAPDATR1
 MASK BIT13-14
 CCS A
 CS CSMDOCKD
 AD BOOLSMASK
 MASK DAPDATR1
 TS L
 CS BOOLSMASK
 MASK DAPBOOLS
 AD L
 TS DAPBOOLS
 MASK CSMDOCKD
 CCS A
 CAE CSMMASS
 AD LEMMASS
 TS MASS
 CAE DAPBOOLS
 MASK ACC4GR2X
 EXTEND
 BZF +5
 CS BIT15
 MASK FLAGWRD1
 TS FLAGWRD1
 TCF +4
 CS FLAGWRD1
 MASK BIT15
 ADS FLAGWRD1
 CA DAPBOOLS
 MASK THREE
 DOUBLE
 TS RATEINDX
 TC POSTJUMP
 CADR STIKLOAD

SET BITS OF DAPBOOLS ON BASIS OF DISPLAY
 MASK OUT CSMDOCKD (BIT 13) UNLESS BOTH
 13 AND 14 ARE SET.

LOAD MASS IN ACCORDANCE WITH CSMDOCKD.
 MASS IS USUALLY ALREADY OKAY, SO DO
 NOT TOUCH ITS LOW-ORDER PART.

2 OR 4 JET X-TRANSLATION
 (BIT ACC4GR2X = 1 FOR 4 JETS)

CLEAR NJTSFLAG TO 0 FOR 4 JETS

SET NJTSFLAG TO 1 FOR 2 JETS

SELECT DESIRED KALCMANU AUTOMATIC
 MANEUVER RATE
 RATEINDX HAS TO BE 0,2,4,6 SINCE RATES
 ARE UP

0995 20,2112 00256 0 VOIN46 VN 0146
 0996 20,2113 33113 1 DSPLYMSK OCT 33113
 0997 20,2114 13113 0 BOOLSMASK OCT 13113
 0998 01,2206 BANK 01
 0999 REF 2 LAST 43 01,2000 SETLOC LOADAPI
 1000 01,2206 BANK
 1001 REF 2 LAST 43 TO 43: 2 2* COUNT* 44/403
 1002 REF 3 LAST 219 01,2206 3 5015 0 STIKLOAD CAF EBANK6

L EXTENDED VERBS

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1003 REF 7 LAST 279 01.2207 54 003 0
 1004 REF 2 LAST 212 E6.1444
 1005 REF 1 01.2210 3 4745 0
 1006 REF 13 LAST 293 01.2211 7 0111 1
 1007 REF 88 LAST 293 01.2212 10 000 0
 1008 REF 1 01.2213 3 2337 1
 1009 REF 1 01.2214 6 2340 1
 1010 REF 3 LAST 294 01.2215 55.1444 0
 1011 REF 1 01.2216 3 2342 0
 1012 REF 3 LAST 212 01.2217 55.1476 1
 1013 REF 3 LAST 293 01.2220 3 4737 0
 1014 REF 14 LAST 294 01.2221 7 0111 1
 1015 01.2222 0 0006 1
 1016 01.2223 1 2232 1
 1017 REF 4 LAST 294 01.2224 3 1444 1
 1018 01.2225 0 0006 1
 1019 REF 1 01.2226 7 2341 1
 1020 REF 5 LAST 294 01.2227 55.1444 0
 1021 REF 1 01.2230 3 2343 1
 1022 REF 4 LAST 294 01.2231 55.1476 1
 1023 01.2232 0 0003 1

TS EBANK
 EBANK= STIKSENS
 CA RHOSCALE
 MASK DAPBOOLS
 CCS A
 CA NORMAL
 AD FINE
 TS STIKSENS
 CA -0.60/S
 TS -RATEDB
 CA CSMDOCKD
 MASK DAPBOOLS
 EXTEND
 BZF +7
 CA STIKSENS
 EXTEND
 MP 1/10
 TS STIKSENS
 CA -0.30/S
 TS -RATEDB
 RELINT

SET STICK SENSITIVITY TO CORRESPOND TO A
 MAXIMUM COMMANDED RATE (AT 42 COUNTS) OF
 20 D/S(NORMAL) OR 4 D/S(FINE), SCALED
 AT 45 D/S.

LM-ONLY BREAKOUT LEVEL IS .6 D/S.
 IF CSM-DOCKED, DIVIDE STICK SENSITIVITY
 BY 10. NORMAL SCALING IS THEN 2 D/S AND
 FINE SCALING IS 0.4 D/S
 BRANCH IF CSM IS NOT DOCKED.

CSM-DOCKED BREAKOUT LEVEL IS .3 D/S.

PROCEED TO NOUN 47. MASS LOAD.

1024 REF 1 01.2233 3 2334 1
 1025 REF 50 LAST 292 01.2234 0 4616 1
 1026 REF 2 LAST 292 01.2235 20353 0
 1027 REF 1 01.2236 1 2244 0
 1028 REF 1 01.2237 1 2250 0
 1029 REF 1 01.2240 1 2233 0
 1030 REF 17 LAST 277 01.2241 3 4751 0
 1031 REF 4 LAST 292 01.2242 0 5464 1
 1032 REF 16 LAST 292 01.2243 1 5155 1
 1033 01.2244 0 0004 0
 1034 REF 14 LAST 288 01.2245 0 4674 0
 1035 REF 2 LAST 298 01.2246 40123 0
 1036 REF 19 LAST 292 01.2247 1 5472 1

DAPDATA2 CAF V0647
 TC BANKCALL
 CADR G0XDSPEF
 TCF ENDRO3
 TCF DAPDATA2
 TCF DAPDATA2
 CAF BIT3
 TC BLANKET
 TCF ENDJOB
 ENDRO3 INHINT
 TC BANKCALL
 CADR RESTORDB
 TCF ENDEXT

V34E TERMINATE. FIRST SET OF DO 1/ACCS
 V33E PROCEED
 LOAD NEW DATA AND RECYCLE
 BLANKS R3
 LM

DOES RELINT

1037 REF 9 LAST 293 01.2250 4 0106 1
 1038 REF 5 LAST 293 01.2251 7 4737 1
 1039 REF 89 LAST 294 01.2252 10 000 0
 1040 REF 1 01.2253 3 2000 0
 1041 REF 1 01.2254 6 2001 1
 1042 REF 8 LAST 293 01.2255 6 1331 1
 1043 01.2256 0 0006 1
 1044 REF 2 LAST 294 01.2257 6 2233 1
 1045 REF 15 LAST 294 01.2260 30 111 0
 1046 REF 4 LAST 294 01.2261 7 4737 1
 1047 01.2262 0 0006 1
 1048 REF 1 01.2263 1 2271 0
 1049 REF 1 01.2264 4 4741 0
 1050 REF 2 LAST 293 01.2265 6 1332 1

DAPDATA2 CS FLGWRD10
 MASK APSFLBIT
 CCS A
 CA MINLMD
 AD MINMINLM
 AD LEMASS
 EXTEND
 BZMF DAPDATA2
 CAF DAPBOOLS
 MASK CSMDOCKD
 EXTEND
 BZF LEMALONE
 CS MINCSM
 AD CSMMASS

DETERMINE STAGE FROM APSFLAG

LEMMASS MUST BE GREATER THAN EMPTY LEM

ASK FOR NEW MASSES

SKIP TEST ON CSMMASS IF NOT DOCKED.

TEST CSM MASS

CSMASS MUST BE GREATER THAN EMPTY CSM

L EXTENDED VERBS

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1051					01.2266	0 0006 1		EXTEND		
1052	REF	3	LAST	294	01.2267	6 2233 1		BZMF	DAPDATA2	ASK FOR NEW MASSES
1053	REF	3	LAST	294	01.2270	31 332 1		CAD	CSMMASS	DOCKED: MASS = CSMMASS + LEMMASS
1054	REF	9	LAST	294	01.2271	6 1331 1	LEMALONE	AD	LEHMASS	LEM ALONE: MASS = LEMMASS
1055					01.2272	22 007 0		ZL		
1056	REF	4	LAST	293	01.2273	53 245 1		DXCH	MASS	
1057					01.2274	0 0004 0		INHINT		
1058	REF	15	LAST	294	01.2275	0 4674 0		TC	IBKCALL	SET DEADBANK AND COMPUTE MOMENTS OF
1059	REF	3	LAST	294	01.2276	40123 0		CADR	RESTORE	INERTIA.
1060					01.2277	0 0003 1		RELINT		PROCEED TO NOUN 48 (DR END).
1061	REF	10	LAST	294	01.2300	4 0106 1	DAPDATA3	CS	FLGWRD10	
1062	REF	6	LAST	294	01.2301	7 4737 1		MASK	APSFLEBIT	
1063					01.2302	0 0006 1		EXTEND		END ROUTINE IF LEM HAS STAGED.
1064	REF	20	LAST	294	01.2303	1 5472 1		BZF	ENDEXT	
1065	REF	1			01.2304	3 2335 0		CAD	V06N48	DISPLAY TRIM ANGLES AND REQUEST RESPONSE
1066	REF	51	LAST	294	01.2305	0 4616 1		TC	BANKCALL	
1067	REF	3	LAST	294	01.2306	20353 0		CADR	GOXDSFER	
1068	REF	21	LAST	295	01.2307	0 5472 0		TC	ENDEXT	
1069	REF	1			01.2310	1 2315 0		TCF	DPDAT3	V35E GO DO TRIM (WAITLIST TO TRIMGIMB)
1070					01.2311	1 2304 0		TCF		LOAD NEW DATA AND RECYCLE
1071	REF	18	LAST	294	01.2312	3 4751 0		CAD	BITS	
1072	REF	5	LAST	294	01.2313	0 5464 1		TC	BLANKET	BLANK R3
1073	REF	17	LAST	294	01.2314	1 5155 1		TCF	ENDOFJOB	
1074	REF	18	LAST	181	01.2315	3 4753 1	DPDAT3	CAD	BITS	GO TO TRIMGIMB VIA WAITLIST SO IT
1075					01.2316	0 0004 0		INHINT		CAN USE FIXDELAY AND VARDELAY
1076	REF	11	LAST	283	01.2317	0 5203 0		TC	WAITLIST	
1077	REF	1			E6.1401			EBANK	ROLLTIME	
1078	REF	1			01.2320	03217 0		ZCADR	TRIMGIMB	
1078	REF	1			01.2321	56066 1				
1079	REF	18	LAST	295	01.2322	1 5155 1		TCF	ENDOFJOB	DOES A RELINT
1080	REF	1			01.2323	3 2336 0	TRIMDONE	CAD	V50N48	
1081	REF	52	LAST	295	01.2324	0 4616 1		TC	BANKCALL	TRIM IS FINISHED; PLEASE TERMINATE PDS
1082	REF	1			01.2325	20361 1		CADR	GO MARK3R	
1083	REF	22	LAST	295	01.2326	0 5472 0		TC	ENDEXT	V34E TERMINATE
1084	REF	23	LAST	295	01.2327	0 5472 0		TC	ENDEXT	
1085	REF	24	LAST	295	01.2330	0 5472 0		TC	ENDEXT	
1086	REF	4	LAST	267	01.2331	3 6007 0		CAD	GOCT24	BITS TO CHANGE TO PERFORM, 3 TO BLANK R3
1087	REF	6	LAST	295	01.2332	0 5464 1		TC	BLANKET	
1088	REF	19	LAST	295	01.2333	1 5155 1		TCF	ENDOFJOB	
10885					01.2334	01457 0	V0647	VN	0647	
1089					01.2335	01460 1	V06N48	VN	0648	
1090					01.2336	14460 0	V50N48	VN	5048	
1091					01.2337	25101 0	NORMAL	DEC	.660214	
A1092										NORMAL SCALING IS 20 D/S
1093					01.2340	05220 1	FINE	DEC	.165054	FINE STICK SCALING (4 D/S).
1094					01.2341	03146 1	1/10	DEC	.1	FACTOR FOR CSH-DOCKED SCALING
1095					01.2342	77445 1	-0.6D/S	DEC	-218	

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1096

01,2343 77622 1 -0.3D/S DEC -109

L EXTENDED VERBS

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P1097 VERB 66. VEHICLES ARE ATTACHED. MOVE THIS VEHICLE STATE VECTOR TO
R1098 OTHER VEHICLE STATE VECTOR.

R1099 USE SUBROUTINE GENTRAN.

1100				07,2667		BANK 7	
1101	REF	6	LAST	288	43,2000	SETLOC EXTVERBS	
1102					43,3142	BANK	
1103	REF	6	LAST	288 TO 292:	61 422*	COUNT* 11/EXTVB	
1104	REF	1			E3,1626	EBANK= RRECTHIS	
1105	REF	3	LAST	286	43,3142 3 4737 0	ATTACHED CAF PRIGIO	
1106	REF	10	LAST	290	43,3143 0 5105 0	TC FINDVAC	
1107	REF	2	LAST	297	E3,1626	EBANK= RRECTHIS	
1108	REF	1			43,3144 03147 0	2CADR ATTACHIT	
1109	REF	20	LAST	295	43,3145 66103 0	TC ENDOFJOB	
1110	REF	7	LAST	287	43,3146 0 5155 0	TC	
1111					43,3147 0 6037 0	ATTACHIT TC INTERPRET	
1112	REF	4	LAST	287	43,3148 77624 1	CALL	
1113					43,3149 27414 0	INTSTALL	
1114	REF	1			43,3150 43014 0	SET BDN	
1115	REF	1			43,3151 04063 0	MOONOTH	
1116					43,3152 04304 1	MOONTHIS	
1117					43,3153 67160 1	+3	
1118	REF	2	LAST	297	43,3154 77614 1	CLEAR	
1119					43,3155 04263 1	MOONOTH	
1120	REF	1			43,3156 77776 1	EXIT	
1121	REF	1			43,3157 3 3204 1	CAF OCT51	
1122	REF	3	LAST	297	43,3158 0 5544 1	TC GENTRAN	
1123	REF	1			43,3159 01626 1	ADRES RRECTHIS	OUR STATE VECTOR INTO OTHER VIA GENTRAN
1124					43,3160 01554 1	ADRES RRECTOTH	
1125	REF	8	LAST	297	43,3161 0 0003 1	RELINT	
1126					43,3162 0 6037 0	TC INTERPRET	
1127	REF	1			43,3163 77624 1	CALL	UPDATE R-OTHER, V-OTHER
1128					43,3164 26760 1	PTDALEN	
1129	REF	2	LAST	114	43,3165 45154 0	LXA,2 CALL	
1130	REF	1			43,3166 02030 0	PBODY	
1131					43,3167 26114 1	SVDWNI	
1132	REF	1			43,3168 77776 1	EXIT	
1133	REF	8	LAST	252	43,3169 3 3205 0	CAF TCPINAD	
1134	REF	1			43,3170 50 120 1	INDEX FIXLOC	
1135	REF	14	LAST	293	43,3171 54 052 1	IS QPRET	
1136	REF	1			43,3200 0 4635 0	TC POSTJUMP	
					43,3201 27425 1	CADR INTWAKE	FREE INTEGRATION AND EXIT.

L EXTENDED VERBS

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1137 43.3202 77634 0 TCPIN RTB
 1138 REF 3 LAST 264 43.3203 21050 1 PINBRNCH

1139 43.3204 00051 0 OCT51 OCT 51
 1140 REF 1 43.3205 67202 0 TCPINAD CADR TCPIN

R1141 VERB 96 SET QUITFLAG TO STOP INTEGRATION.

R1142 GO TO V37 WITH ZERO TO CAUSE POO.

R1143 STATEINT WILL CHECK QUITFLAG AND SKIP 1ST PASS.

R1144 THUS ALLOWING A 10 MINUTE PERIOD WITHOUT INTEGRATION.

1145 REF 10 LAST 289 43.3206 0 5504 0 VERB96 TC UPFLAG QUITFLAG WILL CAUSE INTEGRATION TO EXIT
 1146 REF 1 43.3207 00221 0 ADRES QUITFLAG AT NEXT TIMESTEP

1147 REF 32 LAST 279 43.3210 3 4755 1 CAF ZERO
 1148 REF 15 LAST 297 43.3211 0 4635 0 TC POSTJUMP
 1149 REF 1 43.3212 10040 1 CADR V37 GO TO POO

R1150

R1151 VERB 67 : DISPLAY OF W MATRIX

1152 REF 17 LAST 292 43.3213 0 2076 1 V67 TC TESTXACT
 1153 REF 2 LAST 229 43.3214 3 5017 1 CAF PRIOS
 1154 REF 11 LAST 297 43.3215 0 5105 0 TC FINDVAG
 1155 REF 1 E4.1600 EBANK= WAPDS
 1156 REF 1 43.3216 02007 1 2CADR V67CALL
 1156 REF 1 43.3217 62064 1
 1157 REF 21 LAST 297 43.3220 0 5155 0 TC ENDEFJOB

R1158 VERB 65 DISABLE U,V JETS DURING DPS BURNS

1159 REF 11 LAST 298 43.3221 0 5504 0 SNUFFOUT TC UPFLAG
 1160 REF 1 43.3222 00115 1 ADRES SNUFFER
 1161 REF 22 LAST 290 43.3223 0 2121 1 TC GCPIN

R1162 VERB 75 ENABLE U,V JETS DURING DPS BURNS

1163 REF 24 LAST 289 43.3224 0 5516 0 OUTSNUFF TC DOWNFLAG
 1164 REF 2 LAST 298 43.3225 00115 1 ADRES SNUFFER
 1165 REF 23 LAST 298 43.3226 0 2121 1 TC GCPIN
 R1166 VERB 85 DISPLAY RR LOS AZIMUTH AND ELEVATION.

R1167 AZIMUTH IS THE ANGLE BETWEEN THE LOS AND THE X-Z NB PLANE. 0 - 90 DEG IN THE +Y HEMISPHERE.

R1169 360 - 270 DEG IN THE -Y HEMISPHERE.

R1170 ELEVATION IS THE ANGLE BETWEEN +ZNB AND THE PROJECTION OF THE LOS INTO THE X-Z PLANE. 0 - 360 ABOUT +Y.

1172 REF 2 LAST 118 E4.1600 LBANK= KR-AZ
 1173 REF 18 LAST 298 43.3227 0 2076 1 VERB85 TC TESTXACT

L EXTENDED VERBS

USER'S PAGE NO. 18 E4 S4

1174	REF	16	LAST	298	43.3230	0 4635 0	TC	POSTJUMP	
1175	REF	1			43.3231	60000 1	CADR	DSRRLOS	
1176	REF	1			40,2000		SETLOC	PINBALL1	
1177					40,2000		BANK		
1178	REF	1					COUNT*	\$/EXTVR	
1179	REF	3	LAST	298	40,2000	3 5017 1	DSRRLOS	CAF	PRI05
1180	REF	12	LAST	298	40,2001	0 5105 0	TC	FINDVAC	
1181	REF	3	LAST	298	44,1600		EBANK	RR-AZ	
1182	REF	1			40,2002	02017 0	2CADR	RRLOSDSP	
1182	REF	1			40,2003	60104 1			
1183	REF	3	LAST	280	40,2004	3 4740 0	CAF	PRI04	
1184	REF	5	LAST	292	40,2005	0 5146 1	TC	PRI0CHNG	
1185	REF	1			40,2006	3 2076 1	CAF	V16H56	
1186	REF	53	LAST	295	40,2007	0 4616 1	TC	BANKCALL	
1187	REF	3	LAST	277	40,2010	20353 0	CADR	GOMARKER	
1188	REF	1			40,2011	0 5563 1	TC	B50FF	
1189	REF	2	LAST	299	40,2012	0 5563 1	TC	B50FF	
1190	REF	3	LAST	299	40,2013	0 5563 1	TC	B50FF	
1191	REF	19	LAST	295	40,2014	3 4751 0	CAF	BIT9	
1192	REF	7	LAST	295	40,2015	0 5464 1	TC	BLANKET	
1193	REF	22	LAST	298	40,2016	0 5155 0	TC	ENDPFJOB	
1194					40,2017	0 0006 1	RRLOSDSP	EXTEND	
1195	REF	2	LAST	187	40,2020	3 0036 1	DCA	CDUT	
1196	REF	42	LAST	290	40,2021	52 155 1	DXCH	MPAC	
1197	REF	9	LAST	297	40,2022	0 6037 0	TC	INTERPRET	
1198					40,2023	77624 1	CALL		
1199	REF	1			40,2024	46065 0		FRNBMPAC	GET RE LOS IN BODY AXIS.
1200					40,2025	00001 0	STORE	00	UNIT-LOS
1201					40,2026	14007 0	STOOL	60	
1202	REF	1			40,2027	06522 1		H16ZEROS	
1203					40,2030	24011 1	STOVL	80	
1204					40,2031	00007 0		60	
1205					40,2032	77656 1	UNIT		
1206					40,2033	00007 0	STORE	60	UNIT OF LOS PROJ IN X-Z PLANE
1207					40,2034	77641 1	DOT		
1208	REF	3	LAST	37	40,2035	06514 1		UNITZ	
1209	REF	1			40,2036	24021 1	STOVL	COSTH	160
1210	REF	3	LAST	37	40,2037	06520 0		UNITX	
1211					40,2040	77641 1	DOT		
1212					40,2041	00007 0		60	
1213	REF	1			40,2042	34023 1	STCALL	SINTH	180
1214	REF	1			40,2043	47320 0		ARCTRIG	
1215					40,2044	43244 1	BPL	DAD	INSURE DISPLAY OF 0 - 360 DEG.
1216					40,2045	60047 1		+2	
1217	REF	1			40,2046	06530 1		DPPEMAX	INTRODUCES AN ERROR OF 0-2% REVS.

L EXTENDED VERBS

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1218	REF	1		40,2047	26203 1	STOVL	RR-LLEV	
1219				40,2050	00001 0		OD	
1220				40,2051	77641 1	DDT		
1221	REF	2	LAST	37	40,2052	06516 0		UNITY
1222	REF	2	LAST	299	40,2053	24023 0	STOVL	SINTH
1223					40,2054	00001 0		OD
1224					40,2055	77641 1	DDT	
1225					40,2056	00007 0		GD
1226	REF	2	LAST	299	40,2057	34021 0	STCALL	COSTH
1227	REF	2	LAST	299	40,2060	47320 0		ALCTHIG
1228					40,2061	43244 1	BPL	DAD
1229					40,2062	60064 0		+2
1230	REF	2	LAST	299	40,2063	06530 1		DPPECHAX
1231	REF	4	LAST	299	40,2064	02201 0	STORE	RR-AZ
1232					40,2065	77776 1	EXIT	
1233	REF	2	LAST	270	40,2066	3 4777 1	CA	1 SEC
1234	REF	54	LAST	299	40,2067	0 4616 1	TC	BANKCALL
1235	REF	7	LAST	279	40,2070	01735 1	CAON	DELAYJOB
1236	REF	16	LAST	254	40,2071	3 4747 1	CA	BITS
1237	REF	7	LAST	263	40,2072	7 1644 1	MASK	EXTVDACT
1238	REF	90	LAST	294	40,2073	10 000 0	CCS	A
1239	REF	2	LAST	299	40,2074	0 2017 0	TE	RRLOSDSP
1240	REF	25	LAST	295	40,2075	0 5472 0	TC	ENDEXT
1241					40,2076	04070 1	VN	1656

INSURE DISPLAY OF C - 360 DEG.

INTRODUCES AN ERROR OF D-LS LEVS.

L PINBALL NOUN TABLES

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P1000 THE FOLLOWING REFERS TO THE NOUN TABLES

R1001 COMPONENT CODE NUMBER INTERPRETATION

R1002	00000	1 COMPONENT
R1003	00001	2 COMPONENT
R1004	00010	3 COMPONENT
R1005	X1XXX	BIT4 = 1. DECIMAL ONLY
R1006	1XXXX	BIT5 = 1. NO LOAD
R1007	END OF COMPONENT CODE NUMBERS	

R1008 SF ROUTINE CODE NUMBER INTERPRETATION

R1009	00000	OCTAL ONLY
R1010	00001	STRAIGHT FRACTIONAL
R1011	00010	CDU DEGREES (XXX.XX)
R1012	00011	ARITHMETIC SF
R1013	00100	ARITH DP1 OUT(MULT BY 2EXP14 AT END) IN(STRAIGHT)
R1014	00101	ARITH DP2 OUT(STRAIGHT) IN(SL 7 AT END)
R1015	00110	LANDING RADAR POSITION (+0000X)
R1016	00111	ARITH DP3 OUT (SL 7 AT END) IN (STRAIGHT)
R1017	01000	WHOLE HOURS IN R1. WHOLE MINUTES (MOD 60) IN R2,
R1018		SECONDS (MOD 60) 0XX.XX IN R3. *** ALARMS IF USED WITH OCTAL
R1019	01001	MINUTES (MOD 60) IN D1D2, D3-BLANK, SECONDS (MOD 60) IN D4D5
R1020		LIMITS TO 59059 IF MAG EXCEEDS THIS VALUE.
R1021		ALARMS IF USED WITH OCTAL ***** IN (ALARM)
R1022	01010	ARITH DP4 OUT (STRAIGHT) IN (SL 3 AT END)
R10221	01011	ARITH1 SF OUT(MULT BY 2EXP14 AT END) IN(STRAIGHT)
R10222	01100	2 INTEGERS IN D1D2, D4D5, D3-BLANK.
R10223		ALARMS IF USED WITH OCTAL ***** IN (ALARM)
R10224	01101	360-CDU DEGREES (XXX.XX)
R1023	END OF SF ROUTINE CODE NUMBERS	

R1024 SF CONSTANT CODE NUMBER INTERPRETATION

R1025	00000	WHOLE USE ARITH
R1026	00000	DP TIME SEC (XXX.XX SEC) USE ARITHDP1
R10265	00000	LR POSITION (+0000X) USE LR POSITION4
R1027	00001	SPARE
R1028	00010	CDU DEGREES USE CDU DEGREES
R1029	00010	360-CDU DEGREES USE 360-CDU DEGREES
R1030	00011	DP DEGREES (90) XX.XXX DEG USE ARITHDP3
R1031	00100	DP DEGREES (360) XXX.XX DEG USE ARITHDP4
R1032	00101	DEGREES (180) XXX.XX DEG USE ARITH
R10321	00101	OPTICAL TRACKER AZIMUTH ANGLE(XXX.XXDEG)
R10322		USE ARITHDP1
R1034	00110	HEIGHT2 (XXXXX. LBS) USE ARITH1

L PINBALL NOUN TABLES

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R1035	00111	POSITION5 (XXX.XX NAUTICAL MILES)	
R10351			USE ARITHDP3
R1037	01000	POSITION4 (XXXX.X NAUTICAL MILES)	
R10371			USE ARITHDP3
R1038	01001	VELOCITY2 (XXXXX. FT/SEC)	USE ARITHDP4
R1039	01010	VELOCITY3 (XXXXX. FT/SEC)	USE ARITHDP3
R1040	01011	ELEVATION DEGREES (89.999MAX)	USE ARITH
R1041	01100	RENDEZVOUS RADAR RANGE (XXX.XX NAUT MI)	
R1042			USE ARITHDP1
R1043	01101	RENDEZVOUS RADAR RANGE RATE (XXXXX. FT/SEC)	
R1044			USE ARITHDP1
R1045	01110	LANDING RADAR ALTITUDE (XXXXX. FEET)	
R1046			USE ARITHDP1
R1047	01111	INITIAL/FINAL ALTITUDE (XXXXX. FEET)	
R1048			USE ARITHDP1
R1049	10000	ALTITUDE RATE (XXXXX. FT/SEC)	USE ARITH
R1050	10001	FORWARD/LATERAL VELOCITY (XXXXX. FEET/SEC)	
R1051			USE ARITH
R1052	10010	ROTATIONAL HAND CONTROLLER ANGLE RATES	
R1053		XXXXX. DEG/SEC	USE ARITH
R1054	10011	LANDING RADAR VELX (XXXXX. FEET/SEC)	
R1055			USE ARITHDP1
R1056	10100	LANDING RADAR VELY (XXXXX. FEET/SEC)	
R1057			USE ARITHDP1
R1058	10101	LANDING RADAR VELZ (XXXXX. FEET/SEC)	
R1059			USE ARITHDP1
R1060	10110	POSITION7 (XXXXX. NAUT MI)	USE ARITHDP4
R10601	10111	TRIM DEGREES2 (XXX.XX DEG)	USE ARITH
R1061	11000	COMPUTED ALTITUDE (XXXXX. FEET)	
R106101			USE ARITHDP1
R106102	11001	DP DEGREES (XXXXX. DEG)	USE ARITHDP3
R106103	11010	POSITION9 (XXXXX. FT)	USE ARITHDP3
R106104	11011	VELOCITY4 (XXXXX. FT/SEC)	USE ARITHDP2
R106105	11100	RADIANS (XX.XXX RADIANS)	USE ARITHDP4
R1062	END OF SF CONSTANT CODE NUMBERS		

R1063 FOR GREATER THAN SINGLE PRECISION SCALES. PUT ADDRESS OF MAJOR PART INTO
 R1064 NOUN TABLES.
 R1065 OCTAL LOADS PLACE +0 INTO MAJOR PART, DATA INTO MINOR PART.
 R1066 OCTAL DISPLAYS SHOW MINOR PART ONLY.
 R1067 TO GET AT BOTH MAJOR AND MINOR PARTS (IN OCTAL). USE NOUN 01.

R1068 A NOUN MAY BE DECLARED :DECIMAL ONLY: BY MAKING BIT4=1 OF ITS COMPONENT
 R1069 CODE NUMBER. IF THIS NOUN IS USED WITH ANY OCTAL DISPLAY VERB, OR IF
 R1070 DATA IS LOADED IN OCTAL, IT ALARMS.

R1071 IN LOADING AN :HOURS, MINUTES, SECONDS: NOUN. ALL 3 WORDS MUST BE
 R1072 LOADED, OR ALARM.

L PINBALL NOUN TABLES

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R1073 ALARM IF AN ATTEMPT IS MADE TO LOAD :SPLIT MINUTES/SECONDS: (HMBSS).

R1074 THIS IS USED FOR DISPLAY ONLY.

L PINBALL NOUN TABLES

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R1075 THE FOLLOWING ROUTINES ARE FOR READING THE NOUN TABLES AND THE SF TABLES
 R1076 (WHICH ARE IN A SEPARATE BANK FROM THE REST OF PINBALL). THESE READING
 R1077 ROUTINES ARE IN THE SAME BANK AS THE TABLES. THEY ARE CALLED BY DXCH Z.

R1078 LODNNTAB LOADS NNADTEM WITH THE NNADTAB ENTRY. NNTYPTEN WITH THE
 R1079 NNTYPTAB ENTRY. IF THE NOUN IS MIXED, IDADITEM IS LOADED WITH THE FIRST
 R1080 IDADDTAB ENTRY, IDAD2TEM THE SECOND IDADDTAB ENTRY, IDAD3TEM THE THIRD
 R1081 IDADDTAB ENTRY. RUTMXTEN WITH THE RUTMXTAB ENTRY. MIXBR IS SET FOR
 R1082 MIXED OR NORMAL NOUN.

1200				06,3263		BANK 6	
12002	REF	2	LAST	201	42,2000	SETLOC PINBALL3	
12003					42,2103	BANK	
12005	REF	1				COUNT* 11/NOUNS	
1201	REF	1			42,2103	52 152 0	LODNNTAB
1202	REF	3	LAST	267	42,2104	51'002 1	DXCH IDAD2TEM
1203	REF	1			42,2105	3 2154 0	INDEX NOUNREG
1204	REF	1			42,2106	54 146 0	CAF NNADTAB
1205	REF	4	LAST	304	42,2107	51'002 1	TS NNADTEM
1206	REF	1			42,2110	3 2320 1	INDEX NOUNREG
1207	REF	1			42,2111	54 147 1	CAF NNTYPTAB
1208	REF	5	LAST	304	42,2112	4 1002 0	TS NNTYPTEN
1209	REF	1			42,2113	6 4771 1	CS NOUNREG
1210					42,2114	0 0006 1	AD MIXCON
1211	REF	1			42,2115	6 2121 1	EXTEND
1212	REF	14	LAST	278	42,2116	3 4753 1	BZHF LODMIXNR
1213	REF	1			42,2117	54 140 0	CAF ONE
1214	REF	1			42,2120	0 2137 0	TS MIXBR
1215	REF	11	LAST	282	42,2121	3 4752 0	TC LODONLY
1216	REF	2	LAST	304	42,2122	54 140 0	CAF TWO
1217	REF	6	LAST	304	42,2123	51'002 1	TS MIXBR
1218	REF	1			42,2124	3 3064 0	INDEX NOUNREG
1219	REF	1			42,2125	54 153 1	CAF RUTMXTAB -400
1220	REF	2	LAST	232	42,2126	3 5012 1	TS RUTMXTEN
1221	REF	2	LAST	304	42,2127	7 0146 0	CAF LOWID
1222	REF	28	LAST	282	42,2130	54 002 1	MASK NNADTEM
1223	REF	91	LAST	300	42,2131	50 000 1	TS 4
1224	REF	1			42,2132	3 2650 0	INDEX A
1225	REF	1			42,2133	54 150 1	CAF IDADDTAB
1226					42,2134	0 0006 1	TS IDADITEM
1227	REF	29	LAST	304	42,2135	5 0002 0	EXTEND
1228	REF	2	LAST	304	42,2136	3 2652 1	INDEX 4
1229	REF	2	LAST	304	42,2137	52 152 0	DCA IDADDTAB +1
1230	REF	1			42,2140	52 006 0	LODNLV
							DXCH IDAD2TEM
							DXCH 2
1231	REF	1			4771		MIXCON =
R1232	GTSFOUT						CT50
							(DEC 40)
1233	REF	1			42,2141	52 124 1	GTSFOUT
							DXCH SFTEMP1
							2X(SFCONUM) ARRIVES IN SFTEMP1.

L PINBALL NOUN TABLES

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1234					42,2142	0 0006 1		EXTEND	
1235	REF	92	LAST	304	42,2143	5 0000 1		INDEX	A
1236	REF	1			42,2144	3 2557 1		DCA	SFOUTAB
1237	REF	2	LAST	304	42,2145	52 124 1	SFCOM	DXCH	SFTEMP1
1238	REF	2	LAST	304	42,2146	52 006 0		DXCH	Z

R1239 GTSFIN LOADS SFTEMP1, SFTEMP2 WITH THE DP SFINTAB ENTRIES.

1240	REF	3	LAST	305	42,2147	52 124 1	GTSFIN	DXCH	SFTEMP1	2X(SFCOMUM) ARRIVES IN SFTEMP1.
1241					42,2150	0 0006 1		EXTEND		
1242	REF	93	LAST	305	42,2151	5 0000 1		INDEX	A	
1243	REF	1			42,2152	3 2465 1		DCA	SFINTAB	
1244	REF	1			42,2153	1 2145 1		TCF	SFCOM	

A1400										NN NORMAL NOUNS
1401					42,2154	00000 1	NNADTAB	OCT	00000	00 NOT IN USE
1402					42,2155	40000 0		OCT	40000	01 SPECIFY MACHINE ADDRESS (FRACTIONAL)
1403					42,2156	40000 0		OCT	40000	02 SPECIFY MACHINE ADDRESS (WHOLE)
1404					42,2157	40000 0		OCT	40000	03 SPECIFY MACHINE ADDRESS (DEGREES)
1405	REF	3	LAST	277	42,2160	01045 1		ECADR	DSPTM1	04 ANGULAR ERROR/DIFFERENCE
1406	REF	4	LAST	305	42,2161	01045 1		ECADR	DSPTM1	05 ANGULAR ERROR/DIFFERENCE
1407	REF	1			42,2162	01144 1		ECADR	OPTION1	06 OPTION CODE
1408	REF	1			42,2163	01003 0		ECADR	XREG	07 ECADR OF WORD TO BE MODIFIED
A14081										ONES FOR BITS TO BE MODIFIED
A14082										1 TO SET OR 0 TO RESET SELECTED BITS
1409	REF	2	LAST	108	42,2164	01363 0		ECADR	ALMCADR	08 ALARM DATA
1410	REF	4	LAST	211	42,2165	00375 0		ECADR	FAILREG	09 ALARM CODES
1411					42,2166	77776 1		OCT	77776	10 CHANNEL TO BE SPECIFIED
1412	REF	3	LAST	198	42,2167	03633 1		ECADR	TESI	11 TIG OF CSI (HRS, MIN, SEC)
1413	REF	7	LAST	277	42,2170	01051 1		ECADR	OPTIONX	12 OPTION CODE
A14131										(USED BY EXTENDED VERBS ONLY)
1414	REF	3	LAST	198	42,2171	01776 0		ECADR	TCOH	13 TIG OF COH (HRS, MIN, SEC)
1415	REF	4	LAST	207	42,2172	01051 1		ECADR	DSPTMX	14 CHECKLIST
A14151										(USED BY EXTENDED VERBS ONLY)
1416					42,2173	77777 0		OCT	77777	15 INCREMENT MACHINE ADDRESS
1417	REF	5	LAST	305	42,2174	01051 1		ECADR	DSPTMX	16 TIME OF EVENT (HRS, MIN, SEC)
1418					42,2175	00000 1		OCT	00000	17 SPARE
1419	REF	1			42,2176	02344 0		ECADR	FOAIX	18 AUTO MANEUVER BALL ANGLES
1420					42,2177	00000 1		OCT	00000	19 SPARE
1421	REF	6	LAST	254	42,2200	00032 0		ECADR	LDUX	20 ICDU ANGLES
1422	REF	1			42,2201	00037 0		ECADR	PIPAX	21 PIPAS
1423	REF	6	LAST	282	42,2202	00321 1		ECADR	THETAD	22 NEW ICDU ANGLES
1424					42,2203	00000 1		OCT	00000	23 SPARE
1425	REF	3	LAST	275	42,2204	01051 1		ECADR	DSPTM2 +1	24 DELTA TIME FOR AGC CLOCK (HRS, MIN, SEC)
1426	REF	5	LAST	305	42,2205	01045 1		ECADR	DSPTM1	25 CHECKLIST
A14261										(USED WITH PLEASE PERFORM ONLY)
1427	REF	6	LAST	305	42,2206	01045 1		ECADR	DSPTM1	26 PRIQ/DELAY, ADRES, BBGON
1428	REF	4	LAST	290	42,2207	01362 1		ECADR	SMODE	27 SELF TEST ON/OFF SWITCH

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1429		42,2210	00000 1	DCT	00000	28 SPARE
1430		42,2211	00000 1	DCT	00000	29 SPARE
1431		42,2212	00000 1	DCT	0	30 SPARE
1432		42,2213	00000 1	DCT	0	31 SPARE
1433	REF 1	42,2214	02142 1	ECADR	-TFFF	32 TIME TO PERIGEE (HRS, MIN, SEC)
1434	REF -7 LAST 243	42,2215	03441 0	ECADR	TIG	33 TIME OF IGNITION (HRS, MIN, SEC)
1435	REF -7 LAST 305	42,2216	01045 1	ECADR	DSPTM1	34 TIME OF EVENT (HRS, MIN, SEC)
1436	REF -8 LAST 241	42,2217	03453 0	ECADR	TIDGO	35 TIME TO GO TO EVENT (HRS, MIN, SEC)
1437	REF 10 LAST 275	42,2220	00024 1	ECADR	TIME2	36 TIME OF AGC CLOCK (HRS, MIN, SEC)
1438	REF -3 LAST 198	42,2221	03635 1	ECADR	TTPI	37 TIG OF TPI (HRS, MIN, SEC)
1439	REF -2 LAST 110	42,2222	01516 1	ECADR	TET	38 TIME OF STATE BEING INTEGRATED
1440		42,2223	00000 1	DCT	00000	39 SPARE

R14401 END OF NNADTAB FOR NORMAL NOUNS

A14402						NN MIXED NOUNS
1441		42,2224	64000 0	DCT	64000	40 TIME TO IGNITION/CUTOFF
A14411						VG
A14412						DELTA V (ACCUMULATED)
1442		42,2225	02003 0	DCT	02003	41 TARGET AZIMUTH
A14421						ELEVATION
1443		42,2226	24006 1	DCT	24006	42 APUGEE
A14431						PERIGEE
A14432						DELTA V (REQUIRED)
1444		42,2227	24011 1	DCT	24011	43 LATITUDE
A14441						LONGITUDE
A14442						ALTITUDE
1445		42,2230	64014 0	DCT	64014	44 APUGEE
A14451						PERIGEE
A14452						TFF
1446		42,2231	64017 0	DCT	64017	45 MARKS
A14461						TTI OF NEXT BURN
A14462						MGA
1447		42,2232	00022 1	DCT	00022	46 AUTOPILOT CONFIGURATION
1448		42,2233	22025 0	DCT	22025	47 LEM WEIGHT
A14481						CSM WEIGHT
1449		42,2234	22030 1	DCT	22030	48 GIMBAL PITCH TRIM
A14491						GIMBAL ROLL TRIM
1450		42,2235	24033 1	DCT	24033	49 DELTA R
A14501						DELTA V
A14502						RADAR DATA SOURCE CODE
1451		42,2236	00000 1	DCT	0	50 SPARE
1452		42,2237	22041 1	DCT	22041	51 S-BAND ANTENNA PITCH
A14521						YAW
1453		42,2240	00044 1	DCT	00044	52 CENTRAL ANGLE OF ACTIVE VEHICLE
1454		42,2241	00000 1	DCT	00000	53 SPARE
1455		42,2242	24052 0	DCT	24052	54 RANGE
A14551						RANGE RATE
A14552						THETA
1458		42,2243	24055 1	DCT	24055	55 NO. OF APSIDAL CROSSINGS

L PINBALL NOUN TABLES

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Address	Value	Unit	Label
A14581			ELEVATION ANGLE
A14582			CENTRAL ANGLE
1459	42.2244	02060 0	56 RR LOS AZIMUTH
A14591			ELEVATION
1460	42.2245	20063 0	57 DELTA R
1461	42.2246	24066 1	58 PERIGEE ALT
A14611			DELTA V TPI
A14612			DELTA V TPF
1462	42.2247	24071 1	59 DELTA VELOCITY LOS
1463	42.2250	24074 1	60 HORIZONTAL VELOCITY
A14631			ALTITUDE RATE
A14632			COMPUTED ALTITUDE
1464	42.2251	64077 0	61 TIME TO GO IN BRAKING PHASE
A14641			TIME TO IGNITION
A14642			CROSS RANGE DISTANCE
1465	42.2252	64102 0	62 ABSOLUTE VALUE OF VELOCITY
A14651			TIME TO IGNITION
A14652			DELTA V (ACCUMULATED)
1466	42.2253	24105 0	63 ABSOLUTE VALUE OF VELOCITY
A14661			ALTITUDE RATE
A14662			COMPUTED ALTITUDE
1467	42.2254	64110 0	64 TIME LEFT FOR REDESIGNATION-LPD ANGLE
A14671			ALTITUDE RATE
A14672			COMPUTED ALTITUDE
1468	42.2255	24113 1	65 SAMPLED AGC TIME (HRS, MIN, SEC)
A14681			(FETCHED IN INTERRUPT)
1470	42.2256	62116 0	66 LR RANGE
A14701			POSITION
1471	42.2257	04121 1	67 LRVX
A14711			LRVY
A14712			LRVZ
1472	42.2260	64124 1	68 SLANT RANGE TO LANDING SIGHT
A14721			TIME TO GO IN BRAKING PHASE
A14722			LR ALTITUDE - COMPUTED ALTITUDE
1473	42.2261	00000 1	69 SPARE
1474	42.2262	04132 0	70 ADT DETENT CODE/STAR CODE
1475	42.2263	04135 1	71 ADT DETENT CODE/STAR CODE
1476	42.2264	02140 0	72 RR 360 - TRUNNION ANGLE
A14761			SHAFT ANGLE
1477	42.2265	02143 0	73 NEW RR 360 - TRUNNION ANGLE
A14771			SHAFT ANGLE
1478	42.2266	64146 0	74 TIME TO IGNITION
A14781			YAW AFTER VEHICLE RISE
A14782			PITCH AFTER VEHICLE RISE
1479	42.2267	64151 0	75 DELTA ALTITUDE CDH
A14791			DELTA TIME (CDH-CSI OR TPI-CDH)
A14792			DELTA TIME (TPI-CDH OR TPI-NORTPI)
1480	42.2270	24154 1	76 DESIRED HORIZONTAL VELOCITY
A14801			DESIRED RADIAL VELOCITY
A14802			CROSS-RANGE DISTANCE

L PINBALL NOUN TABLES

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1481	42,2271	62157 0	DCT	62157	77 TIME TO ENGINE CUTOFF
A14811					VELOCITY NORMAL TO CSM PLANE
1482	42,2272	02162 0	DCT	02162	78 RR RANGE
A14821					RANGE RATE
1483	42,2273	24165 0	DCT	24165	79 CURSOR ANGLE
A14831					SPIRAL ANGLE
A14832					POSITION CODE
1484	42,2274	02170 0	DCT	02170	80 DATA INDICATOR
A14841					OMEGA
1485	42,2275	24173 1	DCT	24173	81 DELTA V (LV)
1486	42,2276	24176 1	DCT	24176	82 DELTA V (LV)
1487	42,2277	24201 1	DCT	24201	83 DELTA V (BODY)
1488	42,2300	24204 1	DCT	24204	84 DELTA V (OTHER VEHICLE)
1489	42,2301	24207 1	DCT	24207	85 VG (BODY)
1490	42,2302	24212 0	DCT	24212	86 VG (LV)
1491	42,2303	02215 0	DCT	02215	87 BACKUP OPTICS LOS AZIMUTH
A14911					ELEVATION
1492	42,2304	24220 1	DCT	24220	88 HALF UNIT SUN OR PLANET VECTOR
1493	42,2305	24223 1	DCT	24223	89 LANDMARK LATITUDE
A14931					LONGITUDE/2
A14932					ALTITUDE
1494	42,2306	24226 1	DCT	24226	90 Y
A14941					Y DOT
A14942					PSI
1495	42,2307	04231 0	DCT	04231	91 ALTITUDE
A14951					VELOCITY
A14952					FLIGHT PATH ANGLE
1496	42,2310	00000 1	DCT	00000	92 SPARE
1497	42,2311	04237 0	DCT	04237	93 DELTA GYRO ANGLES
1498	42,2312	00000 1	DCT	00000	94 SPARE
1499	42,2313	00000 1	DCT	0	95 SPARE
1500	42,2314	00000 1	DCT	0	96 SPARE
1501	42,2315	04253 1	DCT	04253	97 SYSTEM TEST INPUTS
1502	42,2316	04256 1	DCT	04256	98 SYSTEM TEST RESULTS
1503	42,2317	24261 1	DCT	24261	99 RMS IN POSITION
A15031					RMS IN VELOCITY
A15032					RMS IN BIAS
R1504	END OF NNADTAB FOR MIXED NOUNS				

				NN	NORMAL NOUNS
A1800				00	NOT IN USE
1801	42,2320	00000 1	NNTYPTAB DCT	00000	
1802	42,2321	04040 1	DCT	04040	01 3COMP FRACTIONAL
1803	42,2322	04140 0	DCT	04140	02 3COMP WHOLE
1804	42,2323	04102 0	DCT	04102	03 3COMP GDU DEGREES
1805	42,2324	00504 0	DCT	00504	04 1COMP DPDEG(360)
1806	42,2325	00504 0	DCT	00504	05 1COMP UPDEG(360)
1807	42,2326	04000 0	DCT	04000	06 3COMP OCTAL ONLY
1808	42,2327	04000 0	DCT	04000	07 3COMP OCTAL ONLY
1809	42,2330	04000 0	DCT	04000	08 3COMP OCTAL ONLY

L PINBALL NOUN TABLES

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1810	42,2331	04000 0	OCT	04000	09 3COMP	OCTAL ONLY
1811	42,2332	00000 1	OCT	00000	10 1COMP	OCTAL ONLY
1812	42,2333	24400 0	OCT	24400	11 3COMP	HMS (DEC ONLY)
1813	42,2334	02000 0	OCT	02000	12 2COMP	OCTAL ONLY
1814	42,2335	24400 0	OCT	24400	13 3COMP	HMS (DEC ONLY)
1815	42,2336	04140 0	OCT	04140	14 3COMP	WHOLE
1816	42,2337	00000 1	OCT	00000	15 1COMP	OCTAL ONLY
1817	42,2340	24400 0	OCT	24400	16 3COMP	HMS (DEC ONLY)
1818	42,2341	00000 1	OCT	0	17	SPARE
1819	42,2342	04102 0	OCT	04102	18 3COMP	CDU DEG
1820	42,2343	00000 1	OCT	00000	19	SPARE
1821	42,2344	04102 0	OCT	04102	20 3COMP	CDU DEGREES
1822	42,2345	04140 0	OCT	04140	21 3COMP	WHOLE
1823	42,2346	04102 0	OCT	04102	22 3COMP	CDU DEGREES
1824	42,2347	00000 1	OCT	00000	23	SPARE
1825	42,2350	24400 0	OCT	24400	24 3COMP	HMS (DEC ONLY)
1826	42,2351	04140 0	OCT	04140	25 3COMP	WHOLE
1827	42,2352	04000 0	OCT	04000	26 3COMP	OCTAL ONLY
1828	42,2353	00140 1	OCT	00140	27 1COMP	WHOLE
1829	42,2354	00000 1	OCT	00000	28	SPARE
1830	42,2355	00000 1	OCT	00000	29	SPARE
1831	42,2356	00000 1	OCT	0	30	SPARE
1832	42,2357	00000 1	OCT	0	31	SPARE
1833	42,2360	24400 0	OCT	24400	32 3COMP	HMS (DEC ONLY)
1834	42,2361	24400 0	OCT	24400	33 3COMP	HMS (DEC ONLY)
1835	42,2362	24400 0	OCT	24400	34 3COMP	HMS (DEC ONLY)
1836	42,2363	24400 0	OCT	24400	35 3COMP	HMS (DEC ONLY)
1837	42,2364	24400 0	OCT	24400	36 3COMP	HMS (DEC ONLY)
1838	42,2365	24400 0	OCT	24400	37 3COMP	HMS (DEC ONLY)
1839	42,2366	24400 0	OCT	24400	38 3COMP	HMS (DEC ONLY)
1840	42,2367	00000 1	OCT	00000	39	SPARE

R18401 END OF NNTYPTAB FOR NORMAL NOUNS

			NN MIXED NOUNS			
A18402	42,2370	24500 1	OCT	24500	40 3COMP	MIN/SEC, VEL3, VEL3 (NO LOAD, DEC ONLY)
1841						
A18411	42,2371	00542 1	OCT	00542	41 2COMP	CDU DEG, ELEV DEG
1842	42,2372	24410 1	OCT	24410	42 3COMP	POS4, POS4, VEL3 (DEC ONLY)
A18431	42,2373	20204 0	OCT	20204	43 3COMP	DPDEG(360), DPDEG(360), POS4 (DEC ONLY)
1844						
A18441	42,2374	00410 1	OCT	00410	44 3COMP	POS4, POS4, MIN/SEC (NO LOAD, DEC ONLY)
1845						
A18451	42,2375	10000 0	OCT	10000	45 3COMP	WHOLE, MIN/SEC, DPDEG(360) (NO LOAD, DEC ONLY)
1846						
A18461	42,2376	00000 1	OCT	00000	46 1COMP	OCTAL ONLY
1847	42,2377	00306 1	OCT	00306	47 2COMP	WEIGHT2 FOR EACH (DEC ONLY)
1848						
A18481	42,2400	01367 1	OCT	01367	48 2COMP	TRIM DEG2 FOR EACH
1849						

PINBALL NOUN TABLES

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A18491					(DEC ONLY)
1850	42,2401	00510 0	DCT	00510	49 3COMP POS4, VEL3, WHOLE
A18501					(DEC ONLY)
1851	42,2402	00000 1	DCT	0	50 SPARE
1852	42,2403	00204 1	DCT	00204	51 2COMP DPDEG(360), DPDEG(360)
A18521					(DEC ONLY)
1853	42,2404	00004 0	DCT	00004	52 1COMP DPDEG(360)
1854	42,2405	00000 1	DCT	00000	53 SPARE
1855	42,2406	10507 1	DCT	10507	54 3COMP POS5, VEL3, DPDEG(360)
A18551					(DEC ONLY)
1858	42,2407	10200 1	DCT	10200	55 3COMP WHOLE, DPDEG(360), DPDEG(360)
A18581					(DEC ONLY)
1859	42,2410	00204 1	DCT	00204	56 2COMP DPDEG(360), DPDEG(360)
1860	42,2411	00010 0	DCT	00010	57 1COMP POS4
A18601					(DEC ONLY)
1861	42,2412	24510 0	DCT	24510	58 3COMP POS4, VEL3, VEL3
A18611					(DEC ONLY)
1862	42,2413	24512 1	DCT	24512	59 3COMP VEL3 FOR EACH
A18621					(DEC ONLY)
1863	42,2414	60512 1	DCT	60512	60 3COMP VEL3, VEL3, COMP ALT
A18631					(DEC ONLY)
1864	42,2415	54000 0	DCT	54000	61 3COMP MIN/SEC, MIN/SEC, POS7
A18641					(NO LOAD, DEC ONLY)
1865	42,2416	24012 1	DCT	24012	62 3COMP VEL3, MIN/SEC, VEL3
A18651					(NO LOAD, DEC ONLY)
1866	42,2417	60512 1	DCT	60512	63 3COMP VEL3, VEL3, COMP ALT
A18661					(DEC ONLY)
1867	42,2420	60500 1	DCT	60500	64 3COMP ZINT, VEL3, COMP ALT
A18671					(NO LOAD, DEC ONLY)
1868	42,2421	00000 1	DCT	00000	65 3COMP MMS (DEC ONLY)
1869	42,2422	00016 0	DCT	00016	66 2COMP LANDING RADAR ALT, POSITION
A18691					(NO LOAD, DEC ONLY)
1870	42,2423	53223 1	DCT	53223	67 3COMP LANDING RADAR VELX, Y, Z
1871	42,2424	60026 0	DCT	60026	68 3COMP POS7, MIN/SEC, COMP ALT
A18711					(NO LOAD, DEC ONLY)
1872	42,2425	00000 1	DCT	00000	69 SPARE
1873	42,2426	00000 1	DCT	0	70 3COMP OCTAL ONLY FOR EACH
1874	42,2427	00000 1	DCT	0	71 3COMP OCTAL ONLY FOR EACH
1875	42,2430	00102 1	DCT	00102	72 2COMP 360-CDU DEG, CDU DEG
1876	42,2431	00102 1	DCT	00102	73 2COMP 360-CDU DEG, CDU DEG
1877	42,2432	10200 1	DCT	10200	74 3COMP MIN/SEC, DPDEG(360), DPDEG(360)
A18771					(NO LOAD, DEC ONLY)
1878	42,2433	00010 0	DCT	00010	75 3COMP POS4, MIN/SEC, MIN/SEC
A18781					(NO LOAD, DEC ONLY)
1879	42,2434	20512 0	DCT	20512	76 3COMP VEL3, VEL3, POS4
A18791					(DEC ONLY)
1880	42,2435	00500 1	DCT	00500	77 2COMP MIN/SEC, VEL3
A18801					(NO LOAD, DEC ONLY)
1881	42,2436	00654 0	DCT	00654	78 2 COMP RR RANGE, RR RANGE RATE
1882	42,2437	00102 1	DCT	00102	79 3COMP CDU DEG, CDU DEG, WHOLE

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Label	Address	Value	Mode	Value	Description
A18821					(DEC ONLY)
1883	42,2440	00200 0	DCT	00200	80 2COMP WHOLE, DPDEG(360)
1884	42,2441	24512 1	DCT	24512	81 3COMP VEL3 FOR EACH
A18841					(DEC ONLY)
1885	42,2442	24512 1	DCT	24512	82 3COMP VEL3 FOR EACH
A18851					(DEC ONLY)
1886	42,2443	24512 1	DCT	24512	83 3COMP VEL3 FOR EACH
A18861					(DEC ONLY)
1887	42,2444	24512 1	DCT	24512	84 3COMP VEL3 FOR EACH
A18871					(DEC ONLY)
1888	42,2445	24512 1	DCT	24512	85 3COMP VEL3 FOR EACH
A18881					(DEC ONLY)
1889	42,2446	24512 1	DCT	24512	86 3COMP VEL3 FOR EACH
A18891					(DEC ONLY)
1890	42,2447	00102 1	DCT	00102	87 2COMP CDU DEG FOR EACH
1891	42,2450	00000 1	DCT	0	88 3COMP FRAC FOR EACH
A18912					(DEC ONLY)
1892	42,2451	16143 0	DCT	16143	89 3COMP DPDEG(90), DPDEG(90), POS5
A18921					(DEC ONLY)
1893	42,2452	10507 1	DCT	10507	90 3COMP POS5, VEL3, DPDEG(360)
A18931					(DEC ONLY)
1894	42,2453	10450 1	DCT	10450	91 3COMP POS4, VEL2, DPDEG(360)
1895	42,2454	00000 1	DCT	00000	92 SPARE
1896	42,2455	06143 1	DCT	06143	93 3COMP DPDEG(90) FOR EACH
1897	42,2456	00000 1	DCT	00000	94 SPARE
1898	42,2457	00000 1	DCT	0	95 SPARE
1899	42,2460	00000 1	DCT	0	96 SPARE
1900	42,2461	00000 1	DCT	00000	97 3COMP WHOLE FOR EACH
1901	42,2462	00000 1	DCT	00000	98 3COMP WHOLE, FRAC, WHOLE
1902	42,2463	71572 1	DCT	71572	99 3COMP POS9, VEL4, RADIAN
A19021					(DEC ONLY)
1903					

END OF NNTYPTAB FOR MIXED NOUNS

Label	Address	Value	Mode	Value	Description
2200	42,2464	00006 1	SFINTAB DCT	00006	WHOLE, DP TIME (SEC)
2201	42,2465	03240 1	DCT	03240	
2202	42,2466	00000 1	DCT	00000	SPARE
2203	42,2467	00000 1	DCT	00000	
2204	42,2470	00000 1	DCT	00000	CDU DEGREES, 360-CDU DEGREES
2205	42,2471	00000 1	DCT	00000	(SFCONS IN DEGINSE)
2206	42,2472	10707 0	DCT	10707	DP DEGREES (90)
2207	42,2473	03435 0	DCT	03435	UPPED BY 1
2208	42,2474	13070 1	DCT	13070	DP DEGREES (360) (POINT BETWN BITS 11-12)
2209	42,2475	34345 1	DCT	34345	UPPED BY 1
2210	42,2476	00005 1	DCT	00005	DEGREES (180)
2211	42,2477	21616 0	DCT	21616	
2212	42,2500	26113 0	DCT	26113	WEIGHT2
2213	42,2501	31713 0	DCT	31713	
2214	42,2502	00070 0	DCT	00070	POSITIONS
2215	42,2503	20460 1	DCT	20460	

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2216	42.2504	01065 0	OCT	01065	POSITION4
2217	42.2505	05740 1	OCT	05740	
2218	42.2506	11414 0	OCT	11414	VELOCITY2 (POINT BETWEEN BITS 11-12)
2219	42.2507	31463 1	OCT	31463	
2220	42.2510	07475 0	OCT	07475	VELOCITY3
2221	42.2511	16051 1	OCT	16051	
2222	42.2512	00001 0	OCT	00001	ELEVATION DEGREES
2223	42.2513	03434 1	OCT	03434	
2224	42.2514	00047 1	OCT	00047	RENDEZVOUS RADAR RANGE
2225	42.2515	21135 0	OCT	21135	
2226	42.2516	77766 0	OCT	77766	RENDEZVOUS RADAR RANGE RATE
2227	42.2517	50711 0	OCT	50711	
2228	42.2520	00005 1	2DEC*	.9267840599 E5	B-28 * LANDING RADAR ALTITUDE
2228	42.2521	25006 0			
2230	42.2522	00002 0	OCT	00002	INITIAL/FINAL ALTITUDE
2231	42.2523	23224 1	OCT	23224	
2232	42.2524	00014 1	OCT	00014	ALTITUDE RATE
2233	42.2525	06500 1	OCT	06500	
2234	42.2526	00012 1	OCT	00012	FORWARD/LATERAL VELOCITY
2235	42.2527	36455 0	OCT	36455	
2236	42.2530	04256 1	OCT	04256	ROT HAND CONT ANGLE RATE
2237	42.2531	07071 0	OCT	07071	
2238	42.2532	77766 0	2DEC*	-1.552795030 E5	B-28 * LANDING RADAR VELX
2238	42.2533	60567 0			
2240	42.2534	00005 1	2DEC*	.8250825087 E5	B-28 * LANDING RADAR VELY
2240	42.2535	01114 1			
2242	42.2536	00007 0	2DEC*	-1.153668673 E5	B-28 * LANDING RADAR VELZ
2242	42.2537	01247 1			
2244	42.2540	04324 0	OCT	04324	POSITION7
2245	42.2541	27600 1	OCT	27600	
2246	42.2542	00036 1	OCT	00036	TRIM DEGREES2
2247	42.2543	20440 0	OCT	20440	
2248	42.2544	00035 1	OCT	00035	COMPUTED ALTITUDE
2249	42.2545	30400 0	OCT	30400	
2250	42.2546	23420 0	OCT	23420	DP DEGREES
2251	42.2547	00000 1	OCT	00000	
2252	42.2550	01670 1	2DEC	30480 B-19	POSITION 9
2252	42.2551	20000 0			
2253	42.2552	07475 0	2DEC	30.48 B-7	VELOCITY4
2253	42.2553	16051 1			
2254	42.2554	14400 0	2DEC	100 B-8	RADIANS
2254	42.2555	00000 1			
A2290					END OF SFINTAB
2300	42.2556	05174 0	SFDUTAB OCT	05174	WHOLE DP TIME (SEC)
2301	42.2557	13261 0	OCT	13261	
2302	42.2560	00000 1	OCT	00000	SPARE
2303	42.2561	00000 1	OCT	00000	
2304	42.2562	00000 1	OCT	00000	CDU DEGREES, 360-CDU DEGREES

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Address	Value	Field	Description
2305	42,2563 00000 1	OCT 00000	(SFCONS IN DEGOUTSF, 360-CDUD)
2306	42,2564 00714 0	OCT 00714	DP DEGREES (90) (POINT BETWN BITS 7-8)
2307	42,2565 31463 1	OCT 31463	
2308	42,2566 13412 1	OCT 13412	DP DEGREES (360)
2309	42,2567 07534 1	OCT 07534	
2310	42,2570 05605 1	OCT 05605	DEGREES (180)
2311	42,2571 03656 1	OCT 03656	
2312	42,2572 00001 0	OCT 00001	WEIGHT2
2313	42,2573 16170 0	OCT 16170	
2314	42,2574 00441 0	OCT 00441	POSITION5
2315	42,2575 34306 0	OCT 34306	
2316	42,2576 07176 0	OCT 07176	POSITION4 (POINT BETWN BITS 7-8)
2317	42,2577 21603 1	OCT 21603	
2318	42,2600 15340 1	OCT 15340	VELOCITY2
2319	42,2601 15340 1	OCT 15340	
2320	42,2602 01031 1	OCT 01031	VELOCITY3 (POINT BETWN BITS 7-8)
2321	42,2603 21032 0	OCT 21032	
2322	42,2604 34631 1	OCT 34631	ELEVATION DEGREES
2323	42,2605 23146 0	OCT 23146	
2324	42,2606 00636 1	OCT 00636	RENDEZVOUS RADAR RANGE
2325	42,2607 14552 0	OCT 14552	
2326	42,2610 74552 0	OCT 74552	RENDEZVOUS RADAR RANGE RATE
2327	42,2611 70307 1	OCT 70307	
2328	42,2612 05520 0	2DEC 1.079 E-5 B14	LANDING RADAR ALTITUDE
2328	42,2613 15312 0		
2330	42,2614 14226 1	OCT 14226	INITIAL/FINAL ALTITUDE
2331	42,2615 31757 0	OCT 31757	
2332	42,2616 02476 0	OCT 02476	ALTITUDE RATE
2333	42,2617 05531 0	OCT 05531	
2334	42,2620 02727 1	OCT 02727	FORWARD/LATERAL VELOCITY
2335	42,2621 16415 0	OCT 16415	
2336	42,2622 00007 0	OCT 00007	ROT HAND CONT ANGLE RATE
2337	42,2623 13734 0	OCT 13734	
2338	42,2624 74477 0	2DEC -.6440 E-5 B14	LANDING RADAR VELX
2338	42,2625 50643 0		
2340	42,2626 06265 0	2DEC 1.212 E-5 B14	LANDING RADAR VELY
2340	42,2627 16004 1		
2342	42,2630 04426 0	2DEC .8668 E-5 B14	LANDING RADAR VELZ
2342	42,2631 31433 1		
2344	42,2632 34772 1	OCT 34772	POSITION7
2345	42,2633 07016 1	OCT 07016	
2346	42,2634 01030 0	OCT 01030	TRIM DEGREES2
2347	42,2635 33675 0	OCT 33675	
2348	42,2636 01046 1	OCT 01046	COMPUTED ALTITUDE
2349	42,2637 15700 1	OCT 15700	
2350	42,2640 00321 1	OCT 00321	DP DEGREES
2351	42,2641 26706 1	OCT 26706	
2352	42,2642 04231 0	2DEC 17.2010499 B-7	POSITION 9
2352	42,2643 27400 0		
2353	42,2644 01031 1	2DEC .032808399	VELOCITY4
2353	42,2645 21032 0		

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2354 42.2646 12172 0
 2354 42.2647 34122 1
 A2390

2DEC .32

RADIAN5

END OF SFOUTAB

A2400

NW SF CONSTANT

SF ROUTINE

2401	REF	9	LAST	306	42.2650	03453 0	10ADDDTAB	ECADR	TTOGH	40	MIN/SEC	M/S
2402	REF	1			42.2651	03663 1		ECADR	VGDISP	40	VEL3	DP3
2403	REF	2	LAST	147	42.2652	03507 0		ECADR	DVTOTAL	40	VEL3	DP3
2404	REF	8	LAST	306	42.2653	01045 1		ECADR	DSPTM1	41	CDU DEG	CDU
2405	REF	9	LAST	314	42.2654	01046 1		ECADR	DSPTM1 +1	41	ELEV DEG	ARTH
2406					42.2655	00000 1		DCT	0	41	SPARE COMPONENT	
2407	REF	3	LAST	283	42.2656	02316 1		ECADR	HAPD	42	POS4	DP3
2408	REF	1			42.2657	02320 1		ECADR	HPER	42	POS4	DP3
2409	REF	2	LAST	314	42.2660	03663 1		ECADR	VGDISP	42	VEL3	DP3
2410	REF	2	LAST	104	42.2661	01120 0		ECADR	LAT	43	DPDEG(360)	DP4
2411	REF	2	LAST	104	42.2662	01122 1		ECADR	LONG	43	DPDEG(360)	DP4
2412	REF	2	LAST	104	42.2663	01124 1		ECADR	ALT	43	POS4	DP3
2413	REF	2	LAST	114	42.2664	02117 1		ECADR	HAPUX	44	POS4	DP3
2414	REF	1			42.2665	02121 1		ECADR	HPERX	44	POS4	DP3
2415	REF	2	LAST	115	42.2666	02140 0		ECADR	TEF	44	MIN/SEC	M/S
2416	REF	3	LAST	241	42.2667	03462 1		ECADR	TEKXCENT	45	WHOLE	ARTH
2417	REF	10	LAST	314	42.2670	03453 0		ECADR	TTOGH	45	MIN/SEC	M/S
2418	REF	1			42.2671	02252 0		ECADR	+MGA	45	DPDEG(360)	DP4
2419	REF	10	LAST	293	42.2672	01343 1		ECADR	DAPDATPI	46	DCTAL ONLY	DCT
2420					42.2673	00000 1		DCT	0	46	SPARE COMPONENT	
2421					42.2674	00000 1		DCT	0	46	SPARE COMPONENT	
2422	REF	10	LAST	295	42.2675	01331 1		ECADR	LEHMASS	47	WEIGHT2	ARTH1
2423	REF	4	LAST	295	42.2676	01332 1		ECADR	CSMASS	47	WEIGHT2	ARTH1
2424					42.2677	00000 1		DCT	0	47	SPARE COMPONENT	
2425	REF	1			42.2700	03002 0		ECADR	PITTIME	48	TRIM DEG2	ARTH
2426	REF	2	LAST	295	42.2701	03001 0		ECADR	ROLLTIME	48	TRIM DEG2	ARTH
2427					42.2702	00000 1		DCT	0	48	SPARE COMPONENT	
2428	REF	1			42.2703	00314 1		ECADR	R22DISP	49	POS4	DP3
2429	REF	2	LAST	314	42.2704	00316 0		ECADR	R22DISP +2	49	VEL3	DP3
2430	REF	1			42.2705	03745 1		ECADR	WHCHHEAD	49	WHOLE	ARTH
2431					42.2706	00000 1		DCT	0	50	SPARE	
2432					42.2707	00000 1		DCT	0	50	SPARE	
2433					42.2710	00000 1		DCT	0	50	SPARE	
2434	REF	4	LAST	280	42.2711	02200 1		ECADR	ALPHASB	51	DPDEG(360)	DP4
2435	REF	3	LAST	118	42.2712	02202 0		ECADR	BETASB	51	DPDEG(360)	DP4
2436					42.2713	00000 1		DCT	0	51	SPARE COMPONENT	
2437	REF	1			42.2714	01755 1		ECADR	ACTCENT	52	DPDEG(360)	DP4
2438					42.2715	00000 1		DCT	00000	52	SPARE COMPONENT	
2439					42.2716	00000 1		DCT	00000	52	SPARE COMPONENT	
2440					42.2717	00000 1		DCT	00000	53	SPARE	
2441					42.2720	00000 1		DCT	00000	53		
2442					42.2721	00000 1		DCT	00000	53		
2443	REF	7	LAST	118	42.2722	02200 1		ECADR	RANGE	54	POS5	DP1

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2444	REF	3	LAST	115	42,2723	02202 0	ECADR	RRATE	54	VEL3	DP3
2445	REF	3	LAST	115	42,2724	02204 0	ECADR	RTHETA	54	DPDEG(360)	DP4
2446	REF	2	LAST	198	42,2725	03466 0	ECADR	NN	55	WHOLE	ARTH
2447	REF	3	LAST	198	42,2726	02256 1	ECADR	ELEV	55	DPDEG(360)	DP4
2448	REF	2	LAST	198	42,2727	03620 0	ECADR	CENTANG	55	DPDEG(360)	DP4
2449	REF	5	LAST	300	42,2730	02200 1	ECADR	RF-AZ	56	DPDEG(360)	DP4
2450	REF	2	LAST	300	42,2731	02202 0	ECADR	RF-ELEV	56	DPDEG(360)	DP4
2451					42,2732	00000 1	DCT	D	56	SPARE COMPONENT	
2452	REF	4	LAST	198	42,2733	02302 1	ECADR	DELTA R	57	POS4	DP3
2453					42,2734	00000 1	DCT	D	57	SPARE COMPONENT	
2454					42,2735	00000 1	DCT	D	57	SPARE COMPONENT	
2455	REF	3	LAST	141	42,2736	03605 1	ECADR	PGSTTPI	58	POS4	DP3
2456	REF	5	LAST	141	42,2737	03575 0	ECADR	DELVTPI	58	VEL3	DP3
2457	REF	2	LAST	198	42,2740	02347 0	ECADR	DELVTPI	58	VEL3	DP3
2458	REF	2	LAST	117	42,2741	02302 1	ECADR	DVLOS	59	VEL3	DP3
2459	REF	3	LAST	315	42,2742	02304 1	ECADR	DVLOS +2	59	VEL3	DP3
2460	REF	4	LAST	315	42,2743	02306 0	ECADR	DVLOS +4	59	VEL3	DP3
2461	REF	2	LAST	119	42,2744	02262 0	ECADR	VHORIZ	60	VEL3	DP3
2462	REF	3	LAST	147	42,2745	03473 1	ECADR	HDOTDISP	60	VEL3	DP3
2463	REF	2	LAST	147	42,2746	03534 0	ECADR	HCALC	60	COMP ALT	DP1
2464	REF	2	LAST	147	42,2747	03475 1	ECADR	TTFDISP	61	MIN/SEC	M/S
2465	REF	11	LAST	314	42,2750	03453 0	ECADR	TTOGO	61	MIN/SEC	M/S
2466	REF	2	LAST	122	42,2751	02626 1	ECADR	OUTOFPLN	61	POST	DP4
2467	REF	2	LAST	147	42,2752	03471 0	ECADR	ABVEL	62	VEL3	DP3
2468	REF	12	LAST	315	42,2753	03453 0	ECADR	TTOGO	62	MIN/SEC	M/S
2469	REF	3	LAST	314	42,2754	03507 0	ECADR	DVTOTAL	62	VEL3	DP3
2470	REF	3	LAST	315	42,2755	03471 0	ECADR	ABVEL	63	VEL3	DP3
2471	REF	4	LAST	315	42,2756	03473 1	ECADR	HDOTDISP	63	VEL3	DP3
2472	REF	1			42,2757	03774 0	ECADR	HCALC1	63	COMP ALT	DP1
2473	REF	5	LAST	150	42,2760	03666 1	ECADR	FUNNYDSP	64	ZINT	ZINT
2474	REF	5	LAST	315	42,2761	03473 1	ECADR	HDOTDISP	64	VEL3	DP3
2475	REF	3	LAST	315	42,2762	03534 0	ECADR	HCALC	64	COMP ALT	DP1
2476	REF	2	LAST	207	42,2763	00013 0	ECADR	SAMPTIME	65	HMS (MIXED ONLY TO KEEP CODE 66)	HMS
2477	REF	3	LAST	315	42,2764	00013 0	ECADR	SAMPTIME	65	HMS	HMS
2478	REF	4	LAST	315	42,2765	00013 0	ECADR	SAMPTIME	65	HMS	HMS
2479	REF	3	LAST	277	42,2766	02206 1	ECADR	RSTACK +6	66	LANDING RADAR ALT	DP1
2480					42,2767	00000 1	DCT	D	66	LR POSITION	LAPDS
2481					42,2770	00000 1	DCT	D	66	SPARE COMPONENT	
2482	REF	4	LAST	315	42,2771	02200 1	ECADR	RSTACK	67	LANDING RADAR VELX	DP1
2483	REF	5	LAST	315	42,2772	02202 0	ECADR	RSTACK +2	67	LANDING RADAR VELY	DP1
2484	REF	6	LAST	315	42,2773	02204 0	ECADR	RSTACK +4	67	LANDING RADAR VELZ	DP1
2485	REF	2	LAST	122	42,2774	02624 0	ECADR	RANGEDSP	68	POST	DP4
2486	REF	3	LAST	315	42,2775	03475 1	ECADR	TTFDISP	68	MIN/SEC	M/S
2487	REF	3	LAST	200	42,2776	03664 0	ECADR	DELTAH	68	COMP ALT	DP1
2488					42,2777	00000 1	DCT	00000	69	SPARE	
2489					42,3000	00000 1	DCT	00000	69		
2490					42,3001	00000 1	DCT	00000	69		
2491	REF	3	LAST	246	42,3002	00735 0	ECADR	AUTCODE	70	OCTAL ONLY	OCT
2492	REF	4	LAST	315	42,3003	00736 0	ECADR	AUTCODE +1	70	OCTAL ONLY	OCT
2493	REF	5	LAST	315	42,3004	00737 1	ECADR	AUTCODE +2	70	OCTAL ONLY	OCT

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2494	REF	6	LAST	315	42,3005	00735 0	ECADR	AUTCODE	71	OCTAL ONLY	OCT
2495	REF	7	LAST	316	42,3006	00736 0	ECADR	AUTCODE +1	71	OCTAL ONLY	OCT
2496	REF	8	LAST	316	42,3007	00737 1	ECADR	AUTCODE +2	71	OCTAL ONLY	OCT
2497	REF	3	LAST	299	42,3010	00035 1	ECADR	CDUT	72	360-CDU DEG	360-CDU
2498	REF	3	LAST	198	42,3011	00036 1	ECADR	CDUS	72	CDU DEG	CDU
2499					42,3012	00000 1	OCT	0	72	SPARE COMPONENT	
2500	REF	2	LAST	103	42,3013	01107 0	ECADR	TANG	73	360-CDU DEG	360-CDU
2501	REF	3	LAST	316	42,3014	01110 0	ECADR	TANG +1	73	CDU DEG	CDU
2502					42,3015	00000 1	OCT	0	73	SPARE COMPONENT	
2503	REF	13	LAST	315	42,3016	03453 0	ECADR	TTDGD	74	MIN/SEC	M/S
2504	REF	2	LAST	120	42,3017	02362 1	ECADR	YAW	74	DPDEG(360)	DP4
2505	REF	1			42,3020	02364 1	ECADR	PITCH	74	DPDEG(360)	DP4
2506	REF	3	LAST	198	42,3021	03577 1	ECADR	DIFFALT	75	POS4	DP3
2507	REF	2	LAST	117	42,3022	02252 0	ECADR	T1TOT2	75	MIN/SEC	
2508	REF	1			42,3023	02254 0	ECADR	T2TOT3	75	MIN/SEC	M/S
2509	REF	2	LAST	119	42,3024	02276 0	ECADR	ZDDTD	76	VEL3	DP3
2510	REF	2	LAST	119	42,3025	02272 1	ECADR	RDDTD	76	VEL3	DP3
2511	REF	2	LAST	152	42,3026	03642 1	ECADR	XRANGE	76	POS4	DP3
2512	REF	14	LAST	316	42,3027	03453 0	ECADR	TTDGD	77	MIN/SEC	M/S
2513	REF	2	LAST	120	42,3030	02310 1	ECADR	YDDT	77	VEL3	DP3
2514					42,3031	00000 1	OCT	0	77	SPARE COMPONENT	
2515	REF	7	LAST	315	42,3032	02200 1	ECADR	RSTACK	78	RR RANGE	DP1
2516	REF	8	LAST	316	42,3033	02202 0	ECADR	RSTACK +2	78	RR RANGE RATE	DP1
2517					42,3034	00000 1	OCT	00000	78	SPARE COMPONENT	
2518	REF	2	LAST	261	42,3035	01236 1	ECADR	CURSOR	79	CDU DEG	CDU
2519	REF	2	LAST	261	42,3036	01240 0	ECADR	SPIRAL	79	CDU DEG	CDU
2520	REF	1			42,3037	01242 1	ECADR	POSCODE	79	WHOLE	ARTH
2521	REF	2	LAST	144	42,3040	03733 0	ECADR	DATAGDUD	80	WHOLE	ARTH
2522	REF	1			42,3041	03734 1	ECADR	OMEGAD	80	DPDEG(360)	DP4
2523					42,3042	00000 1	OCT	0	80	SPARE COMPONENT	
2524	REF	2	LAST	139	42,3043	03433 0	ECADR	DELVLVC	81	VEL3	DP3
2525	REF	3	LAST	316	42,3044	03435 0	ECADR	DELVLVC +2	81	VEL3	DP3
2526	REF	4	LAST	316	42,3045	03437 1	ECADR	DELVLVC +4	81	VEL3	DP3
2527	REF	5	LAST	316	42,3046	03433 0	ECADR	DELVLVC	82	VEL3	DP3
2528	REF	6	LAST	316	42,3047	03435 0	ECADR	DELVLVC +2	82	VEL3	DP3
2529	REF	7	LAST	316	42,3050	03437 1	ECADR	DELVLVC +4	82	VEL3	DP3
2530	REF	1			42,3051	03622 1	ECADR	DELVINU	83	VEL3	DP3
2531	REF	2	LAST	316	42,3052	03624 1	ECADR	DELVINU +2	83	VEL3	DP3
2532	REF	3	LAST	316	42,3053	03626 0	ECADR	DELVINU +4	83	VEL3	DP3
2533	REF	1			42,3054	02222 1	ECADR	DELVDV	84	VEL3	DP3
2534	REF	2	LAST	316	42,3055	02224 1	ECADR	DELVDV +2	84	VEL3	DP3
2535	REF	3	LAST	316	42,3056	02226 0	ECADR	DELVDV +4	84	VEL3	DP3
2536	REF	3	LAST	147	42,3057	03501 0	ECADR	VGBDDY	85	VEL3	DP3
2537	REF	4	LAST	316	42,3060	03503 1	ECADR	VGBDDY +2	85	VEL3	DP3
2538	REF	5	LAST	316	42,3061	03505 1	ECADR	VGBDDY +4	85	VEL3	DP3
2539	REF	8	LAST	316	42,3062	03433 0	ECADR	DELVLVC	86	VEL3	DP3
2540	REF	9	LAST	316	42,3063	03435 0	ECADR	DELVLVC +2	86	VEL3	DP3
2541	REF	10	LAST	316	42,3064	03437 1	ECADR	DELVLVC +4	86	VEL3	DP3
2542	REF	3	LAST	246	42,3065	01347 0	ECADR	AZ	87	CDU DEG	CDU
2543	REF	1			42,3066	01350 0	ECADR	EL	87	CDU DEG	CDU

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2544				42,3067	00000 1	OCT	0	87	SPARE COMPONENT	
2545	REF	11	LAST	253	42,3070	02706 1	ECADR	STARAD	88	FRAC
2546	REF	12	LAST	317	42,3071	02710 0	ECADR	STARAD +2	88	FRAC
2547	REF	13	LAST	317	42,3072	02712 1	ECADR	STARAD +4	88	FRAC
2548	REF	2	LAST	123	42,3073	02706 1	ECADR	LANDLAT	89	DPDEG(90)
2549	REF	2	LAST	123	42,3074	02710 0	ECADR	LANDLONG	89	DPDEG(90)
2550	REF	1			42,3075	02712 1	ECADR	LANDALT	89	POS5
2551	REF	8	LAST	314	42,3076	02200 1	ECADR	RANGE	90	POS5
2552	REF	4	LAST	315	42,3077	02202 0	ECADR	HEATE	90	VEL3
2553	REF	4	LAST	315	42,3100	02204 0	ECADR	ETHETA	90	DPDEG(360)
2554	REF	1			42,3101	03715 1	ECADR	P21ALT	91	POS4
2555	REF	2	LAST	148	42,3102	03711 0	ECADR	P21VEL	91	VEL2
2556	REF	2	LAST	148	42,3103	03713 1	ECADR	P21GAM	91	DPDEG(360)
2557					42,3104	00000 1	OCT	00000	92	SPARE
2558					42,3105	00000 1	OCT	00000	92	
2559					42,3106	00000 1	OCT	00000	92	
2560	REF	6	LAST	273	42,3107	02737 0	ECADR	UGC	93	DPDEG(90)
2561	REF	7	LAST	317	42,3110	02741 1	ECADR	UGC +2	93	DPDEG(90)
2562	REF	8	LAST	317	42,3111	02743 0	ECADR	UGC +4	93	DPDEG(90)
2563					42,3112	00000 1	OCT	00000	94	SPARE
2564					42,3113	00000 1	OCT	00000	94	
2565					42,3114	00000 1	OCT	00000	94	
2566					42,3115	00000 1	OCT	0	95	SPARE
2567					42,3116	00000 1	OCT	0	95	SPARE
2568					42,3117	00000 1	OCT	0	95	SPARE
2569					42,3120	00000 1	OCT	0	96	SPARE
2570					42,3121	00000 1	OCT	0	96	SPARE
2571					42,3122	00000 1	OCT	0	96	SPARE
2572	REF	10	LAST	314	42,3123	01045 1	ECADR	DSPTM1	97	WHOLE
2573	REF	11	LAST	317	42,3124	01046 1	ECADR	DSPTM1 +1	97	WHOLE
2574	REF	12	LAST	317	42,3125	01047 0	ECADR	DSPTM1 +2	97	WHOLE
2575	REF	4	LAST	305	42,3126	01050 0	ECADR	DSPTM2	98	WHOLE
2576	REF	5	LAST	317	42,3127	01051 1	ECADR	DSPTM2 +1	98	FRAC
2577	REF	6	LAST	317	42,3130	01052 1	ECADR	DSPTM2 +2	98	WHOLE
2578	REF	2	LAST	298	42,3131	02200 1	ECADR	WWPOS	99	POS9
2579	REF	1			42,3132	02202 0	ECADR	WWVEL	99	VEL4
2580	REF	1			42,3133	02204 0	ECADR	WXBIA5	99	RADIANS

R2600 END OF IDADDTAB

A2800

NN SF ROUTINES

2801	42,3134	16351 1	RUTMTAB	OCT	16351	40	M/S, DP3, DP3
2802	42,3135	00142 0		OCT	00142	41	CDU, ARTH
2803	42,3136	16347 0		OCT	16347	42	DP3, DP3, DP3
2804	42,3137	16512 0		OCT	16512	43	DP4, DP4, DP3
2805	42,3140	22347 1		OCT	22347	44	DP3, DP3, M/S
2806	42,3141	24443 1		OCT	24443	45	ARTH, M/S, DP4
2807	42,3142	00000 1		OCT	00000	46	OCT
2808	42,3143	00553 1		OCT	00553	47	ARITH1, ARITH1

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2809	42,3144	00143 1	OCT	00143	48 ARTH, ARTH
2810	42,3145	06347 1	OCT	06347	49 DP3, DP3, ARTH
2811	42,3146	00000 1	OCT	0	50 SPARE
2812	42,3147	00512 1	OCT	00512	51 DP4, DP4
2813	42,3150	00012 1	OCT	00012	52 DP4
2814	42,3151	00000 1	OCT	00000	53 SPARE
2815	42,3152	24344 1	OCT	24344	54 DP1, DP3, DP4
2816	42,3153	24503 1	OCT	24503	55 ARTH, DP4, DP4
2817	42,3154	00512 1	OCT	00512	56 DP4, DP4
2818	42,3155	00007 0	OCT	00007	57 DP3
2819	42,3156	16347 0	OCT	16347	58 DP3, DP3, DP3
2820	42,3157	16347 0	OCT	16347	59 DP3, DP3, DP3
2821	42,3160	10347 0	OCT	10347	60 DP3, DP3, DP1
2822	42,3161	24451 1	OCT	24451	61 M/S, M/S, DP4
2823	42,3162	16447 1	OCT	16447	62 DP3, M/S, DP3
2824	42,3163	10347 0	OCT	10347	63 DP3, DP3, DP1
2825	42,3164	10354 1	OCT	10354	64 2INT, DP3, DP1
2826	42,3165	20410 0	OCT	20410	65 HMS, HMS, HMS
2827	42,3166	00304 0	OCT	00304	66 DP1, LRPOS
2828	42,3167	10204 0	OCT	10204	67 DP1, DP1, DP1
2829	42,3170	10452 0	OCT	10452	68 DP4, M/S, DP1
2830	42,3171	00000 1	OCT	00000	69 SPARE
2831	42,3172	00000 1	OCT	0	70 OCT, OCT, OCT
2832	42,3173	00000 1	OCT	0	71 OCT, OCT, OCT
2833	42,3174	00115 1	OCT	00115	72 360-CDU, CDU
2834	42,3175	00115 1	OCT	00115	73 360-CDU, CDU
2835	42,3176	24511 1	OCT	24511	74 M/S, DP4, DP4
2836	42,3177	22447 0	OCT	22447	75 DP3, M/S, M/S
2837	42,3200	16347 0	OCT	16347	76 DP3, DP3, DP3
2838	42,3201	00351 0	OCT	00351	77 M/S, DP3
2839	42,3202	00204 1	OCT	00204	78 DP1, DP1
2840	42,3203	06102 1	OCT	06102	79 CDU, CDU, ARTH
2841	42,3204	00503 1	OCT	00503	80 ARTH, DP4
2842	42,3205	16347 0	OCT	16347	81 DP3, DP3, DP3
2843	42,3206	16347 0	OCT	16347	82 DP3, DP3, DP3
2844	42,3207	16347 0	OCT	16347	83 DP3, DP3, DP3
2845	42,3210	16347 0	OCT	16347	84 DP3, DP3, DP3
2846	42,3211	16347 0	OCT	16347	85 DP3, DP3, DP3
2847	42,3212	16347 0	OCT	16347	86 DP3, DP3, DP3
2848	42,3213	00102 1	OCT	00102	87 CDU, CDU
2849	42,3214	02041 0	OCT	02041	88 FRAC FOR EACH
2850	42,3215	10347 0	OCT	10347	89 DP3, DP3, DP1
2851	42,3216	24344 1	OCT	24344	90 DP1, DP3, DP4
2852	42,3217	24507 0	OCT	24507	91 DP3, DP4, DP4
2853	42,3220	00000 1	OCT	00000	92 SPARE
2854	42,3221	16347 0	OCT	16347	93 DP3, DP3, DP3
2855	42,3222	00000 1	OCT	00000	94 SPARE
2856	42,3223	00000 1	OCT	0	95 SPARE
2857	42,3224	00000 1	OCT	0	96 SPARE
2858	42,3225	06143 1	OCT	06143	97 ARTH, ARTH, ARTH

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2859	42,3226	06043 0	DCT	06043	98 ARTH, FRAC, ARTH
2860	42,3227	24247 0	DCT	24247	99 DP3, DP2, DP4
F2870	END OF RUTXTAB				

2871 REF 3 LAST 292 30.2000 SBANK= LOWSUPER

LEM GEOMETRY

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0001					23,2041	BANK	23
000101	REF	1			13,2000	SETLOC	LEMGEOM
000102					13,2070	BANK	
00015	REF	4	LAST	319	30,2000	SEANK	= LOWSUPER
0002	REF	3	LAST	123	25,1642	EBANK	= XSM

R0500 THESE TWO ROUTINES COMPUTE THE ACTUAL STATE VECTOR FOR LM,CSM BY ADDING
R0501 THE CONIC R.V. AND THE DEVIATION SH.V. THE STATE VECTORS ARE CONVERTED TO
R0502 METERS B-29 AND METERS/SEC B-7 AND STORED APPROPRIATELY IN RN,VN OR
R0503 R-OTHER , V-OTHER FOR DOWNLINK. THE ROUTINE NAMES ARE SWITCHED IN THE
R0504 OTHER VEHICLES COMPUTER.

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R0505  INPUT
R0506  STATE VECTOR IN TEMPORARY STORAGE AREA
R05061 IF STATE VECTOR IS SCALED PDS B27 AND VEL B5
R05062     SET X2 TO +2
R05063 IF STATE VECTOR IS SCALED PDS B29 AND VEL B7
R05064     SET X2 TO 0

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R0507  OUTPUT
R0508      R(T) IN RN, V(T) IN VR, T IN P1TIME
R0509  OR
R0510      R(T) IN R-OTHER, V(T) IN V-OTHER (T IS DEFINED BY T-OTHER)

```

NO	REF	LAST	TIME	DATE	TIME	DATE	TIME	DATE
05106	REF	1						
0511			13.2070	43414	1	SVDWNZ	BOF	RVC
05112	REF	1	13.2071	04756	1			SW=1=AVE TONED DOING W-MATRIX INTEG.
05113			13.2072	26073	1			AVERIDSW
05114			13.2073	53775	1	VLOAD	VSL*	+1
0512	REF	2 LAST	110	13.2074	01521	0		TDELTA V
0513			13.2075	57605	0			O -7.2
0514			13.2076	53655	1	VAD	VSL*	
0515	REF	2 LAST	110	13.2077	01535	0		KCV
0516			13.2100	57576	1			O,2
0517	REF	4 LAST	195	13.2101	25221	1	STOVL	RN
0518	REF	2 LAST	110	13.2102	01527	0		TROV
0519			13.2103	53257	1	VSL*	VAD	
0520			13.2104	57602	1			O -4.2
0521	REF	2 LAST	110	13.2105	01543	1		VCV
0522			13.2106	77657	0	VSL*		
0523			13.2107	57576	1			O,2
0524	REF	4 LAST	195	13.2110	15227	1	STOOL	VH
0525	REF	3 LAST	306	13.2111	01517	0		TET
0526	REF	2 LAST	195	13.2112	01235	1	STORE	PRTIME
0527			13.2113	77616	0		RVC	

L LEM GEOMETRY

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0528				13,2114	53775 1	SVDOWN1	VLOAD	VSL*
0529	REF	3	LAST	320	13,2115	01521 0		TDELTA V
0530				13,2116	57605 0			0 -7.2
0531				13,2117	53655 1		VAD	VSL*
0532	REF	3	LAST	320	13,2120	01535 0		PCV
0533				13,2121	57576 1			0.2
0534	REF	5	LAST	194	13,2122	25720 0	STOVL	R-OTHER
0535	REF	3	LAST	320	13,2123	01527 0		TNUV
0536				13,2124	53257 1		VSL*	VAD
0537				13,2125	57602 1			0 -4.2
0538	REF	3	LAST	320	13,2126	01543 1		VCV
0539				13,2127	77657 0		VSL*	
0540				13,2130	57576 1			0.2
0541	REF	5	LAST	194	13,2131	01726 0	STORE	V-OTHER
0542				13,2132	77616 0		RVQ	

L LEM GEOMETRY

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P0649 THE FOLLOWING ROUTINE TAKES A HALF UNIT TARGET VECTOR REFERRED TO NAV BASE COORDINATES AND FINDS BOTH
 R0651 GIMBAL ORIENTATIONS AT WHICH THE RE MIGHT SIGHT THE TARGET. THE GIMBAL ANGLES CORRESPONDING TO THE PRESENT MODE
 R0653 ARE LEFT IN MODEA AND THOSE WHICH WOULD BE USED AFTER A REMODE IN MODEB. THIS ROUTINE ASSUMES MODE 1 IS TRUNNION
 R0655 ANGLE LESS THAN 90 DEGS IN ABS VALUE WITH ARBITRARY SHAFT. WITH A CORRESPONDING DEFINITION FOR MODE 2. MODE
 R0657 SELECTION AND LIMIT CHECKING ARE DONE ELSEWHERE.

R0658 THE MODE 1 CONFIGURATION IS CALCULATED FROM THE VECTOR AND THEN MODE 2 IS FOUND USING THE RELATIONS

R0660 $S(2) = 180 + S(1)$
 R0661 $T(2) = 180 - T(1)$

R066101 THE VECTOR ARRIVES IN MPAC WHERE TRG=SMNB OR *SMNB* WILL HAVE LEFT IT.

0662				13.2133	00041 1	RRANGLES	STORE	32D	
06625				13.2134	57545 1		DLOAD	DCOMP	SINCE WE WILL FIND THE MODE 1 SHAFT
0663				13.2135	00043 0			34D	ANGLE LATER. WE CAN FIND THE MODE 1
0664				13.2136	67401 0		SETPD	ASIN	TRUNNION BY SIMPLY TAKING THE ARCSIN OF
0665				13.2137	00001 0			0	THE Y COMPONENT, THE ASIN GIVING AN
0666				13.2140	44206 0		PUSH	BDSU	ANSWER WHOSE ABS VAL IS LESS THAN 90 DEG
0667	REF	1		13.2141	24005 1			LOGPHALF	
0668				13.2142	14005 1		STODL	4	MODE 2 TRUNNION TO 4.
0669	REF	3	LAST	249	13.2143	24007 0		LOGZEROS	
0670					13.2144	24043 0	STOVL	34D	UNIT THE PROJECTION OF THE VECTOR
0671					13.2145	00041 1		32D	IN THE X-Z PLANE
0672					13.2146	41056 1	UNIT	BOVB	IF OVERFLOW, TARGET VECTOR IS ALONG Y
0673	REF	1			13.2147	52421 1		LUNDESH	CALL FOR MANEUVER UNLESS ON LUNAR SURF
0674					13.2150	14041 1	STODL	32D	PROJECTION VECTOR.
0675					13.2151	00041 1		32D	
0676					13.2152	44142 0	SR1	STQ	
0677	REF	1			13.2153	00051 0		S2	
0678	REF	3	LAST	300	13.2154	14023 0	STODL	SINTH	USE ARCTRIG SINCE SHAFT COULD BE ARB.
0679					13.2155	00045 0		36D	
0680					13.2156	77742 0	SR1		
0681	REF	3	LAST	300	13.2157	34021 0	STCALL	COSTH	
0682	REF	3	LAST	300	13.2160	47320 0		ARCTRIG	

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0683					13,2161	43206 1	PUSH	DAD	MODE 1 SHAFT TO 2.
0684	REF	2	LAST	322	13,2162	24005 1		LODPHALF	
0685					13,2163	24007 0	STOVL	6	
0686					13,2164	00005 1		4	
0687					13,2165	77634 0	RTB		FIND MODE 2 CDU ANGLES.
0688	REF	1			13,2166	21635 1		2V1ST02S	
0689	REF	2	LAST	103	13,2167	25112 1	STOVL	MODEB	
0690					13,2170	00001 0		0	
0691					13,2171	77634 0	RTB		MODE 1 ANGLES TO MODE A.
0692	REF	2	LAST	323	13,2172	21635 1		2V1ST02S	
0693	REF	1			13,2173	01110 0	STORE	MODEA	
0694					13,2174	77776 1	EXIT		
0695	REF	26	LAST	276	13,2175	4 0110 0	CS	PADMODES	SWAP MODEA AND MODEB IF RR IN MODE 2.
0696	REF	1			13,2176	7 4740 1	MASK	ANTENBIT	
0697	REF	94	LAST	305	13,2177	10 000 0	CCS	A	
0698					13,2200	1 2204 1	TCF	+4	
0699	REF	2	LAST	323	13,2201	53 110 1	DXCH	MODEA	
0700	REF	3	LAST	323	13,2202	53 112 0	DXCH	MODEB	
0701	REF	3	LAST	323	13,2203	53 110 1	DXCH	MODEA	
0702	REF	10	LAST	299	13,2204	0 6037 0	TC	INTERPRET	
0703					13,2205	77650 1	GOTO		
0704	REF	2	LAST	322	13,2206	00051 0		S2	

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PO705 GIVEN RR TRUNNION AND SHAFT (T,S) IN TANGNB,+1,FIND THE ASSOCIATED
 RD706 LINE OF SIGHT IN NAV-BASE-AXES. THE HALF UNIT VECTOR, .5(SIN(S)COS(T),
 R0707 -SIN(T),COS(S)COS(T)) IS LEFT IN MPAC AND 320.

07072 REF 1 23,2000 SETLOC INFLIGHT
 07074 23,2041 BANK

07076 REF 1 COUNT* 337/GEOM

0708 23,2041 47135 0 RRNB SLOAD RTB
 0709 REF 4 LAST 201 23,2042 03753 0 TANGNB
 07091 REF 5 LAST 250 23,2043 21576 0 CDULOGIC
 0710 23,2044 41401 1 SETPD PUSH TRUNNION ANGLE TO 0
 0711 23,2045 00001 0 0
 0712 23,2046 57556 0 SIN DCOMP
 0713 23,2047 14043 0 STOOL 340 Y COMPONENT

0714 23,2050 41546 0 COS PUSH .5 COS(T) TO 0
 0715 23,2051 47135 0 SLOAD RTB
 0716 REF 5 LAST 324 23,2052 03754 1 TANGNB +1
 0717 REF 6 LAST 324 23,2053 21576 0 CDULOGIC
 0718 23,2054 71406 0 RRNB1 PUSH COS SHAFT ANGLE TO 2
 0719 23,2055 72405 0 DMP SL1
 0720 23,2056 00001 0 0
 0721 23,2057 14045 0 STOOL 360 Z COMPONENT

0722 23,2060 41356 1 SIN DMP
 0723 23,2061 77752 1 SL1
 0724 23,2062 24041 1 STOVL 320
 0725 23,2063 00041 1 320
 0726 23,2064 77616 0 RVQ

PO727 THIS ENTRY TO RRNB REQUIRES THE TRUNNION AND SHAFT ANGLES IN MPAC AND MPAC +1 RESPECTIVELY

0729 23,2065 14025 0 RRNBMPAC STOOL 200 SAVE SHAFT CDU IN 21.
 07291 REF 43 LAST 299 23,2066 00155 0 MPAC SET MODE TO DP. (THE PRECEDING STORE
 A07292 MAY BE DP, TP OR VECTOR.)
 0730 23,2067 40234 0 RTB SETPD
 0731 REF 7 LAST 324 23,2070 21576 0 CDULOGIC
 0732 23,2071 00001 0 0
 0733 23,2072 73406 1 PUSH SIN TRUNNION ANGLE TO 0
 0734 23,2073 77676 0 DCOMP
 0735 23,2074 14043 0 STOOL 340 Y COMPONENT
 0736 23,2075 41546 0 COS PUSH .5 COS(T) TO 0
 0737 23,2076 47135 0 SLOAD RTB PICK UP CDUS.
 0738 23,2077 00026 0 210
 0739 REF 8 LAST 324 23,2100 21576 0 CDULOGIC
 0740 23,2101 77650 1 GOTO
 0741 REF 1 23,2102 46054 1 RRNB1

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L IMU COMPENSATION PACKAGE

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0001				07,2667			BANK 7	
000101	REF	1		06,2000			SETLOC IMUCOMP	
000102				06,3263			BANK	
0002	REF	1		E3,1460			EBANK= NSDX	
0100	REF	1					COUNT* 64/ICOMP	
0112	REF	1		06,3263	3 3531 0	1/PIPA	CAF LGCOMP	SAVE EBANK OF CALLING PROGRAM
0113	REF	8	LAST	294	06,3264	56 003 1	XCH EBANK	
0114	REF	1			06,3265	54 163 1	TS MODE	
0115	REF	1			06,3266	11 477 0	CCS GCOMP SW	BYPASS IF GCOMP SW NEGATIVE
0116					06,3267	1 3272 1	TCF +3	
0117					06,3270	1 3272 1	TCF +2	
0118	REF	1			06,3271	1 3353 0	TCF TRIG1	RETURN
0119	REF	4	LAST	255	06,3272	3 4751 0	CAF FOUR	PIPAZ, PIPAY, PIPAX
0120	REF	9	LAST	122	06,3273	54 132 0	TS BUF +2	
0121	REF	10	LAST	326	06,3274	50 132 1	INDEX BUF +2	
0122	REF	1			06,3275	3 1453 1	CA PIPASCF	(P.P.M.) X 2(-9)
0123					06,3276	0 0006 1	EXTEND	
0124	REF	11	LAST	326	06,3277	5 0132 1	INDEX BUF +2	
0125	REF	1			06,3300	7 0324 0	MP DELVX	(PP) X 2(+14) NOW (PIPA PULSES) X 2(+5)
0126	REF	30	LAST	304	06,3301	54 002 1	TS	SAVE MAJOR PART
0127	REF	26	LAST	293	06,3302	3 0001 0	CA 1	MINOR PART
0128					06,3303	0 0006 1	EXTEND	
0129	REF	33	LAST	281	06,3304	7 4746 1	MP BIT6	SCALE 2(+9) SHIFT RIGHT 9
0130	REF	12	LAST	326	06,3305	50 132 1	INDEX BUF +2	
0131	REF	2	LAST	326	06,3306	54 325 1	TS DELVX +1	FRACTIONAL PIPA PULSES SCALED 2(+14)
0132	REF	31	LAST	326	06,3307	3 0002 0	CA 0	MAJOR PART
0133					06,3310	0 0006 1	EXTEND	
0134	REF	34	LAST	326	06,3311	7 4746 1	MP BIT6	SCALE 2(+9) SHIFT RIGHT 9
0135	REF	13	LAST	326	06,3312	50 132 1	INDEX BUF +2	
0136	REF	3	LAST	326	06,3313	20 325 1	DAS DELVX	(PIPA1) + (PIPA1)(SFE)
0137	REF	14	LAST	326	06,3314	50 132 1	INDEX BUF +2	
0138	REF	1			06,3315	4 1452 1	CS PIPABIAS	(PIPA PULSES)/(CS) X 2(-5)
0139					06,3316	0 0006 1	EXTEND	
0140	REF	2	LAST	165	06,3317	7 1075 0	MP 1/PIPADT	(CS) X 2(+8) NOW (PIPA PULSES) X 2(+3)*
0141					06,3320	0 0006 1	EXTEND	
0142	REF	19	LAST	254	06,3321	7 4750 0	MP BIT4	SCALE 2(+11) SHIFT RIGHT 11
0143	REF	15	LAST	326	06,3322	50 132 1	INDEX BUF +2	
0144	REF	4	LAST	326	06,3323	20 325 1	DAS DELVX	(PIPA1) + (PIPA1)(SFE) - (BIAS)(DELTAT)
0145	REF	16	LAST	326	06,3324	10 132 0	CCS BUF +2	PIPAZ, PIPAY, PIPAX
0146	REF	1			06,3325	6 7747 1	AD NEG1	
0147	REF	1			06,3326	1 3273 0	TCF 1/PIPA1 +1	

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0148

06,3327 13 330 0

NOOP

LESS THAN ZERO IMPOSSIBLE

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01481	REF	2	LAST	326	06,3330	55 1477 0	IRIGCOMP	TS	GCOMP SW	INDICATE COMMANDS 2 PULSES OR LESS.
01482	REF	17	LAST	326	06,3331	54 130 1		TS	DOF	INDEX COUNTER - IRIGX, IRIGY, IRIGZ.
01483	REF	1			06,3332	0 3356 1		TC	IRIGX	COMPENSATE ACCELERATION TERMS
01484	REF	2	LAST	326	06,3333	4 1460 0		CS	NBOX	(GYRO PULSES)/(CS) X 2(-5)
01485	REF	1			06,3334	0 3454 1		TC	DRIFTSUB	-(NBOX)(DELTAT) (GYRO PULSES) X 2(+14)
01486	REF	1			06,3335	0 3373 0		TC	IRIGY	COMPENSATE ACCELERATION TERMS
01487	REF	1			06,3336	4 1461 1		CS	NBY	(GYRO PULSES)/(CS) X 2(-5)
01488	REF	2	LAST	328	06,3337	0 3454 1		TC	DRIFTSUB	-(NBY)(DELTAT) (GYRO PULSES) X 2(+14)
01489	REF	1			06,3340	0 3410 1		TC	IRIGZ	COMPENSATE ACCELERATION TERMS
0149	REF	1			06,3341	3 1462 0		CA	NBZ	(GYRO PULSES)/(CS) X 2(-5)
01491	REF	3	LAST	328	06,3342	0 3454 1		TC	DRIFTSUB	+(NBZ)(DELTAT) (GYRO PULSES) X 2(+14)
01492	REF	3	LAST	328	06,3343	11 1477 0		CCS	GCOMP SW	ARE GYRO COMMANDS GREATER THAN 2 PULSES
01493					06,3344	1 3346 1		TCF	+	YES - SEND OUT GYRO TORQUING COMMANDS.
01494	REF	2	LAST	326	06,3345	1 3353 0		TCF	IRIG1	NO - RETURN
01495	REF	1			06,3346	3 5031 0		CA	PRI021	PRI0 GREATER THAN SERVICER
01496	REF	4	LAST	260	06,3347	0 5072 1		TC	NOVAC	SEND OUT GYRO TORQUING COMMANDS.
01497	REF	3	LAST	328	E3,1460			EBANK=	NBOX	
01498	REF	1			06,3350	03507 0		2CADP	1/GYRO	
01498	REF	1			06,3351	14063 1				
01499					06,3352	0 0003 1		RELINT		
0150	REF	2	LAST	326	06,3353	3 0163 0	IRIG1	CA	MODE	RESTORE CALLERS EBANK
01501	REF	9	LAST	326	06,3354	54 003 0		TS	EBANK	
01502	REF	2	LAST	244	06,3355	1 4631 0		TCF	SW-RETURN	

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0151				06.3356	0 0006 1	IRIGX	EXTEND		
01511	REF 44	LAST 324		06.3357	22 156 0		QXCH	MPAC +2	SAVE Q
01512				06.3360	0 0006 1		EXTEND		
0152	REF 5	LAST 326		06.3361	4 0325 1		DCS	DELVX	(PIPA PULSES) X 2(+14)
0153	REF 45	LAST 329		06.3362	52 155 1		DXCH	MPAC	
0154	REF 1			06.3363	3 1463 1		CA	ADIAX	(GYRO PULSES)/(PIPA PULSE) X 2(-6) *
0155	REF 1			06.3364	0 3425 1		TC	GCOMPSUB	-(ADIAX)(PIPA) (GYRO PULSES) X 2(+14)
0156				06.3365	0 0006 1		EXTEND		
0157	REF 1			06.3366	4 0327 0		DCS	DELVY	(PIPA PULSES) X 2(+14)
0158	REF 46	LAST 329		06.3367	52 155 1		DXCH	MPAC	
0159	REF 1			06.3370	4 1466 0		CS	ADSHAX	(GYRO PULSES)/(PIPA PULSE) X 2(-6) *
0160	REF 2	LAST 329		06.3371	0 3425 1		TC	GCOMPSUB	+(ADSHAX)(PIPAY) (GYRO PULSES) X 2(+14)
A01603							EXTEND	***	
A01604							DCS	DELVZ	*** (PIPA PULSES) X 2(+14)
A01605							DXCH	MPAC	***
A01606							CA	ADSHAX	*** (GYRO PULSES)/(PIPA PULSE) X 2(-6) *
A01607							TC	GCOMPSUB	*** -(ADSHAX)(PIPAZ) (GYRO PULSES) X 2(+14)
0161	REF 47	LAST 329		06.3372	0 0156 0		TC	MPAC +2	
0163				06.3373	0 0006 1	IRIGY	EXTEND		
01631	REF 48	LAST 329		06.3374	22 156 0		QXCH	MPAC +2	SAVE Q
01632				06.3375	0 0006 1		EXTEND		
0164	REF 2	LAST 329		06.3376	4 0327 0		DCS	DELVY	(PIPA PULSES) X 2(+14)
0165	REF 49	LAST 329		06.3377	52 155 1		DXCH	MPAC	
0166	REF 1			06.3400	3 1464 0		CA	ADSHAX	(GYRO PULSES)/(PIPA PULSE) X 2(-6) *
0167	REF 3	LAST 329		06.3401	0 3425 1		TC	GCOMPSUB	-(ADSHAX)(PIPAY) (GYRO PULSES) X 2(+14)
0168				06.3402	0 0006 1		EXTEND		
0169	REF 1			06.3403	4 0331 1		DCS	DELVZ	(PIPA PULSES) X 2(+14)
0170	REF 50	LAST 329		06.3404	52 155 1		DXCH	MPAC	
0171	REF 1			06.3405	4 1467 1		CS	ADSHAX	(GYRO PULSES)/(PIPA PULSE) X 2(-6) *
0172	REF 4	LAST 329		06.3406	0 3425 1		TC	GCOMPSUB	+(ADSHAX)(PIPAZ) (GYRO PULSES) X 2(+14)
A01723							EXTEND	***	
A01724							DCS	DELVX	*** (PIPA PULSES) X 2(+14)
A01725							DXCH	MPAC	***
A01726							CA	ADSHAX	*** (GYRO PULSES)/(PIPA PULSE) X 2(-6) *
A01727							TC	GCOMPSUB	*** -(ADSHAX)(PIPA) (GYRO PULSES) X 2(+14)
0173	REF 51	LAST 329		06.3407	0 0156 0		TC	MPAC +2	
0175				06.3410	0 0006 1	IRIGZ	EXTEND		
01751	REF 52	LAST 329		06.3411	22 156 0		QXCH	MPAC +2	SAVE Q
01752				06.3412	0 0006 1		EXTEND		
0176	REF 3	LAST 329		06.3413	4 0327 0		DCS	DELVY	(PIPA PULSES) X 2(+14)
0177	REF 53	LAST 329		06.3414	52 155 1		DXCH	MPAC	
0178	REF 1			06.3415	3 1470 0		CA	ADSHAX	(GYRO PULSES)/(PIPA PULSE) X 2(-6) *

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0179	REF	5	LAST	329	06.3416	0 3425 1	TC	GCORPSUB	-(ADSKAZI)(PIPAY) (GYRO PULSES) X 2(+14)
0180					06.3417	0 0006 1	EXTEND		
0181	REF	2	LAST	329	06.3420	4 0331 1	DCS	DELVZ	(PIPA PULSES) X 2(+14)
0182	REF	54	LAST	329	06.3421	52 155 1	DXCH	MPAC	
0183	REF	1			06.3422	3 1465 1	CA	ADIAZ	(GYRO PULSES)/(PIPA PULSE) X 2(-6)
0184	REF	6	LAST	330	06.3423	0 3425 1	TC	GCORPSUB	-(ADIAZI)(PIPAZ) (GYRO PULSES) X 2(+14)
A01843							EXTEND	***	
A01844							DCS	DELVX	(PIPA PULSE) X 2(+14)
A01845							DXCH	MPAC	***
A01846							CS	ADIAZ	(GYRO PULSES)/(PIPA PULSE) X 2(-6)
A01847							TC	GCORPSUB	+(ADIAZI)(PIPAZ) (GYRO PULSES) X 2(+14)
0185	REF	55	LAST	330	06.3424	0 0156 0	TC	MPAC +2	

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0199	REF	56	LAST	330	06.3425	56 154 1	GCOMP SUB	XCH	HPAC	ADIA OR ADSRA COEFFICIENT ARRIVES IN A
0200					06.3426	0 0006 1		EXTEND		C(HPAC) = (PIPA PULSES) X 2(+14)
0201	REF	57	LAST	331	06.3427	7 0154 0		MP	HPAC	(GYRO PULSES)/(PIPA PULSE) X 2(+6)
0202	REF	18	LAST	98	06.3430	52 123 0		DXCH	VRUF	NOW = (GYRO PULSES) X 2(+8)
0203	REF	58	LAST	331	06.3431	3 0155 0		CA	HPAC +1	MINOR PART PIPA PULSES
0204					06.3432	0 0006 1		EXTEND		
0205	REF	59	LAST	331	06.3433	7 0154 0		MP	HPAC	ADIA OR ADSPA
0206	REF	27	LAST	326	06.3434	54 001 1		TS	L	
0207	REF	33	LAST	298	06.3435	3 4755 1		CAF	ZERO	
0208	REF	19	LAST	331	06.3436	20 123 0		DAS	VRUF	NOW = (GYRO PULSES) X 2(+8)
0209	REF	20	LAST	331	06.3437	3 0122 0		CA	VRUF	PARTIAL RESULT - MAJOR
0210					06.3440	0 0006 1		EXTEND		
0211	REF	17	LAST	246	06.3441	7 4743 1		MP	RITH	SCALE 2(+6) SHIFT RIGHT 6
0212	REF	18	LAST	328	06.3442	50 130 0		INDEX	RUF	RESULT = (GYRO PULSES) X 2(+14)
0213	REF	3	LAST	110	06.3443	21 472 0		DAS	GCOMP	HI(ADIA)(PIPA) OR HI(ADSPA)(PIPA)
0214	REF	21	LAST	331	06.3444	3 0123 1		CA	VRUF +1	PARTIAL RESULT - MINOR
0215					06.3445	0 0006 1		EXTEND		
0216	REF	18	LAST	331	06.3446	7 4743 1		MP	RITH	SCALE 2(+6) SHIFT RIGHT 6
0217	REF	28	LAST	331	06.3447	54 001 1		TS	L	
0218	REF	34	LAST	331	06.3450	3 4755 1		CAF	ZERO	
0219	REF	19	LAST	331	06.3451	50 130 0		INDEX	RUF	RESULT = (GYRO PULSES) X 2(+14)
0220	REF	4	LAST	331	06.3452	21 472 0		DAS	GCOMP	(ADIA)(PIPA) OR (ADSPA)(PIPA)
0221	REF	32	LAST	326	06.3453	0 0002 0		TC		

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0222				06,3454	0 0006 1	DRIFTSUB	EXTEND	
0223	REF	20	LAST	331	06,3455	22 131 1	QXCH	BUF +1
0224				06,3456	0 0006 1		EXTEND	C(A) = NBD (GYRO PULSES)/(CS) X 2(-5)
0225	REF	3	LAST	326	06,3457	7 1075 0	MP	1/PIPADT (CS) X 2(+8) NOW (GYRO PULSES) X 2(+3)
0226	REF	60	LAST	331	06,3460	22 155 0	LXCH	MPAC +1 SAVE FOR FRACTIONAL COMPENSATION
0227				06,3461	0 0006 1		EXTEND	
0228	REF	20	LAST	326	06,3462	7 4750 0	MP	BIT4 SCALE 2(+11) SHIFT RIGHT 11
0229	REF	21	LAST	332	06,3463	50 130 0	INDEX	BUF
0230	REF	5	LAST	331	06,3464	21 472 0	DAS	GCOMP HI(NBD)(DELTAT) (GYRO PULSES) X 2(+14)
0231	REF	61	LAST	332	06,3465	3 0155 0	CA	MPAC +1 NOW MINOR PART
0232				06,3466	0 0006 1		EXTEND	
0233	REF	21	LAST	332	06,3467	7 4750 0	MP	BIT4 SCALE 2(+11) SHIFT RIGHT 11
0234	REF	29	LAST	331	06,3470	54 001 1	TS	1
0235	REF	35	LAST	331	06,3471	3 4755 1	CAF	ZERO
0236	REF	22	LAST	332	06,3472	50 130 0	INDEX	BUF ADD IN FRACTIONAL COMPENSATION
0237	REF	6	LAST	332	06,3473	21 472 0	DAS	GCOMP (NBD)(DELTAT) (GYRO PULSES) X 2(+14)
0238	REF	12	LAST	304	06,3474	3 4752 0	DRIFTSUB2	CAF TWO PIPAX, PIPAY, PIPAZ
0239	REF	23	LAST	332	06,3475	6 0130 0	AD	BUF
0240	REF	24	LAST	332	06,3476	56 130 0	XCH	BUF
0241	REF	95	LAST	323	06,3477	50 000 1	INDEX	A
0242	REF	7	LAST	332	06,3500	11 471 0	CCS	GCOMP ARE GYRO COMMANDS 1 PULSE OR GREATER
0243				06,3501	1 3503 0		TCF	+2 YES
0244	REF	25	LAST	332	06,3502	0 0131 1	TC	BUF +1 NO
0245	REF	1			06,3503	7 3553 0	MASK	COMPCHK DEC -1
0246	REF	96	LAST	332	06,3504	10 000 0	CCS	A ARE GYRO COMMANDS GREATER THAN 2 PULSES
0247	REF	4	LAST	328	06,3505	55 477 0	TS	GCOMP SW YES - SET GCOMP SW POSITIVE
0248	REF	26	LAST	332	06,3506	0 0131 1	TC	BUF +1 NO

L IMU COMPENSATION PACKAGE

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0249	REF	5	LAST	326	06.3507	3 4751 0	1/GYRO	CAF	FOUR	PIPAZ, PIPAY, PIPAX
0250	REF	27	LAST	332	06.3510	54 130 1		TS	BUF	
0251	REF	28	LAST	333	06.3511	50 130 0		INDEX	BUF	SCALE GYRO COMMANDS FOR IMPULSE
0252	REF	8	LAST	332	06.3512	3 1472 1		CA	GCOMP +1	FRACTIONAL PULSES
0253					06.3513	0 0006 1		EXTEND		
0254	REF	20	LAST	279	06.3514	7 4744 0		MP	BIT8	SHIFT RIGHT 7
0255	REF	29	LAST	333	06.3515	50 130 0		INDEX	BUF	
0256	REF	9	LAST	333	06.3516	55 472 0		TS	GCOMP +1	FRACTIONAL PULSES SCALED
0257	REF	36	LAST	332	06.3517	3 4755 1		CAF	ZERO	SET GCOMP = 0 FOR DAS INSTRUCTION
0258	REF	30	LAST	333	06.3520	50 130 0		INDEX	BUF	
0259	REF	10	LAST	333	06.3521	57 471 1		XCH	GCOMP	GYRO-PULSES
0260					06.3522	0 0006 1		EXTEND		
0261	REF	21	LAST	333	06.3523	7 4744 0		MP	BIT8	SHIFT RIGHT 7
0262	REF	31	LAST	333	06.3524	50 130 0		INDEX	BUF	
0263	REF	11	LAST	333	06.3525	21 472 0		DAS	GCOMP	ADD THESE TO FRACTIONAL PULSES ABOVE
0264	REF	32	LAST	333	06.3526	10 130 1		CCS	BUF	PIPAZ, PIPAY, PIPAX
0265	REF	2	LAST	326	06.3527	6 7747 1		AD	NEG1	
0266	REF	2	LAST	328	06.3530	1 3510 1		TCF	1/GYRO +1	
0267	REF	12	LAST	333	06.3531	01471 1	LGCOMP	ECADR	GCOMP	LESS THAN ZERO IMPOSSIBLE
0268	REF	2	LAST	326	06.3532	3 3531 0		CAF	LGCOMP	
0269	REF	55	LAST	300	06.3533	0 4616 1		TC	HANKCALL	
0270	REF	2	LAST	273	06.3534	17323 0		CADR	IMPULSE	CALL GYRO TORQUING ROUTINE
0271	REF	56	LAST	333	06.3535	0 4616 1		TC	HANKCALL	
0272	REF	6	LAST	273	06.3536	17716 1		CADR	INSTALL	WAIT FOR PULSES TO GET OUT
0273	REF	23	LAST	299	06.3537	1 5155 1		TCF	ENDOFJDB	TEMPORARY
0274	REF	6	LAST	333	06.3540	3 4751 0	GCOMP1	CAF	FOUR	PIPAZ, PIPAY, PIPAX
0275	REF	33	LAST	333	06.3541	54 130 1		TS	BUF	
0276	REF	34	LAST	333	06.3542	50 130 0		INDEX	BUF	RESCALE
0277	REF	13	LAST	333	06.3543	3 1472 1		CA	GCOMP +1	
0278					06.3544	0 0006 1		EXTEND		
0279	REF	22	LAST	333	06.3545	7 4744 0		MP	BIT8	SHIFT MINOR PART LEFT 7 - MAJOR PART = 0
0280	REF	35	LAST	333	06.3546	50 130 0		INDEX	BUF	
0281	REF	14	LAST	333	06.3547	23 472 1		LXCH	GCOMP +1	BITS 8-14 OF MINOR PART WERE 0
0282	REF	36	LAST	333	06.3550	10 130 1		CCS	BUF	PIPAZ, PIPAY, PIPAX
0283	REF	3	LAST	333	06.3551	6 7747 1		AD	NEG1	
0284	REF	1			06.3552	1 3541 0		TCF	GCOMP1 +1	
0285					06.3553	77776 1	COMPCHK	DEC	-1	LESS THAN ZERO IMPOSSIBLE
0286	REF	24	LAST	333	06.3554	1 5155 1		TCF	ENDOFJDB	

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0287	REF	5	LAST	332	06.3555	11 477 0	NRDONLY	CCS	GCOMP SW	BYPASS IF GCOMP SW NEGATIVE
0288					06.3556	1 3561 1		TCF	+3	
0289					06.3557	1 3561 1		TCF	+2	
0290	REF	25	LAST	333	06.3560	1 5155 1		TCF	ENDOFJOB	
029005					06.3561	0 0004 0		INHINT		
02901	REF	6	LAST	229	06.3562	10 076 1		CCS	FLAGWRD2	PREREAD TBRUPT MAY COINCIDE
02902	REF	26	LAST	334	06.3563	1 5155 1		TCF	ENDOFJOB	
02903	REF	27	LAST	334	06.3564	1 5155 1		TCF	ENDOFJOB	
02904					06.3565	1 3566 0		TCF	+1	
02905	REF	2	LAST	258	06.3566	3 0104 1		CA	FLAGWRD8	IF SURFACE FLAG IS SET, SET TEM1
02906	REF	23	LAST	333	06.3567	7 4744 0		MASK	BIT8	POSITIVE SO THAT THE ACCELERATION TERMS
02907	REF	4	LAST	98	06.3570	54 141 1		TS	TEM1	WILL BE COMPENSATED.
02908					06.3571	0 0006 1		EXTEND		
0291					06.3572	1 3575 1		BZF	+3	ARE WE ON THE SURFACE
0292	REF	16	LAST	295	06.3573	0 4674 0		TC	IBNECALL	ON THE SURFACE
02925	REF	1			06.3574	77544 1		CADR	PIPASR +3	READ PIPAS. BUT DO NOT SCALE THEN
0293	REF	2	LAST	165	06.3575	3 0025 0		CA	TIME1	(CS) X 2(+14)
0294	REF	4	LAST	332	06.3576	57 075 1		XCH	1/PIPADT	PREVIOUS TIME
0295					06.3577	0 0003 1		RELINT		
0296					06.3600	4 0000 0		COM		
0297	REF	5	LAST	334	06.3601	6 1075 1		AD	1/PIPADT	PRESENT TIME - PREVIOUS TIME
0298	REF	1			06.3602	6 4736 1	NBD2	AD	HALF	CORRECT FOR POSSIBLE TIME1 TICK
0299	REF	2	LAST	334	06.3603	6 4736 1		AD	HALF	
0300	REF	30	LAST	332	06.3604	56 001 0		XCH	L	IF TIME1 DID NOT TICK, REMOVE RESULTING
0301	REF	31	LAST	334	06.3605	56 001 0		XCH	L	OVERFLOW.
0302					06.3606	0 0006 1	NBD3	EXTEND		C(A) = DELTAT (CS) X 2(+14)
0303	REF	18	LAST	255	06.3607	7 4742 0		MP	BIT10	SHIFT RIGHT 5
0304	REF	22	LAST	331	06.3610	52 125 0		DXCH	VBUF +2	
03041	REF	37	LAST	333	06.3611	3 4755 1		CA	ZERO	
03042	REF	6	LAST	334	06.3612	55 477 0		TS	GCOMP SW	INDICATE COMMANDS 2 PULSES OR LESS.
03043	REF	37	LAST	333	06.3613	54 130 1		TS	HUF	INDEX- X, Y, Z.
03044	REF	5	LAST	334	06.3614	10 141 1		CCS	TEM1	IF SURFACE FLAG IS SET.
03045	REF	2	LAST	328	06.3615	0 3356 1		TC	IFIGX	COMPENSATE ACCELERATION TERMS.
0305					06.3616	0 0006 1		EXTEND		
0306	REF	23	LAST	334	06.3617	3 0125 1		DCA	VBUF +2	
0307	REF	62	LAST	332	06.3620	52 155 1		DXCH	MPAC	DELTAT NOW SCALED (CS) X 2(+19)
0311	REF	4	LAST	328	06.3621	4 1460 0		CS	NBD4	(GYRO PULSES)/(CS) X 2(-5)
0312	REF	1			06.3622	0 3644 1		TC	FBIASSUB	-(NBDX)(DELTAT) (GYRO PULSES) X 2(+14)
03121	REF	6	LAST	334	06.3623	10 141 1		CCS	TEM1	IF SURFACE FLAG IS SET,
03122	REF	2	LAST	328	06.3624	0 3373 0		TC	IFIGY	COMPENSATE ACCELERATION TERMS.

L IMU-COMPENSATION PACKAGE

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0313 06.3625 0 0006 1
 0314 REF 24 LAST 334 06.3626 4 0125 0
 0315 REF 63 LAST 334 06.3627 52 155 1
 0316 REF 2 LAST 328 06.3630 3 1461 0
 0317 REF 2 LAST 334 06.3631 0 3644 1

03171 REF 7 LAST 334 06.3632 10 141 1
 03172 REF 2 LAST 328 06.3633 0 3410 1

0318 06.3634 0 0006 1
 0319 REF 25 LAST 335 06.3635 4 0125 0
 0320 REF 64 LAST 335 06.3636 52 155 1
 0321 REF 2 LAST 328 06.3637 4 1462 1
 0322 REF 3 LAST 335 06.3640 0 3644 1

0323 REF 7 LAST 334 06.3641 11 477 0
 0324 REF 3 LAST 333 06.3642 1 3507 1
 0325 REF 28 LAST 334 06.3643 1 5155 1

EXTEND
 DCS VBUF +2
 DXCH MPAC
 CA NBDY
 TC FBIASSUB

CCS TEM1
 TC IRIGZ

EXTEND
 DCS VBUF +2
 DXCH MPAC
 CS NBDZ
 TC FBIASSUB

CCS GCOMPSW
 TCF 1/GYRO
 TCF FNDLEJOB

DELTAT SCALED (CS) X 2(+19)
 (GYRO PULSES)/(CS) X 2(-5)
 -(NBDY)(DELTAT) (GYRO PULSES) X 2(+14)

IF SURFACE FLAG IS SET,
 COMPENSATE ACCELERATION TERMS

DELTAT SCALED (CS) X 2(+19)
 (GYRO PULSES)/(CS) X 2(-5)
 +(NBDZ)(DELTAT) (GYRO PULSES) X 2(+14)

ARE GYRO COMMANDS GREATER THAN 2 PULSES
 YES
 NO

L IMU COMPENSATION PACKAGE

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13 55

0326	REF	33	LAST	331	06,3644	56 002 0	FBI ASSUB	XCH	Q	
0327	REF	38	LAST	334	06,3645	54 131 0	TS		BUF +1	
0328	REF	34	LAST	336	06,3646	3 0002 0	CA	Q		NBD SCALED (GYRO PULSES)/(CS) X 2(-5)
0329					06,3647	0 0006 1	EXTEND			
0330	REF	65	LAST	335	06,3650	7 0154 0	MP	MPAC		DELTAT SCALED (CS) X 2(+19)
0331	REF	39	LAST	336	06,3651	50 130 0	INDEX	BUF		
0332	REF	15	LAST	333	06,3652	21 472 0	DAS	GCOMP		HI(NBD)(DELTAT) (GYRO PULSES) X 2(+14)
0333	REF	35	LAST	336	06,3653	3 0002 0	CA	Q		NOW FRACTIONAL PART
0334					06,3654	0 0006 1	EXTEND			
0335	REF	66	LAST	336	06,3655	7 0155 1	MP	MPAC +1		
0336	REF	32	LAST	334	06,3656	54 001 1	TS	L		
0337	REF	38	LAST	334	06,3657	3 4755 1	CAF	ZERO		
0338	REF	40	LAST	336	06,3660	50 130 0	INDEX	BUF		
0339	REF	16	LAST	336	06,3661	21 472 0	DAS	GCOMP		(NBD)(DELTAT) (GYRO PULSES) X 2(+14)
0340	REF	1			06,3662	1 3474 1	TCF	DEFTSUB2		CHECK MAGNITUDE OF COMPENSATION
0341	REF	57	LAST	333	06,3663	0 4616 1	LASTBIAS	TC	BANKCALL	
03411	REF	1			06,3664	17277 0	CADR		PIPUSE1	
03412	REF	8	LAST	335	06,3665	11 477 0	CCS	GCOMP SW		
0342					06,3666	1 3671 0	TCF	+3		
0343					06,3667	1 3671 0	TLF	+2		
0344	REF	29	LAST	335	06,3670	1 5155 1	TCF	ENDOFFLD		
03441	REF	3	LAST	334	06,3671	3 0104 1	CA	FLAGWRDB		IF SURFACE FLAG IS SET, SET TEM1
03442	REF	2	LAST	213	06,3672	7 4744 0	MASK	SURFFBIT		POSITIVE SO THAT THE ACCELERATION TERMS
03443	REF	8	LAST	335	06,3673	54 141 1	TS	TE41		WILL BE COMPENSATED.
0345	REF	1			06,3674	3 7716 0	CAF	PRIG31		2 SECONDS SCALED (CS) X 2(+8) ---
0346	REF	6	LAST	334	06,3675	57 075 1	XCH	1/PIPAUT		
0347					06,3676	4 0000 0	COM			
0348	REF	3	LAST	320	06,3677	6 1235 1	AD	PIPTIME +1		
0349	REF	1			06,3700	1 3602 1	TCF	NBD2		
0350	REF	3	LAST	333	06,3701	3 3531 0	GCOMPZER	CAF	LGCOMP	ROUTINE TO ZERO GCOMP BEFORE FIRST
0351	REF	10	LAST	328	06,3702	56 003 1	XCH	EBANK		CALL TO 1/PIPA
0352	REF	3	LAST	328	06,3703	54 163 1	TS	MODE		
0353	REF	39	LAST	336	06,3704	3 4755 1	CAF	ZERO		
0354	REF	9	LAST	336	06,3705	55 477 0	TS	GCOMP SW		
0355	REF	17	LAST	336	06,3706	55 471 0	TS	GCOMP		
0356	REF	18	LAST	336	06,3707	55 472 0	TS	GCOMP +1		
0357	REF	19	LAST	336	06,3710	55 473 1	TS	GCOMP +2		
0358	REF	20	LAST	336	06,3711	55 474 0	TS	GCOMP +3		
0359	REF	21	LAST	336	06,3712	55 475 1	TS	GCOMP +4		

L IMJ COMPENSATION PACKAGE

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0360 REF 22 LAST 336 06.3713 55.476 1

TS 6COMP +5

0361 REF 3 LAST 328 06.3714 1 3353 0

TCF IFIGL RESTORE EBANK AND RETURN

L R63

USER'S PAGE NO. 1 ED 53

R0010 SUBROUTINE NAME: V89CALL

R0011 MOD NO: 0 DATE: 9 JAN 1968

R0012 MOD BY: DIGITAL DEVEL GROUP LOG SECTION: R63

R0013 FUNCTIONAL DESCRIPTION:

R0014 CALLED BY VERB 89 ENTER DURING P00. PRI0 10 USED. CALCULATES AND
R0015 DISPLAYS FINAL FOAI BALL ANGLES TO POINT LM +X OR +Z AXIS AT CSM.R0016 1. KEY IN V 89 E ONLY IF IN PROG 00. IF NOT IN P00. OPERATOR ERROR AND
R0017 EXIT-R63. OTHERWISE CONTINUE.R0018 2. IF IN P00. DO IMU STATUS CHECK ROUTINE (R02BOTH). IF IMU ON AND ITS
R0019 ORIENTATION KNOWN TO LGC. CONTINUE.R0020 3. FLASH DISPLAY V 04 N 06. R2 INDICATES WHICH SPACECRAFT AXIS IS TO
R0021 BE POINTED AT CSM. INITIAL CHOICE IS PREFERRED (+Z) AXIS (R2=1).
R0022 ASTRONAUT CAN CHANGE TO (+X) AXIS (R2 NOT = 1) BY V 22 E 2 1. CONTINUE
R0023 AFTER KEYING IN PROCEED.

R0024 4. BOTH VEHICLE STATE VECTORS UPDATED BY CONIC EQS.

R0025 5. HALF MAGNITUDE UNIT LOS VECTOR (IN STABLE MEMBER COORDINATES) AND
R0026 HALF MAGNITUDE UNIT SPACECRAFT AXIS VECTOR (IN BODY COORDINATES)
R0027 PREPARED FOR VECPOINT.R0028 6. GIMBAL ANGLES FROM VECPOINT TRANSFORMED INTO FOAI BALL ANGLES BY
R0029 BALLANGS. FLASH DISPLAY V 06 N 18 AND AWAIT RESPONSE.R0030 7. RECYCLE - RETURN TO STEP 4.
R0031 TERMINATE - EXIT R63.
R0032 PROCEED - RESET 3AXISFLG AND CALL R60LEM FOR ATTITUDE MANEUVER.

R0033 CALLING SEQUENCE: V 89 E.

R0034 SUBROUTINES CALLED: CHKPDON, R02BOTH, GOXDSPE, CSMCONIC, LEMCONIC,
R0035 VECPOINT, BALLANGS, R60LEM.

R0036 NORMAL EXIT MODES: TC ENDEXT

R0037 ALARMS: 1. OPERATOR ERROR IF NOT IN P00.
R0038 2. PROGRAM ALARM IF IMU IS OFF.
R0039 3. PROGRAM ALARM IF IMU ORIENTATION IS UNKNOWN.

R0040 OUTPUT: NONE

R0041 ERASABLE INITIALIZATION REQUIRED: NONE

R0042 DEBRIS: OPTION1, +1, TDECI, POINTVSM, SCAXIS, CPHI, CTHETA, CPSI,

L 863

USER'S PAGE NO. 2 EO-S3

R0043 3AXISFLG.

0044 REF 4 LAST 284 E4,1606
 0045 32,2217
 0046 REF 1 26,2000
 0047 26,2022

EBANK= RONE
 BANK 32
 SETLOC BAWLANGS
 BANK

0048 REF 1
 0049 REF 58 LAST 336 26,2022 0 4616 1
 0050 REF 1 26,2023 11254 1
 0051 REF 3 LAST 293 26,2024 3 6245 1
 0052 REF 8 LAST 305 26,2025 55'051 0
 0053 REF 15 LAST 304 26,2026 3 4753 1
 0054 REF 9 LAST 339 26,2027 55'052 0
 0055 REF 1 26,2030 3 2117 1
 0056 REF 59 LAST 339 26,2031 0 4616 1
 0057 REF 2 LAST 225 26,2032 20476 0
 0058 REF 26 LAST 300 26,2033 0 5472 0
 0059 26,2034 0 2036 0
 0060 26,2035 0 2030 0
 0061 REF 11 LAST 323 26,2036 0 6037 0
 0062 26,2037 43234 0
 0063 REF 2 LAST 207 26,2040 21573 0
 00635 REF 1 26,2041 14122 0
 0064 REF 1 26,2042 02205 1
 0065 REF 4 LAST 236 26,2043 34041 0
 0066 REF 1 26,2044 27066 1
 0067 26,2045 77775 1
 0068 26,2046 00001 0
 0069 REF 5 LAST 339 26,2047 16207 0
 0070 REF 2 LAST 339 26,2050 02205 1
 0071 REF 5 LAST 339 26,2051 34041 0
 0072 REF 1 26,2052 27100 0
 0073 26,2053 52375 1
 0074 REF 6 LAST 339 26,2054 02207 0
 0075 REF 2 LAST 339 26,2055 00001 0
 0076 26,2056 47121 0
 0077 REF 6 LAST 209 26,2057 01734 0
 00771 REF 1 26,2060 21726 1
 0078 REF 2 LAST 152 26,2061 03773 1
 0079 26,2062 77776 1
 0080 REF 10 LAST 339 26,2063 4 1052 0
 0081 REF 16 LAST 339 26,2064 6 4753 1
 0082 26,2065 0 0006 1
 0083 REF 1 26,2066 1 2113 1
 0084 REF 12 LAST 339 26,2067 0 6037 0
 0085 26,2070 77775 1
 0086 REF 4 LAST 299 26,2071 06520 0

V89CALL

V89RECL

CBUNT+ 53/863
 TC BANKCALL
 CADR 20265TH
 CAF THREE
 TS OPTIONX
 CAF ONE

TS OPTIONX +1
 CAF V804/12
 TC BANKCALL
 CADR GOFASH
 TC ENDEXT
 TC +2
 TC -2

TC INTERPRET
 RTB DAD

LOADTIME
 OPIMIN

STORE TSTART62
 STCALL TDEC1
 CSMCONIC

VLOAD
 RATT

STOPL RONE
 TSTART62

STCALL TDEC1
 LEMCONIC

VLOAD VSU
 RONE

RATT
 RATT

MXV
 REFMMAT

HORMUNIT
 STORE POINTVSM

EXIT
 CS OPTIONX +1

AD ONE
 EXTEND

BZF ALINEZ
 TC INTERPRET

VLOAD
 UNITX

IMU STATUS CHECK. RETURNS IF ORIENTATION
 KNOWN. ALARMS IF NOT.
 ALLOW ASTRONAUT TO SELECT DESIRED
 TRACKING ATTITUDE AXIS.

V 04 N 12

TERMINATE

PROCEED

DATA IN. OPTION1+1 = 1 FOR Z AXIS
 = 2 FOR X AXIS

READ PRESENT TIME

SAVE TIME FOR LEMCONIC CALL

STORE TIME FOR CSMCONIC CALL

CSM STATE VECTOR UPDATE

CSMCONIC LEFT R VECTOR IN RATT

SAVE FOR LINE OF SIGHT (LOS) COMPUTATION

STORE TIME FOR LEMCONIC CALL

LEM STATE VECTOR UPDATE

CSM POSITION - LEM POSITION = LOS

LOS VECTOR LEFT IN MPAC

(REFMMAT X LOS). TRANSFORMS LOS FROM
 REFERENCE COORD TO STAB MEMB COORD.

STORE LOS FOR VECPOINT CALL

1 FOR Z AXIS. 2 FOR X AXIS.

X AXIS ALIGNMENT

READ (1, 0, 0)

R63

USER'S PAGE NO. 3

0087	REF	11	LAST	251	26,2072	37765 1	V89CALL1	STCALL	SCAXIS	STORE SELECTED ALIGNMENT AXIS
0088	REF	1			26,2073	56040 0			VECPOINT	PUTS DESIRED GIM ANG (DG, IG, MG) IN IMPAC
0089	REF	1			26,2074	30322 1		STORE	CPMI	STORE GIMBAL ANGLES FOR BALLANGS CALL.
0090					26,2075	77776 1		EXIT		
00905	REF	60	LAST	339	26,2076	0 4616 1		TC	BANKCALL	
0091	REF	1			26,2077	54266 1		CADR	BALLANGS	PUTS DESIRED BALL ANGLES IN FDAIX,Y,Z
0092	REF	1			26,2100	3 2120 0		GAF	V806N18	V 06 N 18
0093	REF	61	LAST	340	26,2101	0 4616 1		TC	BANKCALL	WORD 18 REFERS TO FDAIX,Y,Z
0094	REF	3	LAST	339	26,2102	20476 0		CADR	GLFLASH	
0095	REF	27	LAST	339	26,2103	0 5472 0		TC	INDEXT	TERMINATE
0096					26,2104	0 2106 1		TC	+2	PROCEED
0097	REF	1			26,2105	0 2036 0		TC	V89RECL	RECYCLE
0098	REF	25	LAST	298	26,2106	0 5516 0		TC	DOWNFLAG	RESET 3 AXIS FLAG
0099	REF	2	LAST	229	26,2107	00124 0		ADRES	3AXISFLG	RESET BIT6 FLAG WORD 5
0100	REF	62	LAST	340	26,2110	0 4616 1		TC	BANKCALL	PERFORMS LEM MANEUVER TO ALIGN SELECTED
0101	REF	1			26,2111	54123 0		CADR	R60LEM	SPACECRAFT AXIS TO CSM.
0102	REF	28	LAST	340	26,2112	1 5472 1		TCF	UNDLXT	TERMINATE R63
0103	REF	13	LAST	339	26,2113	0 6037 0	ALINEZ	TC	INTPRET	Z AXIS ALIGNMENT
0104					26,2114	52175 0		VLOAD	GOTD	
0105	REF	4	LAST	299	26,2115	06514 1			UNITZ	READ (0, C, .5)
0106	REF	1			26,2116	54072 0			V89CALL1	
0107					26,2117	01014 0	V804N12	VN	412	
0108					26,2120	01422 1	V806N18	VN	0616	

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01085	26.2121	00000 1	GP1MIN	2DEC	5000
01085	26.2122	13560 3			

L ATTITUDE MANEUVER ROUTINE

USER'S PAGE NO. 1 TO 5

P0003 BLOCK 2 LGC ATTITUDE MANEUVER ROUTINE-KALCMANU

R0002 MOD 2 DATE 5/1/67 BY DON KEENE
R0003 PROGRAM DESCRIPTION

R0004 KALCMANU IS A ROUTINE WHICH GENERATES COMMANDS FOR THE LM DAP TO CHANGE THE ATTITUDE OF THE SPACECRAFT
R0006 DURING FREE FALL. IT IS DESIGNED TO MANEUVER THE SPACECRAFT FROM ITS INITIAL ORIENTATION TO SOME DESIRED
R0008 ORIENTATION SPECIFIED BY THE PROGRAM WHICH CALLS KALCMANU, AVOIDING GIMBAL LOCK IN THE PROCESS. IN THE
R0010 MOD 2 VERSION, THIS DESIRED ATTITUDE IS SPECIFIED BY A SET OF THREE COMMANDED CDU ANGLES STORED AS 29 COMPLEMENT
R0012 SINGLE PRECISION ANGLES IN THE THREE CONSECUTIVE LOCATIONS, CPHI, CTHETA, CPSI, WHERE

R0014 CPHI = COMMANDED OUTER GIMBAL ANGLE
R0015 CTHETA = COMMANDED INNER GIMBAL ANGLE
R0016 CPSI = COMMANDED MIDDLE GIMBAL ANGLE

R0017 WHEN POINTING A SPACECRAFT AXIS (E.I. X, Y, Z, THE AOT, THRUST AXIS, ETC) THE SUBROUTINE VECPOINT MAY BE
R0019 USED TO GENERATE THIS SET OF DESIRED CDU ANGLES (SEE DESCRIPTION IN R60) -
R0021 WITH THIS INFORMATION KALCMANU DETERMINES THE DIRECTION OF THE SINGLE EQUIVALENT ROTATION (COF ALSO U) AND THE
R0023 MAGNITUDE OF THE ROTATION (AM) TO BRING THE S/C FROM ITS INITIAL ORIENTATION TO ITS FINAL ORIENTATION.
R0025 THIS DIRECTION REMAINS FIXED BOTH IN INERTIAL COORDINATES AND IN COMMANDED S/C AXES THROUGHOUT THE
R0027 MANEUVER. ONCE COF AND AM HAVE BEEN DETERMINED, KALCMANU THEN EXAMINES THE MANEUVER TO SEE IF IT WILL BEING
R0029 THE S/C THROUGH GIMBAL LOCK. IF SO, COF AND AM ARE READJUSTED SO THAT THE S/C WILL JUST SKIM THE GIMBAL
R0031 LOCK ZONE AND ALIGN THE X-AXIS. IN GENERAL A FINAL YAW ABOUT X WILL BE NECESSARY TO COMPLETE THE MANEUVER.
R0033 NEEDLESS TO SAY, NEITHER THE INITIAL NOR THE FINAL ORIENTATION CAN BE IN GIMBAL LOCK.
R0035

R0037 FOR PROPER ATTITUDE CONTROL THE DIGITAL AUTOPILOT MUST BE GIVEN AN ATTITUDE REFERENCE WHICH IT CAN TRACK.
R0038 KALCMANU DOES THIS BY GENERATING A REFERENCE OF DESIRED GIMBAL ANGLES (CDUXD, CDUYD, CDUZD) WHICH ARE UPDATED
R0040 EVERY ONE SECOND DURING THE MANEUVER. TO ACHIEVE A SMOOTHER SEQUENCE OF COMMANDS BETWEEN SUCCESSIVE UPDATES,
R0042 THE PROGRAM ALSO GENERATES A SET OF INCREMENTAL CDU ANGLES (DELICDU) TO BE ADDED TO CDU DESIRED BY THE DIGITAL
R0044 AUTOPILOT. KALCMANU ALSO CALCULATES THE COMPLEMENT MANEUVER RATES (OMEGARD, OMEGADD, OMEGARDI), WHICH CAN
R0046 BE DETERMINED SIMPLY BY MULTIPLYING COF BY SOME SCALAR (ALATE) CORRESPONDING TO THE DESIRED ROTATIONAL RATE.
R0048
R0049

R0051 AUTOMATIC MANEUVERS ARE TIMED WITH THE HELP OF WAITLIST SO THAT AFTER A SPECIFIED INTERVAL THE Y AND Z
R0052 DESIRED RATES ARE SET TO ZERO AND THE DESIRED CDU ANGLES (CDUYD, CDUZD) ARE SET EQUAL TO THE FINAL DESIRED CDU
R0054 ANGLES (CTHETA, CPSI). IF ANY YAW REMAINS DUE TO GIMBAL LOCK AVOIDANCE, THE FINAL YAW MANEUVER IS
R0056 CALCULATED AND THE DESIRED YAW RATE SET TO SOME FIXED VALUE (RCLLRATE = + OR - 2 DEGREES PER SEC).
R0058 IN THIS CASE ONLY AN INCREMENTAL CDUX ANGLE (DELFCUL) IS SUPPLIED TO THE DAP. AT THE END OF THE YAW
R0060 MANEUVER OR IN THE EVENT THAT THERE WAS NO FINAL YAW, CDUXD IS SET EQUAL TO CPHI AND THE X-AXIS DESIRED
R0062 RATE SET TO ZERO. THUS, UPON COMPLETION OF THE MANEUVER THE S/C WILL FINISH UP IN A LIMIT CYCLE ABOUT THE
R0064 DESIRED FINAL GIMBAL ANGLES.
R0066

R0067 PROGRAM LOGIC FLOW

R0068 KALCMANU IS CALLED AS A HIGH PRIORITY JOB WITH ENTRY POINTS AT KALCMANB AND VECPOINT. IT FIRST PICKS
R0070 UP THE CURRENT CDU ANGLES TO BE USED AS THE BASIS FOR ALL COMPUTATIONS INVOLVING THE INITIAL S/C ORIENTATION.

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R0072 IT THEN DETERMINES THE DIRECTION COSINE MATRICES RELATING BOTH THE INITIAL AND FINAL S/C ORIENTATION TO STABLE

R0074 * * *
R0076 MEMBER AXES (MIS, MFS). IT ALSO COMPUTES THE MATRIX RELATING FINAL S/C AXES TO INITIAL S/C AXES (MFI). THE
R0078 ANGLE OF ROTATION (AM) IS THEN EXTRACTED FROM THIS MATRIX, AND TESTS ARE MADE TO DETERMINE IF

R0080
R0081 A) AM LESS THAN .25 DEGREES (MINANG)
R0082 B) AM GREATER THAN 170 DEGREES (MAXANG)

R0083 IF AM LESS THAN .25 DEGREES, NO COMPLICATED AUTOMATIC MANEUVERING IS NECESSARY. THEREFORE WE CAN SIMPLY
R0085 SET CDU DESIRED EQUAL TO THE FINAL CDU DESIRED ANGLES AND TERMINATE THE JOB.

R0087
R0088 IF AM IS GREATER THAN .25 DEGREES BUT LESS THAN 170 DEGREES, THE AXES OF THE SINGLE EQUIVALENT ROTATION
R0090 *
R0091 (COF) IS EXTRACTED FROM THE SKEW SYMMETRIC COMPONENTS OF MFI. * *

R0092 IF AM GREATER THAN 170 DEGREES AN ALTERNATE METHOD EMPLOYING THE SYMMETRIC PART OF MFI (MFISYM) IS USED

R0095
R0096 TO DETERMINE COF.

R0097 THE PROGRAM THEN CHECKS TO SEE IF THE MANEUVER AS COMPUTED WILL BRING THE S/C THROUGH GIMBAL LOCK. IF
R0099 SO, A NEW MANEUVER IS CALCULATED WHICH WILL JUST SKIM THE GIMBAL LOCK ZONE AND ALIGN THE S/C X-AXIS. THIS
R0101 METHOD ASSURES THAT THE ADDITIONAL MANEUVERING TO AVOID GIMBAL LOCK WILL BE KEPT TO A MINIMUM. SINCE A FINAL
R0103 P AXIS YAW WILL BE NECESSARY, A SWITCH IS RESET (STATE SWITCH 31) TO ALLOW FOR THE COMPUTATION OF THIS FINAL
R0105 YAW.

R0106 AS STATED PREVIOUSLY KALCMANU GENERATES A SEQUENCE OF DESIRED GIMBAL ANGLES WHICH ARE UPDATED EVERY
R0108
R0110 SECOND. THIS IS ACCOMPLISHED BY A SMALL ROTATION OF THE DESIRED S/C FRAME ABOUT THE VECTOR COF. THE NEW
R0112 DESIRED REFERENCE MATRIX IS THEN.

R0113 * * *
R0114 MIS = MIS DEL
R0115 N+1 N

R0116 *
R0117 WHERE DEL IS THE MATRIX CORRESPONDING TO THIS SMALL ROTATION. THE NEW CDU ANGLES CAN THEN BE EXTRACTED
R0119 *
R0120 FROM MIS.

R0121 AT THE BEGINNING OF THE MANEUVER THE AUTOPILOT DESIRED RATES (OMEGAPD, OMEGAGD, OMEGARD) AND THE
R0123 MANEUVER TIMINGS ARE ESTABLISHED. ON THE FIRST PASS AND ON ALL SUBSEQUENT UPDATES THE CDU DESIRED
R0125 ANGLES ARE LOADED WITH THE APPROPRIATE VALUES AND THE INCREMENTAL CDU ANGLES ARE COMPUTED. THE AGC CLOCKS
R0127 (TIME1 AND TIME2) ARE THEN CHECKED TO SEE IF THE MANEUVER WILL TERMINATE BEFORE THE NEXT UPDATE. IF
R0129 NOT, KALCMANU CALLS FOR ANOTHER UPDATE (RUN AS A JOB WITH PRIORITY TBD) IN ONE SECOND. ANY DELAYS IN THIS
R0131 CALLING SEQUENCE ARE AUTOMATICALLY COMPENSATED IN CALLING FOR THE NEXT UPDATE.

R0133
R0134 IF IT IS FOUND THAT THE MANEUVER IS TO TERMINATE BEFORE THE NEXT UPDATE A ROUTINE IS CALLED (AS A WAIT-
R0136 LIST TASK) TO STOP THE MANEUVER AT THE APPROPRIATE TIME AS EXPLAINED ABOVE.
R0138

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R0139 CALLING SEQUENCE

R0140 IN ORDER TO PERFORM A KALCMANU SUPERVISED MANEUVER, THE COMMANDED GIMBAL ANGLES MUST BE PRECOMPUTED AND
R0142 STORED IN LOCATIONS CPHI, CTHETA, CPSI. THE USER'S PROGRAM MUST THEN CLEAR STATE SWITCH NO 33 TO ALLOW THE
R0144 ATTITUDE MANEUVER ROUTINE TO PERFORM ANY FINAL P-AXIS YAW INCURRED BY AVOIDING GIMBAL LOCK. THE MANEUVER IS
R0146 THEN INITIATED BY ESTABLISHING THE FOLLOWING EXECUTIVE JOB

R0147 *
R0148 CAF PRIO XX
R0149 --
R0150 INHINT
R0151 TC FINDVAC
R0152 2CADR KALCMAN3
R0153 RELINT

R0154 THE USER'S PROGRAM MAY EITHER CONTINUE OR WAIT FOR THE TERMINATION OF THE MANEUVER. IF THE USER WISHES TO
R0156 WAIT, HE MAY PUT HIS JOB TO SLEEP WITH THE FOLLOWING INSTRUCTIONS

R0157 L TC BANKCALL
R0158 L+1 CADR ATTSTALL
R0159 L+2 (BAD RETURN)
R0160 L+3 (GOOD RETURN)

R0161 UPON COMPLETION OF THE MANEUVER, THE PROGRAM WILL BE AWAKENED AT L+3 IF THE MANEUVER WAS COMPLETED
R0163 SUCCESSFULLY, OR AT L+2 IF THE MANEUVER WAS ABORTED. THIS ABORT WOULD OCCUR IF THE INITIAL OR FINAL ATTITUDE
R0165 WAS IN GIMBAL LOCK.

R0166 ***NOTA BENE*** IT IS ASSUMED THAT THE DESIRED MANEUVERING RATE (0.5, 2, 5, 10, DEG/SEC) HAS BEEN SELECTED BY
R0168 KEYBOARD ENTRY PRIOR TO THE EXECUTION OF KALCMANU.

R0169 IT IS ALSO ASSUMED THAT THE AUTOPILOT IS IN THE AUTO MODE. IF THE MODE SWITCH IS CHANGED DURING THE
R0171 MANEUVER, KALCMANU WILL TERMINATE VIA GOODEND WITHIN 1 SECOND SO THAT R60 MAY REQUEST A TRIM OF THE S/C ATTITUDE
R0173 THIS IS THE ONLY MEANS FOR MANUALLY TERMINATING A KALCMANU SUPERVISED MANEUVER.
R0175

SUBROUTINES

R0176 KALCMANU USES A NUMBER OF INTERPRETIVE SUBROUTINES WHICH MAY BE OF GENERAL INTEREST. SINCE THESE ROUTINES
R0178 WERE PROGRAMMED EXCLUSIVELY FOR KALCMANU, THEY ARE NOT, AS YET, GENERALLY AVAILABLE FOR USE BY OTHER PROGRAMS.

R0180
R0181 MXM3
R0182 ----

R0183 THIS SUBROUTINE MULTIPLIES TWO 3X3 MATRICES AND LEAVES THE RESULT IN THE FIRST 18 LOCATIONS OF THE PUSH
R0185 DOWN LIST, I.E.,

R0186 (M M M)
R0187 (G 1 2)
R0188 * () *
R0189 M = (M M M) = M1 X M2
R0190 (3 4 5)
R0191 ()
R0192 (M M M)

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R0193 (6 7 8)

R0194
R0196 INDEX REGISTER X1 MUST BE LOADED WITH THE COMPLEMENT OF THE STARTING ADDRESS FOR M1, AND X2 MUST BE
R0198
R0199 LOADED WITH THE COMPLEMENT OF THE STARTING ADDRESS FOR M2. THE ROUTINE USES THE FIRST 20 LOCATIONS OF THE PUSH
R0201 DOWN LIST. THE FIRST ELEMENT OF THE MATRIX APPEARS IN PDD. PUSH UP FOR M.
R0203
R0205

R0206 TRANSPOS
R0207

R0208 THIS ROUTINE TRANSPOSES A 3X3 MATRIX AND LEAVES THE RESULT IN THE PUSH DOWN LIST. I.E.,

R0210
R0211 * * T
R0212 M = M1

R0213 INDEX REGISTER X1 MUST CONTAIN THE COMPLEMENT OF THE STARTING ADDRESS FOR M1. PUSH UP FOR THE FIRST AND SUB-
R0215
R0216 SEQUENT COMPONENTS OF M. THIS SUBROUTINE ALSO USES THE FIRST 20 LOCATIONS OF THE PUSH DOWN LIST.
R0218

R0219 CDU TO DCM
R0220

R0221 THIS SUBROUTINE CONVERTS THREE CDU ANGLES IN T(PAC) TO A DIRECTION COSINE MATRIX (SCALED BY 2) RELATING
R0223 THE CORRESPONDING S/C ORIENTATIONS TO THE STABLE MEMBER FRAME. THE FORMULAS FOR THIS CONVERSION ARE
R0225

R0226 M = COSY COSZ
R0227 0

R0228 M = -COSY SINZ COSX + SINY SINX
R0229 1

R0230 M = COSY SINZ SINX + SINY COSX
R0231 2

R0232 M = SINZ
R0233 3

R0234 M = COSZ COSX
R0235 4

R0236 M = -COSZ SINX
R0237 5

R0238 M = -SINY COSZ
R0239 6

R0240 M = SINY SINZ COSX + COSY SINX
R0241 7

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R0242 M = -SINY SINZ SINX + COSY COSX
R0243 8

R0244 WHERE X = OUTER GIMBAL ANGLE
R0245 Y = INNER GIMBAL ANGLE
R0246 Z = MIDDLE GIMBAL ANGLE

R0247 THE INTERPRETATION OF THIS MATRIX IS AS FOLLOWS

R0248 IF A , A , A REPRESENT THE COMPONENTS OF A VECTOR IN S/C AXES THEN THE COMPONENTS OF THE SAME VECTOR IN
R0250 X Y Z
R0251 STABLE MEMBER AXES (B , B , B) ARE
R0252 X Y Z

R0253	(B)	(A)
R0254	(X)	(X)
R0255	()	()
R0256	()	* ()
R0257	(B)	= B (A)
R0258	(Y)	(Y)
R0259	()	()
R0260	(B)	(A)
R0261	(-Z)	(-Z)

R0262 THE SUBROUTINE WILL STORE THIS MATRIX IN SEQUENTIAL LOCATIONS OF ERASABLE MEMORY AS SPECIFIED BY THE CALLING
R0264 PROGRAM. TO DO THIS THE CALLING PROGRAM MUST FIRST LOAD X2 WITH THE COMPLEMENT OF THE STARTING ADDRESS FOR M.
R0266
R0268 INTERNALLY, THE ROUTINE USES THE FIRST 16 LOCATIONS OF THE PUSH DOWN LIST, ALSO STEP REGISTER S, AND INDEX
R0269 REGISTER X2.
R0271

R0272 DCM TO CDU

R0273
R0274 THIS ROUTINE EXTRACTS THE CDU ANGLES FROM A DIRECTION COSINE MATRIX (M SCALED BY 2) RELATING S/C AXIS TO
R0276
R0278 STABLE MEMBER AXES. X1 MUST CONTAIN THE COMPLEMENT OF THE STARTING ADDRESS FOR M. THE SUBROUTINE LEAVES THE
R0280 CORRESPONDING GIMBAL ANGLES IN V(XRAC) AS DOUBLE PRECISION 1:5 COMPLEMENT ANGLES SCALED BY 1. THE FORMULAS
R0282 FOR THIS CONVERSION ARE
R0284

R0285 Z = ARCSIN (M)
R0286 3

R0287 Y = ARCSIN (-4 /COSZ)
R0288 6

R0289 IF M IS NEGATIVE, Y IS REPLACED BY PI SGN Y - Y
R0290 0

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R0291 X = ARCSIN (-M / COSZ)
R0292 5

R0293 IF M IS NEGATIVE X IS REPLACED BY PI - X
R0294 4

R0295 THIS ROUTINE DOES NOT SET THE PUSH DOWN POINTER, BUT USES THE NEXT 8 LOCATIONS OF THE PUSH DOWN LIST AND
R0297 RETURNS THE POINTER TO ITS ORIGINAL SETTING. THIS PROCEDURE ALLOWS THE CALLER TO STORE THE MATRIX AT THE TOP OF
R0299 THE PUSH DOWN LIST.

R0300 DELCOMP
R0301 -----

R0302 THIS ROUTINE COMPUTES THE DIRECTION COSINE MATRIX (DEL) RELATING ON
R0303
R0304 IS ROTATED WITH RESPECT TO THE FIRST BY AN ANGLE, A, ABOUT A UNIT VECTOR, U. THE FORMULA FOR THIS MATRIX IS
R0306
R0308

R0309 * * --T *
R0310 DEL = I COSA + UU (1-COSA) + V SINA
R0311 X

R0312 WHERE * *
R0313 I = (1 0 0)
R0314 (0 1 0)
(0 0 1)

R0315 2
R0316 (U U U U)
R0317 (X X Y X Z)
R0318 ()
R0319 --T
R0320 UU = (U U U U)
R0321 (Y X Y Y Z)
R0322 ()
R0323 () 2
R0324 (U U U U)
R0325 (Z X Z Y Z)

R0326 (0 -U U)
R0327 (Z Y)
R0328 * *
R0329 V = (U 0 -U)
R0330 X (Z X)
R0331 ()
R0332 (-U U 0)
R0333 (-Y X)

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R0334 -
 R0335 U - UNIT ROTATION VECTOR RESOLVED INTO S/C AXES
 R0336 A - ROTATION ANGLE

R0337 *
 R0338 THE INTERPRETATION OF DEL IS AS FOLLOWS

R0339 - IF A, A, A REPRESENT THE COMPONENT OF A VECTOR IN THE ROTATED FRAME, THEN THE COMPONENTS OF THE SAME
 R0341 X Y Z
 R0342 VECTOR IN THE ORIGINAL S/C AXES (B, B, B) ARE
 R0343 X Y Z

R0344	(B)	(A)
R0345	(X)	(X)
R0346	()	()
R0347	(B)	(A)
R0348	(Y)	(Y)
R0349	()	()
R0350	(B)	(A)
R0351	(Z)	(Z)

R0352 THE ROUTINE WILL STORE THIS MATRIX (SCALED UNITY) IN SEQUENTIAL LOCATIONS OF ERASABLE MEMORY BEGINNING WITH
 R0354 THE LOCATION CALLED DEL. IN ORDER TO USE THE ROUTINE, THE CALLING PROGRAM MUST FIRST STORE U (A HALF UNIT
 R0356 DOUBLE PRECISION VECTOR) IN THE SET OF ERASABLE LOCATIONS BEGINNING WITH THE ADDRESS CALLED CDF. THE ANGLE, A,
 R0360 MUST THEN BE LOADED INTO DIMPAC).

R0361 INTERNALLY, THE PROGRAM ALSO USES THE FIRST 10 LOCATIONS OF THE PUSH DOWN LIST.
 R0363

R0364 READCDUK
 R0365 -----

R0366 THIS BASIC LANGUAGE SUBROUTINE LOADS T(MPAC) WITH THE THREE CDU ANGLES.
 R0368

R0369 SIGNMPAC
 R0370 -----

R0371 THIS IS A BASIC LANGUAGE SUBROUTINE WHICH LIMITS THE MAGNITUDE OF D(MPAC) TO + OR - DPOS MAX ON OVERFLOW.
 R0373

R0374 PROGRAM STORAGE ALLOCATION

R0375	1) FIXED MEMORY	1059 WORDS
R0376	2) ERASABLE MEMORY	96
R0377	3) STATE SWITCHES	3

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R0378 4) FLAGS 1

R0379 JOB PRIORITIES

R0380 1) KALCMANU T8D
 R0381 2) ONE SECOND UPDATE T8D

R0382 SUMMARY OF STATE SWITCHES AND FLAGWORDS USED BY KALCMANU.

R0383 R0384	STATE SWITCH NO.	FLAGWRD 2 BIT NO.	SETTING	MEANING
R0385	*			
R0386	31	14	0	MANEUVER WENT THROUGH GIMBAL LOCK
R0388			1	MANEUVER DID NOT GO THROUGH GIMBAL LOCK
R0390				
R0391	*			
R0392	32	13	0	CONTINUE UPDATE PROCESS
R0393			1	START UPDATE PROCESS
R0394	33	12	0	PERFORM FINAL P-AXIS YAW IF REQUIRED
R0396			1	IGNORE ANY FINAL P-AXIS YAW
R0398				
R0399	34	11	0	SIGNAL END OF KALCMANU
R0400			1	KALCMANU IN PROCESS USER MUST SET SWITCH BEFORE INITIATING

R0402 * INTERNAL TO KALCMANU

R0403 SUGGESTIONS FOR PROGRAM INTEGRATION

R0404 THE FOLLOWING VARIABLES SHOULD BE ASSIGNED TO UNSWITCH ERASABLE

R0405 CPM1
 R0406 CTHETA
 R0407 CPS1
 R0408 POINTVSM +5
 R0409 SCAXIS +5
 R0410 DELDCDU
 R0411 DELDCDU1
 R0412 DELDCDU2
 R0413 RATEINDX

R0414 THE FOLLOWING SUBROUTINES MAY BE PUT IN A DIFFERENT BANK

R0415 MXM3

SAP: ASSEMBLE REVISION 001 OF AGC PROGRAM LMY99 BY NASA-2021112-061 16:27 JULY 14, 1969 LMYAIDE.001 4466 350

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R0416	TRANSPOS
R0417	SIGNMPAC
R0418	HEADCDUK
R0419	CDUTODCM

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0420 15,2050 BANK 15
 0421 REF 1 22,2000 SETLOC KALCHONI
 0422 22,2004 BANK

0423 REF 3 LAST 286 E6,1676 EBANK= ECDU

R0424 THE THREE DESIRED CDU ANGLES MUST BE STORED AS SINGLE PRECISION TWO'S COMPLEMENT ANGLES IN THE THREE SUCCESSIVE
 R0426 LOCATIONS, CPHI, CTHETA, CPSI.

0427	REF 1				COUNT# 33/KALC	
0428	REF 14	LAST 340	22,2004	0 6037 0	KALCHAN3 TC	INTPRET
0429			22,2005	77634 0	RTB	PICK UP THE CURRENT CDU ANGLES AND COMPUTE THE MATRIX FROM INITIAL S/C AXES TO FINAL S/C AXES
0430	REF 1		22,2006	44403 0	READCDUK	STORE INITIAL S/C ANGLES
0431	REF 4	LAST 351	22,2007	03277 0	STORE ECDU	CHECK THE MAGNITUDE OF THE DESIRED MIDDLE GIMBAL ANGLE
0437			22,2010	51535 0	SLOAD ABS	
0438	REF 1		22,2011	00324 1	CPSI	
0439			22,2012	51025 1	DSU BPL	
0440	REF 1		22,2013	04403 1	LOCKANGI	IF GREATER THAN 70 DEG ABORT MANEUVER
0441	REF 1		22,2014	44724 0	TOROADF	
0442			22,2015	72364 0	AXC,2 TLOAD	
0443	REF 2	LAST 136	22,2016	03246 1	MIS	
0444	REF 5	LAST 351	22,2017	03277 0	ECDU	
0445			22,2020	77624 1	CALL	COMPUTE THE TRANSFORMATION FROM INITIAL S/C AXES TO STABLE MEMBER AXES
0446	REF 1		22,2021	44410 1	CDUTBCH	
0447			22,2022	72364 0	AXC,2 TLOAD	
0448	REF 4	LAST 116	22,2023	02230 1	MFS	PREPARE TO CALCULATE ARRAY MFS
0449	REF 2	LAST 340	22,2024	00322 1	CPHI	
0450			22,2025	77624 1	CALL	
0451	REF 2	LAST 351	22,2026	44410 1	CDUTBCH	
0452			22,2027	45160 1	SECAD AXC,1	MIS AND MFS ARRAYS CALCULATED \$2
0453	REF 4	LAST 351	22,2030	03246 1	MIS	
0454	REF 1		22,2031	44326 0	TRANSPOS	
0455			22,2032	45575 1	VLOAD STADR	
0456	REF 12	LAST 135	22,2033	50457 1	STOVL TMIS +120	
0457			22,2034	77626 0	STADR	
0458	REF 13	LAST 351	22,2035	50465 0	STOVL TMIS +6	
0459			22,2036	77626 0	STADR	
0460	REF 14	LAST 351	22,2037	74473 1	STORE THIS	THIS = TRANSPOSE(MIS) SCALED BY 2
0461			22,2040	75160 1	AXC,1 AXC,2	
0462	REF 15	LAST 351	22,2041	03303 1	THIS	
0463	REF 5	LAST 351	22,2042	02230 1	MFS	
0464			22,2043	77624 1	CALL	
0465	REF 1		22,2044	44312 1	MXM3	
0466			22,2045	45575 1	VLOAD STADR	
0467	REF 1		22,2046	51532 1	STOVL MFI +120	
0468			22,2047	77626 0	STADR	
0469	REF 2	LAST 351	22,2050	51540 1	STOVL MFI +6	
0470			22,2051	77626 0	STADR	
0471	REF 3	LAST 351	22,2052	75546 1	STORE MFI	MFI = THIS MFS (SCALED BY 4)
0472			22,2053	45001 1	SETPD CALL	TRANSPOSE MFI IN PD LIST

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0473				22,2054	00023 0		180	
0474	REF	1		22,2055	44335 1		TRNSPSPD	
0475				22,2056	45575 1	VLOAD	STADR	
0476	REF	1		22,2057	50457 1	STOVL	TMFI +120	
0477				22,2060	77626 0	STADR		
0478	REF	2	LAST	352	22,2061	50465 0	STOVL	TMFI +6
0479				22,2062	77626 0	STADR		
0480	REF	3	LAST	352	22,2063	74473 1	STORE	TMFI
								TMFI = TRANSPOSE (MFI) SCALED BY 4
R0481								
R0482								
R0483								
0484				22,2064	45345 1	DLOAD	DSU	
0485	REF	4	LAST	352	22,2065	03306 1		TMFI +2
0486	REF	4	LAST	351	22,2066	02233 1		MFI +2
0487				22,2067	45325 1	PDDL	DSU	CALCULATE COF SCALED BY 2/SIN(CAM)
0488	REF	5	LAST	352	22,2070	02235 1		MFI +4
0489	REF	5	LAST	352	22,2071	03310 0		TMFI +4
0490				22,2072	45325 1	PDDL	DSU	
0491	REF	6	LAST	352	22,2073	03316 0		TMFI +100
0492	REF	6	LAST	352	22,2074	02243 0		MFI +100
0493				22,2075	77666 1	VDEF		
0494	REF	5	LAST	136	22,2076	03326 0	STORE	COFSKEW
								EQUALS MFI SKEW
R0495								
R0496								
R0497								
0498				22,2077	43345 1	DLOAD	DAD	
0499	REF	7	LAST	352	22,2100	02231 0		MFI
0500	REF	8	LAST	352	22,2101	02251 0		MFI +160
0501				22,2102	43225 0	DSU	DAD	
0502	REF	2	LAST	37	22,2103	06512 1		DPI/4TH
0503	REF	9	LAST	352	22,2104	02241 1		MFI +80
0504	REF	2	LAST	135	22,2105	03334 0	STORE	CAM
				22,2106	77726 1	ARCCOS		CAM = (MFI0+MFI4+MFI8-1)/2 HALF SCALE
0506	REF	1		22,2107	03336 1	STORE	AM	AM=ARCCOS(CAM) (AM SCALED BY 2)
0507				22,2110	51025 1	DSU	BPL	
0508	REF	1		22,2111	04363 0		MINANG	
0509	REF	1		22,2112	44117 0		CHECKMAX	
0510				22,2113	77751 1	TLOAD		MANEUVER LESS THAN .25 DEGREES
0511	REF	3	LAST	351	22,2114	00322 1		GO DIRECTLY INTO ATTITUDE HOLD
0512	REF	6	LAST	195	22,2115	37236 1	STCALL	CDIXD
0513	REF	1		22,2116	44742 0		TOUBADI	STOP RATE AND EXIT
0514				22,2117	45345 1	CHECKMAX	DLOAD	DSU
0515	REF	2	LAST	352	22,2120	03336 1		AM
0516	REF	1		22,2121	04365 0		MAXANG	
0517				22,2122	77244 0	BPL	VLOAD	
0518	REF	1		22,2123	44131 1		ALTCALC	UNIT
0519	REF	6	LAST	352	22,2124	03326 0		COFSKEW
				22,2125	77656 1	UNIT		COFSKEW
0520				22,2126	03271 0	STORE	COF	COF IS THE MANEUVER AXIS
0521	REF	1						

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L ATTITUDE MANEUVER ROUTINE

SEE IF MANEUVER GOES THRU GINGAL LOCK

IF AM GREATER THAN 170 DEGREES

MFISYM=(MF1+TNF1)/2 SCALED BY 4

COFZ = SQRT(MFISYM8-CAM)/(1-CAM)

4 ROOT 2

COFY = SQRT(MFISYM4-CAM)/(1-CAM) 4 ROOT 2

COFX = SQRT(MFISYM-CAM)/(1-CAM) 4 ROOT 2

COFY & COFX

0522 22,2127 77650 1
 0523 REF 1 22,2130 44744 0
 0524 22,2131 53375 0
 0525 REF 10 LAST 352 22,2132 02231 0
 0526 REF 7 LAST 352 22,2133 03304 0
 0527 22,2134 77762 1
 0528 REF 1 22,2135 27304 0
 0529 REF 11 LAST 353 22,2136 02237 0
 0530 22,2137 74455 0
 0531 REF 8 LAST 353 22,2140 03312 1
 0532 REF 2 LAST 353 22,2141 27312 1
 0533 REF 12 LAST 353 22,2142 02245 0
 0534 22,2143 74455 0
 0535 REF 9 LAST 353 22,2144 03320 0
 0536 REF 3 LAST 353 22,2145 03320 0

ALTCALC

GOTO

LUCKSKIRT

VLOAD VAD

MF1

TNF1

VSR1

STOVL MFISYM

MF1 +6

VAD

VSR1

TNF1 +6

STOVL MFISYM +6

MF1 +120

VAD

VSR1

TNF1 +120

STORE MFISYM +120

CALCULATE COF

R0537
 R0538
 R0539
 R0540
 0541 22,2146 70545 1
 0542 REF 3 LAST 352 22,2147 03334 0
 0543 22,2150 45325 1
 0544 REF 1 22,2151 06520 0
 0545 REF 4 LAST 353 22,2152 03334 0
 0546 22,2153 65204 1
 0547 REF 1 22,2154 21712 0
 0548 REF 4 LAST 353 22,2155 03324 1
 0549 22,2156 56225 1
 0550 22,2157 00001 0
 0551 22,2160 00003 1
 0552 22,2161 65366 1
 0553 REF 5 LAST 353 22,2162 03314 1
 0554 22,2163 56225 1
 0555 22,2164 00001 0
 0556 22,2165 00003 1
 0557 22,2166 65366 1
 0558 REF 6 LAST 353 22,2167 03304 0
 0559 22,2170 56225 1
 0560 22,2171 00001 0
 0561 22,2172 00003 1
 0562 22,2173 55566 1
 0563 22,2174 77656 1
 0564 REF 2 LAST 352 22,2175 03271 0

DLOAD

SRI

CAM

PDOL

DSU

PD0 CAM

34

DPHALF

CAM

BDVB

PDOL

PD2 1 - CAM

32

SIGN-PAL

MFISYM +160

DSU

DDV

0

2

SQRT

PDOL

COFZ = SQRT(MFISYM8-CAM)/(1-CAM)

4 ROOT 2

MFISYM +80

DSU

DDV

0

2

SQRT

PDOL

COFY = SQRT(MFISYM4-CAM)/(1-CAM) 4 ROOT 2

MFISYM

DSU

DDV

0

2

SQRT

VDEF

COFX = SQRT(MFISYM-CAM)/(1-CAM) 4 ROOT 2

UNIT

STORE

COF

DETERMINE LARGEST COF AND ADJUST ACCORDINGLY

R0565
 R0566
 R0567
 0568 22,2176 45345 1
 0569 REF 3 LAST 353 22,2177 03271 0
 0570 REF 4 LAST 353 22,2200 03273 1
 0571 22,2201 71240 1

COFMAXGO

DLOAD

DSU

COF

COF +2

BRI

DLOAD

COFY & COFX

L ATTITUDE-MANEUVER ROUTINE

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0572	REF	1		22,2202	44211 0		COMP12		
0573	REF	5	LAST	353	22,2203	03271 0		COF	
0574					22,2204	50025 0	DSU	BMN	
0575	REF	6	LAST	354	22,2205	03275 1		COF +4	
0576	REF	1			22,2206	44266 0		METHOD3	COFZ G COFX OR COFY
0577					22,2207	77650 1	GOTO		
0578	REF	1			22,2210	44242 0		METHOD1	COFX G COFY OR COFZ
0579					22,2211	45345 1	COMP12	DLOAD	DSU
0580	REF	7	LAST	354	22,2212	03273 1		COF +2	
0581	REF	8	LAST	354	22,2213	03275 1		COF +4	
0582					22,2214	77640 0		BMN	
0583	REF	2	LAST	354	22,2215	44266 0		METHOD3	COFZ G COFY OR COFX
0584					22,2216	51145 0	METHOD2	DLOAD	BPL COFY MAX
0585	REF	7	LAST	352	22,2217	03330 1		COFSKEW +2	UY
0586	REF	1			22,2220	44224 0		U2POS	
0587					22,2221	57575 1	VLOAD	VCOMP	
0588	REF	9	LAST	354	22,2222	03271 0		COF	
0589	REF	10	LAST	354	22,2223	03271 0	STORE	COF	
0590					22,2224	51145 0	U2POS	DLOAD	BPL
0591	REF	7	LAST	353	22,2225	03306 1		MFISYM +2	UX UY
0592	REF	1			22,2226	44232 1		OKU21	
0593					22,2227	57545 1	DLOAD	DCOMP	SIGN OF UX OPPOSITE TO UY
0594	REF	11	LAST	354	22,2230	03271 0		COF	
0595	REF	12	LAST	354	22,2231	03271 0	STORE	COF	
0596					22,2232	51145 0	OKU21	DLOAD	BPL
0597	REF	8	LAST	354	22,2233	03316 0		MFISYM +100	UY-UZ
0598	REF	2	LAST	353	22,2234	44744 0		LOCKSKIRT	
0599					22,2235	57545 1	DLOAD	DCOMP	SIGN OF UZ OPPOSITE TO UY
0600	REF	13	LAST	354	22,2236	03275 1		COF +4	
0601	REF	14	LAST	354	22,2237	03275 1	STORE	COF +4	
0602					22,2240	77650 1	GOTO		
0603	REF	3	LAST	354	22,2241	44744 0		LOCKSKIRT	
0604					22,2242	51145 0	METHOD1	DLOAD	BPL COFX MAX
0605	REF	8	LAST	354	22,2243	03326 0		COFSKEW	UX
0606	REF	1			22,2244	44250 0		UIPOS	
0607					22,2245	57575 1	VLOAD	VCOMP	
0608	REF	15	LAST	354	22,2246	03271 0		COF	
0609	REF	16	LAST	354	22,2247	03271 0	STORE	COF	
0610					22,2250	51145 0	UIPOS	DLOAD	BPL
0611	REF	9	LAST	354	22,2251	03306 1		MFISYM +2	UX UY
0612	REF	1			22,2252	44256 0		OKU12	
0613					22,2253	57545 1	DLOAD	DCOMP	
0614	REF	17	LAST	354	22,2254	03273 1		COF +2	SIGN OF UY OPPOSITE TO UX
0615	REF	18	LAST	354	22,2255	03273 1	STORE	COF +2	
0616					22,2256	51145 0	OKU12	DLOAD	BPL
0617	REF	10	LAST	354	22,2257	03310 0		MFISYM +4	UX-UZ
0618	REF	4	LAST	354	22,2260	44744 0		LOCKSKIRT	
0619					22,2261	57545 1	DLOAD	DCOMP	SIGN OF UZ OPPOSITE TO UY
0620	REF	19	LAST	354	22,2262	03275 1		COF +4	

L ATTITUDE MANEUVER ROUTINE

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0621	REF	20	LAST	354	22,2263	03275 1	STORE	COF +4	
0622					22,2264	77650 1	GOTO		
0623	REF	5	LAST	354	22,2265	44744 0		LOCKSKIPT	
0624					22,2266	51145 0	METHOD3	DLOAD	BPL
0625	REF	9	LAST	354	22,2267	03332 0		COFSKEW +4	COFZ MAX
0626	REF	1			22,2270	44274 0		U3POS	UZ
0627					22,2271	57575 1	VLOAD	VCOMP	
0628	REF	21	LAST	355	22,2272	03271 0		COF	
0629	REF	22	LAST	355	22,2273	03271 0	STORE	COF	
0630					22,2274	51145 0	U3POS	DLOAD	BPL
0631	REF	11	LAST	354	22,2275	03310 0		MFISYM +4	UX UZ
0632	REF	1			22,2276	44302 0		OKU31	
0633					22,2277	57545 1	DLOAD	DCOMP	
0634	REF	23	LAST	355	22,2300	03271 0		COF	SIGN OF UX OPPOSITE TO UZ
0635	REF	24	LAST	355	22,2301	03271 0	STORE	COF	
0636					22,2302	51145 0	OKU31	DLOAD	BPL
0637	REF	12	LAST	355	22,2303	03316 0		MFISYM +100	UY UZ
0638	REF	6	LAST	355	22,2304	44744 0		LOCKSKIPT	
0639					22,2305	57545 1	DLOAD	DCOMP	
0640	REF	25	LAST	355	22,2306	03273 1		COF +2	SIGN OF UY OPPOSITE TO UZ
0641	REF	26	LAST	355	22,2307	03273 1	STORE	COF +2	
0642					22,2310	77650 1	GOTO		
0643	REF	7	LAST	355	22,2311	44744 0		LOCKSKIPT	

L ATTITUDE MANEUVER ROUTINE

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R0644 MATRIX OPERATIONS

0645			13,2207		BANK 13	
0646	REF 1		22,2000		SETLOC KALGMON2	
0647			22,2312		BANK	
0648	REF 6	LAST 351	E6,1676		EBANK= BCDU	
0649			22,2312	76601 1	SETPD VLOAD*	MXM3 MULTIPLIES 2 3X3 MATRICES
0650			22,2313	00001 0	0	AND LEAVES RESULT IN PD LIST
0651			22,2314	00001 0	0.1	AND MPAC
0652			22,2315	62703 1	VXM* PDVL*	
0653			22,2316	77776 1	0.2	
0654			22,2317	00007 0	6.1	
0655			22,2320	62703 1	VXM* PDVL*	
0656			22,2321	77776 1	0.2	
0657			22,2322	00015 0	120.1	
0658			22,2323	41503 1	VXM* PUSH	
0659			22,2324	77776 1	0.2	
0660			22,2325	77616 0	RVO	

R0661					RETURN WITH MIXM2 IN PD LIST	
R0662						
0663			22,2326	76601 1	TRANSPDS SETPD VLOAD*	TRANSPDS TRANSPOSES A 3X3 MATRIX
0664			22,2327	00001 0	0	AND LEAVES RESULT IN PD LIST
0665			22,2330	00001 0	0.1	MATRIX ADDRESS IN XR1
0666			22,2331	62713 0	PDVL* PDVL*	
0667			22,2332	00007 0	6.1	
0668			22,2333	00015 0	120.1	
0669			22,2334	77606 1	PUSH	MATRIX IN PD
0670			22,2335	77776 1	TRANSPSPD EXIT	ENTER WITH MATRIX AT 0 IN PD LIST
0671	REF 9	LAST 297	22,2336	50 120 1	INDEX FIXLOC	
0672			22,2337	52 013 1	DXCH 12	
0673	REF 10	LAST 356	22,2340	50 120 1	INDEX FIXLOC	
0674			22,2341	52 017 0	DXCH 16	
0675	REF 11	LAST 356	22,2342	50 120 1	INDEX FIXLOC	
0676			22,2343	52 013 1	DXCH 12	
0677	REF 12	LAST 356	22,2344	50 120 1	INDEX FIXLOC	
0678			22,2345	52 015 1	DXCH 14	
0679	REF 13	LAST 356	22,2346	50 120 1	INDEX FIXLOC	
0680			22,2347	52 005 0	DXCH 4	
0681	REF 14	LAST 356	22,2350	50 120 1	INDEX FIXLOC	
0682			22,2351	52 015 1	DXCH 14	
0683	REF 15	LAST 356	22,2352	50 120 1	INDEX FIXLOC	
0684			22,2353	52 003 0	DXCH 2	
0685	REF 16	LAST 356	22,2354	50 120 1	INDEX FIXLOC	
0686			22,2355	52 007 1	DXCH 4	
0687	REF 17	LAST 356	22,2356	50 120 1	INDEX FIXLOC	
0688			22,2357	52 003 0	DXCH 2	

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0689 REF 15 LAST 351 22,2360 0 6037 0 TC INTERPRET
0690 22,2361 77616 0 RVQ

0691 15,2050 BANK 15
0692 REF 2 LAST 351 22,2000 SETLOC KALCHONI
0693 22,2362 BANK

0694 REF 7 LAST 356 E6,1676 EBANK = BCDU

0695 22,2362 00013 0 MINANG 2DEC 0.00069375
0695 22,2363 13563 0
0696 22,2364 17070 0 MAXANG 2DEC 0.47222222
0696 22,2365 34343 1
R0697 GIMBAL LOCK CONSTANTS

```

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R0698 D = MGA CORRESPONDING TO GIMBAL LOCK = 60 DEGREES
R0699 HGL = BUFFER ANGLE (TO AVOID DIVISIONS BY ZERO) = 2 DEGREES

```

```

0700 22,2366 15666 0 SD 2DEC .433015 = SIN(D) $2
0700 22,2367 20443 0
0701 22,2370 33555 1 K3S1 2DEC .86603 = SIN(D) $1
0701 22,2371 01106 1
0702 22,2372 67777 1 K4 2DEC -.25 = -COS(D) $2
0702 22,2373 77777 0
0703 22,2374 04000 0 K4SQ 2DEC .125 = COS(D)COS(D) $2
0703 22,2375 00000 1
0704 22,2376 00216 1 SNGLED 2DEC .008725 = SIN(HGL)COS(D) $2
0704 22,2377 36323 0
0705 22,2400 17773 1 CNGL 2DEC .499695 COS(HGL) $2
0705 22,2401 00057 0
0706 22,2402 14344 1 LOCKANGL DEC .588889 = 70 DEGREES
R0707 INTERPRETIVE SUBROUTINE TO READ THE CDU ANGLES

```

```

0708 REF 5 LAST 254 22,2403 3 0034 0 READCDUX CA CDUZ LOAD T(MPAC) WITH CDU ANGLES
0709 REF 67 LAST 336 22,2404 54 156 1 TS MPAC +2
0710 22,2405 0 0006 1 EXTEND
0711 REF 7 LAST 305 22,2406 3 0033 1 DCA CDUX AND CHANGE MODE TO TRIPLE PRECISION
0712 REF 1 22,2407 1 6476 0 TCF TLOAD +6

```

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0713 22,2410 66370 0 COUTODCM AXT,1 SSP
0714 22,2411 00003 1 OCT 3
0715 REF 1 22,2412 00051 0 51
0716 22,2413 00001 0 OCT 1 SET XR1, S1, AND PD FOR LOOP
0717 22,2414 00010 0 STORE 7
0718 22,2415 77601 0 SETPD
0719 22,2416 00001 0
0720 22,2417 47133 0 LOOPSIN SLOAD KTB
0721 22,2420 00013 0 1CD,1
0722 REF 9 LAST 324 22,2421 21576 0 CDULOGIC

```


L ATTITUDE MANEUVER ROUTINE

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0723	22,2422	00013 0	STORE	100	LOAD PD WITH 0 SIN(PHI)
0724	22,2423	65356 1	SIN	PDDL	2 COS(PHI)
0725	22,2424	00013 0		100	4 SIN(THETA)
0726	22,2425	41546 0	COS	PUSH	6 COS(THETA)
0727	22,2426	71300 1	TIX.1	DLOAD	8 SIN(PSI)
0728	22,2427	44417 0		LOGPSIN	10 COS(PSI)
0729	22,2430	00007 0		6	
0730	22,2431	72405 0	DMP	SL1	
0731	22,2432	00013 0		100	
0732	22,2433	10001 1	STORE	0.2	$C0 = \cos(\text{THETA}) \cos(\text{PSI})$
0733	22,2434	41345 0	DLOAD	DMP	
0734	22,2435	00005 1		4	
0735	22,2436	00001 0		0	
0736	22,2437	41325 0	PDDL	DMP	$(PD6 \sin(\text{THETA}) \sin(\text{PHI}))$
0737	22,2440	00007 0		6	
0738	22,2441	00011 1		80	
0739	22,2442	72405 0	DMP	SL1	
0740	22,2443	00003 1		2	
0741	22,2444	72421 0	BDSU	SL1	
0742	22,2445	00015 0		120	
0743	22,2446	10003 0	STORE	2.2	$C1 = -\cos(\text{THETA}) \sin(\text{PSI}) \cos(\text{PHI})$
0744	22,2447	41345 0	DLOAD	DMP	
0745	22,2450	00003 1		2	
0746	22,2451	00005 1		4	
0747	22,2452	41325 0	PDDL	DMP	$(PD7 \cos(\text{PHI}) \sin(\text{THETA})) \text{ SCALED } 4$
0748	22,2453	00007 0		6	
0749	22,2454	00011 1		80	
0750	22,2455	72405 0	DMP	SL1	
0751	22,2456	00001 0		0	
0752	22,2457	72415 1	DAD	SL1	
0753	22,2460	00017 1		140	
0754	22,2461	10005 0	STORE	4.2	$C2 = \cos(\text{THETA}) \sin(\text{PSI}) \sin(\text{PHI})$
0755	22,2462	77745 1	DLOAD		
0756	22,2463	00011 1		80	
0757	22,2464	10007 1	STORE	6.2	$C3 = \sin(\text{PSI})$
0758	22,2465	77745 1	DLOAD		
0759	22,2466	00013 0		100	
0760	22,2467	72405 0	DMP	SL1	
0761	22,2470	00003 1		2	
0762	22,2471	10011 0	STORE	80.2	$C4 = \cos(\text{PSI}) \cos(\text{PHI})$
0763	22,2472	41345 0	DLOAD	DMP	
0764	22,2473	00013 0		100	
0765	22,2474	00001 0		0	
0766	22,2475	72476 1	DCOMP	SL1	
0767	22,2476	10013 1	STORE	100.2	$C5 = -\cos(\text{PSI}) \sin(\text{PHI})$
0768	22,2477	41345 0	DLOAD	DMP	
0769	22,2500	00005 1		4	
0770	22,2501	00013 0		100	
0771	22,2502	72476 1	DCOMP	SL1	
0772	22,2503	10015 1	STORE	120.2	$C6 = -\sin(\text{THETA}) \cos(\text{PSI})$

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0773	22,2504	77745 1	DLOAD		
0774	22,2505	72405 0	DMP	SL1	(PUSH UP 7)
0775	22,2506	00011 1		80	
0776	22,2507	41325 0	PDDL	DMP	(PD7 COS(PHI) SIN(THETA) SIN(PSI)) SCALE4
0777	22,2510	00007 0		6	
0778	22,2511	00001 0		0	
0779	22,2512	72415 1	DAD	SL1	(PUSH UP 7)
0780	22,2513	77626 0	STADR		C7=COS(PHI) SIN(THETA) SIN(PSI)
0781	22,2514	67760 1	STORE	140.2	+COS(THETA) SIN(PHI)
0782	22,2515	77745 1	DLOAD		
0783	22,2516	72405 0	DMP	SL1	(PUSH UP 6)
0784	22,2517	00011 1		80	
0785	22,2520	41325 0	PDDL	DMP	(PD6 SIN(THETA) SIN(PHI) SIN(PSI)) SCALE4
0786	22,2521	00007 0		6	
0787	22,2522	00003 1		2	
0788	22,2523	72425 1	DSU	SL1	(PUSH UP 6)
0789	22,2524	77626 0	STADR		
0790	22,2525	67756 1	STORE	140.2	C8=-SIN(THETA) SIN(PHI) SIN(PSI)
0791	22,2526	77616 0	RVC		+COS(THETA) COS(PHI)

R0792 CALCULATION OF THE MATRIX DEL.....

R0793 * * * * *

R0794 DEL = (IDMATRIX)COS(A)+UU (1-COS(A))+UX SIN(A) SCALED 1

R0795 -

R0796 WHERE U IS A UNIT VECTOR (DP SCALED 2) ALONG THE AXIS OF ROTATION.

R0798 A IS THE ANGLE OF ROTATION (DP SCALED 2)

R0799

R0800 UPON ENTRY THE STARTING ADDRESS OF U IS CDF. AND A IS IN MPAC

0801	22,2527	41401 1	DELCOMP	SETPO	PUSH	MPAC CONTAINS THE ANGLE A
0802	22,2530	00001 0			0	
0803	22,2531	65356 1		SIN	PDDL	PD0 = SIN(A)
0804	22,2532	41546 0		COS	PUSH	PD2 = COS(A)
0805	22,2533	65302 0		SR2	PDDL	PD2 = COS(A)
0806	22,2534	41021 1		BDSU	BDVB	
0807	REF 2 LAST 353	22,2535	06520 0		DPHALF	
0808	REF 2 LAST 353	22,2536	21712 0		SIGNMPAC	
0809	22,2537	77725 1	PDDL			PD4 = 1-COS(A)

R0810 COMPUTE THE DIAGONAL COMPONENTS OF DEL

0811	REF 27 LAST 355	22,2540	03271 0		CDF
0812		22,2541	41316 0	DSQ	DMP
0813		22,2542	00005 1		4
0814		22,2543	52415 0	DAD	SL3
0815		22,2544	00003 1		2
0816		22,2545	77604 0	BDVB	
0817	REF 3 LAST 359	22,2546	21712 0		SIGNMPAC

L ATTITUDE MANEUVER ROUTINE

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0818	REF 1	22,2547	16231 0	STODL	KEL	UX UX(1-COS(A)) +COS(A)	\$1
0819	REF 28 LAST 359	22,2550	03273 1		COF +2		
0820		22,2551	41316 0	DSQ	DMP		
0821		22,2552	00005 1		4		
0822		22,2553	52415 0	DAD	SL3		
0823		22,2554	00003 1		2		
0824		22,2555	77604 0	BOVB			
0825	REF 4 LAST 359	22,2556	21712 0		SIGNMPAC		
0826	REF 2 LAST 360	22,2557	16241 1	STODL	KEL +3D	UY UY(1-COS(A)) +COS(A)	\$1
0827	REF 29 LAST 360	22,2560	03275 1		COF +4		
0828		22,2561	41316 0	DSQ	DMP		
0829		22,2562	00005 1		4		
0830		22,2563	52415 0	DAD	SL3		
0831		22,2564	00003 1		2		
0832		22,2565	77604 0	BOVB			
0833	REF 5 LAST 360	22,2566	21712 0		SIGNMPAC		
0834	REF 3 LAST 360	22,2567	02251 0	STORE	KEL +16D	UZ UZ(1-COS(A)) +COS(A)	\$1

R0835 COMPUTE THE OFF DIAGONAL TERMS OF DEL

0836		22,2570	41345 0	DL DAD	DMP		
0837	REF 30 LAST 360	22,2571	03271 0		COF		
0838	REF 31 LAST 360	22,2572	03273 1		COF +2		
0839		22,2573	72405 0	DMP	SL1		
0840		22,2574	00005 1		4		
0841		22,2575	41325 0	PDDL	DMP	D6 UX UY (1-COS A)	\$ 4
0842	REF 32 LAST 360	22,2576	03275 1		COF +4		
0843		22,2577	00001 0		0		
0844		22,2600	43206 1	PUSH	DAD	D8 UZ SIN A	\$ 4
0845		22,2601	00007 0		6		
0846		22,2602	41112 0	SL2	BOVB		
0847	REF 6 LAST 360	22,2603	21712 0		SIGNMPAC		
0848	REF 4 LAST 360	22,2604	16237 0	STODL	KEL +6		
0849		22,2605	62421 1	BDSU	SL2		
0850		22,2606	77604 0	BOVB			
0851	REF 7 LAST 360	22,2607	21712 0		SIGNMPAC		
0852	REF 5 LAST 360	22,2610	16233 1	STODL	KEL +2		
0853	REF 33 LAST 360	22,2611	03271 0		COF		
0854		22,2612	41205 0	DMP	DMP		
0855	REF 34 LAST 360	22,2613	03275 1		COF +4		
0856		22,2614	00005 1		4		
0857		22,2615	65352 0	SL1	PDDL	D6 UX UZ (1-COS A)	\$ 4
0858	REF 35 LAST 360	22,2616	03273 1		COF +2		
0859		22,2617	41405 0	DMP	PUSH	D8 UY SIN(A)	
0860		22,2620	00001 0		0		
0861		22,2621	62415 0	DAD	SL2		
0862		22,2622	00007 0		6		
0863		22,2623	77604 0	BOVB			
0864	REF 8 LAST 360	22,2624	21712 0		SIGNMPAC		
0865	REF 6 LAST 360	22,2625	16235 1	STODL	KEL +4	UX UZ (1-COS(A)) +UY SIN(A)	

1 ATTITUDE MANEUVER ROUTINE

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0866			22,2626	62421 1	BDSU	SL2	
0867			22,2627	77604 0	BDVB		
0868	REF	9	LAST	360	22,2630	21712 0	SIGNMPAC
0869	REF	7	LAST	360	22,2631	16245 0	STOOL KEL +120 UX UZ (1-COS(A))-UY SIN(A)
0870	REF	36	LAST	360	22,2632	03273 1	COF +2
0871					22,2633	41205 0	DMP DMP
0872	REF	37	LAST	361	22,2634	03275 1	COF +4
0873					22,2635	00005 1	4
0874					22,2636	65352 0	SL1 PDDL D6 UY UZ (1-COS(A)) 4
0875	REF	38	LAST	361	22,2637	03271 0	COF
0876					22,2640	41405 0	DMP PUSH D8 UX SIN(A)
0877					22,2641	00001 0	0
0878					22,2642	62415 0	DAD SL2
0879					22,2643	00007 0	6
0880					22,2644	77604 0	BDVB
0881	REF	10	LAST	361	22,2645	21712 0	SIGNMPAC
0882	REF	8	LAST	361	22,2646	16247 1	STOOL KEL +140 UY UZ (1-COS(A)) +UX SIN(A)
0883					22,2647	62421 1	BDSU SL2
0884					22,2650	77604 0	BDVB
0885	REF	11	LAST	361	22,2651	21712 0	SIGNMPAC
0886	REF	9	LAST	361	22,2652	02243 0	STORE KEL +100 UY UZ (1-COS(A)) -UX SIN(A)
0887					22,2653	77616 0	RVQ

R0886 DIRECTION COSINE MATRIX TO CDU ANGLE ROUTINE

R0889 X1 CONTAINS THE COMPLEMENT OF THE STARTING ADDRESS FOR MATRIX (SCALED 2)

R0890 LEAVES CDU ANGLES SCALED 2PI IN V(MPAC)

R0891 COS(MGA) WILL BE LEFT IN S1 (SCALED 1)

R0892 THE DIRECTION COSINE MATRIX RELATING S/C AXES TO STABLE MEMBER AXES CAN BE WRITTEN AS***

R0894	C =COS(THETA)COS(PSI)
R0895	0
R0896	C =-COS(THETA)SIN(PSI)COS(PHI)+S1 (THETA)SIN(PHI)
R0897	1
R0898	C =COS(THETA)SIN(PSI)SIN(PHI) + S N(THETA)COS(PHI)
R0899	2
R0900	C =SIN(PSI)
R0901	3
R0902	C =COS(PSI)COS(PHI)
R0903	4
R0904	C =-COS(PSI)SIN(PHI)
R0905	5
R0906	C =-SIN(THETA)COS(PSI)
R0907	6
R0908	C =SIN(THETA)SIN(PSI)COS(PHI)+COS THETA)SIN(PHI)
R0909	7
R0910	C =-SIN(THETA)SIN(PSI)SIN(PHI)+CO (THETA)COS(PHI)
R0911	8

L ATTITUDE MANEUVER ROUTINE

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R0912 WHERE PHI = OGA
 R0913 THETA = IGA
 R0914 PSI = MGA

0915			22.2654	67543 1	DCMTCDDU	DLDA0*	ARCSIN	
0916			22.2655	00007 0			6.1	
0917			22.2656	71406 0		PUSH	COS	PD +0 PSI
0918			22.2657	41152 1		SL1	BOVR	
0919	REF	12	LAST	361			SIGNPAC	
0920	REF	2	LAST	357		STORE	S1	
0921			22.2662	57543 1		DLDA0*	DCOMP	
0922			22.2663	00015 0			120.1	
0923			22.2664	67471 1		DDV	ARCSIN	
0924	REF	3	LAST	362			S1	
0925			22.2666	51123 0		PDCL*	BPL	PD +2 THETA
0926			22.2667	00001 0			6.1	MUST CHECK THE SIGN OF COS(THETA)
0927	REF	1					DKTHETA	TO DETERMINE THE PROPER QUADRANT
0928			22.2671	57545 1		DLDA0	DCOMP	
0929			22.2672	43244 1		BPL	DAD	
0930	REF	1					SUHALFA	
0931	REF	3	LAST	359			DPHALF	
0932			22.2675	77650 1		GOTO	CALCPHI	
0933	REF	1						
0934			22.2677	77625 0	SUHALFA	DSU		
0935	REF	4	LAST	362			DPHALF	
0936			22.2701	77606 1	CALCPHI	PUSH		
0937			22.2702	57543 1	DKTHETA	DLDA0*	DCOMP	
0938			22.2703	00013 0			100.1	
0939			22.2704	67471 1		DDV	ARCSIN	
0940	REF	4	LAST	362			S1	
0941			22.2706	51123 0		PDCL*	BPL	PUSH DOWN PHI
0942			22.2707	00011 1			80.1	
0943	REF	1					DKPHI	
0944			22.2711	57545 1		DLDA0	DCOMP	PUSH UP PHI
0945			22.2712	43244 1		BPL	DAD	
0946	REF	1					SUHALFAP	
0947	REF	5	LAST	362			DPHALF	
0948			22.2715	77650 1		GOTO		
0949	REF	1					VECDIFANG	
0950			22.2717	52025 1	SUHALFAP	DSU	GOTO	
0951	REF	6	LAST	362			DPHALF	
0952	REF	2	LAST	362			VECDIFANG	
0953			22.2722	77745 1	DKPHI	DLDA0		PUSH UP PHI
0954			22.2723	43466 1	VECDIFANG	VDEF	RVR	

L ATTITUDE MANEUVER ROUTINE

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P0955 ROUTINES FOR TERMINATING THE AUTOMATIC MANEUVER AND RETURNING TO USER

0956				22,2724	77776 1	TGOBADF	EXIT		
0957	REF	19	LAST	270	22,2725	0 5567 0	TC	ALARM	
0958					22,2726	00401 1	OCT	00401	
0959	REF	1			22,2727	1 2732 1	TCF	NOGO	DO NOT ZERO ATTITUDE ERRORS
0960	REF	63	LAST	340	22,2730	0 4616 1	TC	BANKCALL	
0961	REF	2	LAST	285	22,2731	40153 1	CADR	ZATTERDR	ZERO ATTITUDE ERRORS
0962	REF	64	LAST	363	22,2732	0 4616 1	TC	BANKCALL	
0963	REF	2	LAST	288	22,2733	40165 1	CADR	STOPRATE	STOP RATES
0964	REF	13	LAST	332	22,2734	3 4752 0	CAF	TWO	
0965					22,2735	0 0004 0	INHINT		ALL RETURNS ARE NOW MADE VIA GOODEND
0966	REF	12	LAST	295	22,2736	0 5203 0	TC	WAITLIST	
0967	REF	8	LAST	357	22,2737	03234 1	EBANK*	BCDU	
0968	REF	1			22,2740	44066 1	ZCADR	GOODMANU	
0969	REF	30	LAST	336	22,2741	1 5155 1	TCF	ENDGFJOB	
0970					22,2742	77776 1	TGOBADI	EXIT	
0971	REF	2	LAST	363	22,2743	1 2732 1	TCF	NOGO	

L GIMBAL LOCK AVOIDANCE

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0001 —15,2050

BANK 15

0002 REF 3 LAST 357 22,2000
0003 22,2744SETLOC KALCHONI
BANK

R0004

R0005 DETECTING GIMBAL LOCK

0006 REF 1 22,2744

LOCKSKIRT EQUALS NOGIMLOC

0007 22,2744 77614 1 NOGIMLOC SET

0008 REF 1 22,2745 01074 0

0009 22,2746 70740 0 WCALC LXC.1

0010 REF 3 LAST 293 22,2747 01325 1

0011 REF 1 22,2750 04772 1

0012 22,2751 45002 1

0013 REF 1 22,2752 44527 1

CHOOSE THE DESIRED MANEUVER RATE
FROM A LIST OF FOUR
COMPUTE THE INCREMENTAL ROTATION MATRIX
DEL CORRESPONDING TO A 1 SEC ROTATION
ABOUT COF

A0014

0015 22,2753 74343 0

0016 REF 2 LAST 364 22,2754 04772 1

0017 REF 39 LAST 361 22,2755 03271 0

0018 REF 1 22,2756 17326 0

0019 REF 3 LAST 352 22,2757 03336 1

0020 22,2760 55605 1

0021 REF 1 22,2761 05002 0

0022 REF 3 LAST 344 22,2762 04772 1

0023 22,2763 77661 0

0024 22,2764 20606 0

0025 REF 1 22,2765 03334 0

0026 22,2766 77614 1

0027 REF 1 22,2767 01035 0

0028 REF 1 22,2770 45010 1

COMPONENT MANEUVER RATES 45 DEG/SEC

MANEUVER EXECUTION TIME SCALED AS T2

0(DEF) = CONTINUE MANEUVER
1(UN) = START MANEUVER

R0029 THE FOUR SELECTABLE FREE FALL MANEUVER RATES SELECTED BY

R0030 LOADING RATEINDEX WITH 0,2,4,6, RESPECTIVELY

0031 22,2771 00221 0 ARATE 2DEC .0088888888 = 0.2 DEG/SEC \$ 22.5 DEG/SEC

0031 22,2772 24255 0 2DEC .0222222222 = 0.5 DEG/SEC \$ 22.5 DEG/SEC

0032 22,2773 00554 0 2DEC .0688888888 = 2.0 DEG/SEC \$ 22.5 DEG/SEC

0032 22,2774 02660 0 2DEC .4444444444 = 10.0 DEG/SEC \$ 22.5 DEG/SEC

0033 22,2775 02660 0 2DEC .0001907349 = 1008-19 FUDGE FACTOR TO CONVERT

0033 22,2776 13301 1 2DEC .0001907349 = 1008-19 FUDGE FACTOR TO CONVERT

0034 22,2777 16161 0 2DEC .0001907349 = 1008-19 FUDGE FACTOR TO CONVERT

0034 22,3000 30707 1 2DEC .0001907349 = 1008-19 FUDGE FACTOR TO CONVERT

0035 22,3001 00003 1 ANGLTIME 2DEC .0001907349 = 1008-19 FUDGE FACTOR TO CONVERT

0035 22,3002 04000 0 ANGLTIME 2DEC .0001907349 = 1008-19 FUDGE FACTOR TO CONVERT

A0036

MANEUVER ANGLE TO MANEUVER TIME

L KALCMANU-STEERING

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R0001 GENERATION OF STEERING COMMANDS FOR DIGITAL AUTOPILOT FREE FALL MANEUVERS

R0003 NEW COMMANDS WILL BE GENERATED EVERY ONE SECOND DURING THE MANEUVER

0004	REF	1		E6.1707		EBANK= TTFAP	
0005	REF	65	LAST	363	22.3003	0 4616 1	NEWDELHI TC BANKCALL CHECK FOR AUTO STABILIZATION
0006	REF	1			22.3004	54262 0	CAOP ISITAUD ONLY
0007	REF	97	LAST	332	22.3005	10 000 0	CCS A
0008	REF	3	LAST	363	22.3006	1 2730 0	TCF NOGD -2
0009	REF	16	LAST	357	22.3007	0 6037 0	NEWANGL TC INTERPRET
0010					22.3010	75160 1	AXC.1 AXC.2
0011	REF	5	LAST	351	22.3011	03246 1	PIS COMPUTE THE NEW MATRIX FROM S/L TO
0012	REF	10	LAST	361	22.3012	02230 1	KEL STABLE MEMBER AXES
0013					22.3013	77624 1	CALL
0014	REF	2	LAST	351	22.3014	44312 1	MXH1
0015					22.3015	45575 1	VLOAD STADP
0016	REF	6	LAST	365	22.3016	50514 1	STOVL HIS +120 CALCULATE NEW DESIRED CDU ANGLES
0017					22.3017	77626 0	STADP
0018	REF	7	LAST	365	22.3020	50522 1	STOVL HIS +60
0019					22.3021	77626 0	STADR
0020	REF	8	LAST	365	22.3022	74530 1	STORE HIS
0021					22.3023	45160 1	AXC.1 CALL
0022	REF	9	LAST	365	22.3024	03246 1	HIS
0023	REF	1			22.3025	44654 0	DCPACED PICK UP THE NEW CDU ANGLES FROM MATRIX
0024					22.3026	77634 0	RTB
0025	REF	1			22.3027	21626 0	VISTRES
0026	REF	1			22.3030	03304 0	STORE NCDU NEW CDU ANGLES
0027					22.3031	77414 0	BONCLR EXIT
0028	REF	2	LAST	364	22.3032	01215 0	CALCMAN2
0029	REF	1			22.3033	45122 1	MANUSTAT TO START MANEUVER
0030	REF	14	LAST	365	22.3034	3 4752 0	CAF TWO +0 OTHERWISE
0031	REF	1			22.3035	551272 0	INCRCDDU TS SPNDX
0032	REF	2	LAST	365	22.3036	511272 1	INDEX SPNDX
0033	REF	9	LAST	363	22.3037	3 1676 1	CA BCDU INITIAL CDU ANGLES
0034					22.3040	0 0006 1	EXTEND OR PREVIOUS DESIRED CDU ANGLES
0035	REF	3	LAST	365	22.3041	5 1272 1	INDEX SPNDX
0036	REF	2	LAST	365	22.3042	211703 0	MSU NCDU
0037					22.3043	0 0006 1	EXTEND
0038	REF	4	LAST	364	22.2000		SETLOC KALCMON1
0039					22.3044		BANK
0040	REF	1			22.3044	7 3121 1	MP DT/TAU
0041	REF	98	LAST	365	22.3045	10 000 0	CCS A CONVERT TO 25 COMPLEMENT
0042	REF	17	LAST	359	22.3046	6 4753 1	AD ONE
0043					22.3047	1 3051 1	TCF +2
0044					22.3050	4 0000 0	COM
0045	REF	4	LAST	365	22.3051	511272 1	INDEX SPNDX
0046	REF	1			22.3052	551640 0	TS DELDCDDU
0047	REF	5	LAST	365	22.3053	511272 1	INDEX SPNDX

ANGLE INCREMENTS TO BE ADDED TO
CDUXD, CDUYD, CDUZD EVERY TENTH SECOND

L KALCHMANU-STEERING

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0048	REF	3	LAST	365	22,3054	3 1703 1	CA	ACDU	BY LEM DAP
0049	REF	6	LAST	365	22,3055	51'272 1	INDEX	SPNDX	
0050	REF	10	LAST	365	22,3056	57'676 1	XCH	BCDU	
0051	REF	7	LAST	366	22,3057	51'272 1	INDEX	SPNDX	
0052	REF	7	LAST	352	22,3060	55'635 1	TS	CDUXD	
0053	REF	8	LAST	366	22,3061	11'272 0	CCS	SPNDX	
0054	REF	1			22,3062	1 3035 0	TCF	INCROCDU	LOOP FOR THREE AXES

0055					22,3063	0 0003 1	RELINT		
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R0056 COMPARE PRESENT TIME WITH TIME TO TERMINATE MANEUVER

0057	REF	1			22,3064	0 3075 0	TMANUCHK	TC	TIMECHK	
0058	REF	1			22,3065	1 3170 0	TCF	CONTMANU		
0059	REF	18	LAST	365	22,3066	3 4753 1	CAF	ONE		
0060					22,3067	0 0004 0	MANUSTAL	INHINT		END MAJOR PART OF MANEUVER WITHIN 1 SEC
0061	REF	13	LAST	363	22,3070	0 5203 0	TC	WAITLIST		UNDER WAITLIST CALL TO MANUSTOP
0062	REF	2	LAST	365	E6,1707		EBANK	TTEMP		
0063	REF	1			22,3071	00213 1	2CADR	MANUSTOP		
0063	REF	1			22,3072	44066 1				
0064					22,3073	0 0003 1	RELINT			
0065	REF	31	LAST	363	22,3074	1 5155 1	TCF	ENDCFJOB		

0066					22,3075	0 0006 1	TIMECHK	EXTEND		
0067	REF	11	LAST	366	22,3076	4 0025 1	DCS	TTEMP		
0068	REF	3	LAST	366	22,3077	53'710 1	DXCH	TTEMP		
0069					22,3100	0 0006 1	EXTEND			
0070	REF	2	LAST	364	22,3101	3 1734 0	DCA	TM		
0071	REF	4	LAST	366	22,3102	21'710 1	DAS	TTEMP		
0072	REF	5	LAST	366	22,3103	11'707 1	CCS	TTEMP		
0073	REF	36	LAST	336	22,3104	0 0002 0	TC	Q		
0074					22,3105	1 3107 0	TCF	+2		
0075	REF	1			22,3106	1 3117 1	TCF	2NDRETRN		
0076	REF	6	LAST	366	22,3107	11'710 1	CCS	TTEMP +1		
0077	REF	37	LAST	366	22,3110	0 0002 0	TC	Q		
0078	REF	1			22,3111	1 3113 0	TCF	HANDOFF		
0079					22,3112	4 0000 0	CON			
0080	REF	1			22,3113	6 3166 0	MANUOFF	AD	ONESEC +1	
0081					22,3114	0 0006 1	EXTEND			
0082	REF	2	LAST	366	22,3115	6 3117 0	BZMF	2NDRETRN		
0083	REF	38	LAST	366	22,3116	24 002 0	INCR	Q		
0084	REF	39	LAST	366	22,3117	24 002 0	2NDRETRN	INCR	Q	
0085	REF	40	LAST	366	22,3120	0 0002 0	TC	Q		

0086					22,3121	03146 1	DT/TAU	DEC	.1	
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0087					22,3122	77776 1	MANUSTAT	EXIT		INITIALIZATION ROUTINE
0088					22,3123	0 0006 1		EXTEND		FOR AUTOMATIC MANEUVERS
0089	REF	12	LAST	366	22,3124	3 0025 0	DCA	TTEMP		

L KALCMANU STEERING

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0138	REF	4	LAST	267	22.3203	3 3166 0	CAF	ONESCK +1	INCREMENT TIME FOR NEXT UPDATE
0139	REF	3	LAST	367	22.3204	27 706 0	ADS	NEXTIME	
0140	REF	32	LAST	366	22.3205	1 5155 1	TCF	ENDEFJOL	
0141	REF	1			22.3206	3 7714 1	UPDTCALL	CAF	PRI02b
0142	REF	13	LAST	249	22.3207	0 5105 0	TC	FINDVAC	SATELLITE PROGRAM TO CALL FOR UPDATE
0143	REF	8	LAST	367	E6.1707		EBANK=	TTEMP	OF STEERING COMMANDS
0144	REF	1			22.3210	03003 1	2CADR	NEWDELHI	
0144	REF	1			22.3211	44066 1			
0145	REF	5	LAST	282	22.3212	0 5261 1	TC	TASKOVER	

L KALCMANU-STEERING

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P0146 ROUTINE FOR TERMINATING AUTOMATIC MANEUVERS

0147	REF	40	LAST	336	22.3213	3 4755 1	MANUSTOP	CAF	ZERF	ZERO MANEUVER RATES
0148	REF	1			22.3214	55.642 1		TS	DELDGDU2	
0149	REF	1			22.3215	55.645 0		TS	DMEGARD	
0150	REF	1			22.3216	55.301 0		TS	DELPERDR	
0151	REF	1			22.3217	55.641 1		TS	DELDGDU1	
0152	REF	1			22.3220	55.644 1		TS	DMEGARD	
0153	REF	1			22.3221	55.300 1		TS	DELPERDR	
0154	REF	2	LAST	351	22.3222	3-0323 0		CA	CPST	SET DESIRED GIMBAL ANGLES TO
0155	REF	1			22.3223	55.637 0		TS	CDUZO	DESIRED FINAL GIMBAL ANGLES
0156	REF	1			22.3224	3-0322 1		CA	CTHETA	
0157	REF	1			22.3225	55.636 1		TS	CDUYO	
0158	REF	4	LAST	352	22.3226	3-0321 1	ENDROLL	CA	CPHI	NO FINAL YAW
0159	REF	8	LAST	366	22.3227	55.635 1		TS	CDUXO	
0160	REF	41	LAST	369	22.3230	3-4755 1		CAF	ZERO	
0161	REF	5	LAST	367	22.3231	55.643 0		TS	DMEGARD	I.E. MANEUVER DID NOT GO THRU
0162	REF	2	LAST	365	22.3232	55.640 0		TS	DELDGDU	GIMBAL LOCK ORIGINALLY
0163	REF	2	LAST	367	22.3233	55.277 0		TS	DELPERDR	
0164	REF	1			22.3234	3 1311 0	GOODMANU	CA	ATTPRIO	RESTORE USERS PRIO
0165	REF	2	LAST	232	22.3235	54 063 0		TS	NEWPRIO	
0166	REF	42	LAST	369	22.3236	3 4755 1		CA	ZERD	ZERO ATTCADR
0167	REF	1	LAST	222	22.3237	53.310 0		DXCH	ATTCADR	
0168	REF	2	LAST	232	22.3240	0 5116 1		TC	SPVAC	RETURN TO USER
0169	REF	6	LAST	368	22.3241	0 5261 1		TC	TASKOVER	

L SYSTEM TEST STANDARD LEAD INS

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0001 REF 4 LAST 320 E5,1642 EBANK = XSM
 0002 REF 1 33,2045 BANK 33
 0003 REF 1 04,2000 SETLOG E/PROG
 0004 04,2576 BANK
 0005 REF 1 COUNT# 31/P07

*0006 SPECIAL PROGRAMS TO EASE THE PANGS OF ERASABLE MEMORY PROGRAMS.

R0007 F/BKCALL FOR DOING BANKCALLS FROM AND RETURNING TO ERASABLE.

R0008 THIS ROUTINE IS CALLABLE FROM ERASABLE OR FIXED. LIKE BANKCALL, HOWEVER, SWITCHING BETWEEN S3 AND S4
 R0010 IS NOT POSSIBLE.

R0011 THE CALLING SEQUENCE IS:

A0012 TC BANKCALL
 A0013 CADR F/BKCALL
 A0014 CADR ROUTINE WHERE YOU WANT TO GO IN FIXED.
 A0015 RETURN HERE FROM DISPLAY TERMINATE, BAD STALL OR TC Q.
 A0016 RETURN HERE FROM DISPLAY PROCEED OR GOOD RETURN FROM STALL.
 A0017 RETURN HERE FROM DISPLAY ENTER OR RECYCLE.

R0018 THIS ROUTINE REQUIRES TWO ERASABLES (EBUF2, +1) IN UNSWITCHED WHICH ARE UNSHARED BY INTERRUPTS AND
 R0020 OTHER MEMORY PROGRAMS.

R0021 A + L ARE PRESERVED THROUGH BANKCALL AND E/BKCALL.

0022	REF	3	LAST	245	04,2576	52 134 0	E/BKCALL	DXCH	EBUF2	SAVE A+L AND GET DP RETURN.
0023	REF	1			04,2577	53 170 1		DXCH	EBUF2	SAVE DP RETURN.
0024	REF	2	LAST	370	04,2600	25 167 0		INCP	EBUF2	RETURN +1 BECAUSE DOUBLE CADR.
0025	REF	10	LAST	154	04,2601	3 0006 1		CA	EBANK	
0026	REF	3	LAST	304	04,2602	7 5012 0		MASK	LOW10	GET CURRENT EBANK. (SBANK SOMEDAY)
0027	REF	3	LAST	370	04,2603	27 170 1		ADS	EBUF2 +1	FORM BBCH. (WAS FBANK)
0028	REF	4	LAST	370	04,2604	51 167 0		NDX	EBUF2	
0029					04,2605	21 7777 0		CA	0 -1	GET CADR OF ROUTINE.
0030	REF	2	LAST	217	04,2606	0 4622 0		TC	SCALL	GO TO ROUTINE, SETTING G TO SWRPTURN
A0031										AND RESTORING A + L.
0032					04,2607	0 2613 1		TC	+4	TX Q, V34, OR BAD STALL RETURN.
0033					04,2610	0 2612 0		TC	+2	PROCEED OR GOOD STALL RETURN.
0034	REF	5	LAST	370	04,2611	25 167 0		INCR	EBUF2	ENTER OR RECYCLE RETURN.
0035	REF	6	LAST	370	04,2612	25 167 0		INCR	EBUF2	
0036	REF	7	LAST	370	04,2613	53 170 1	E/SWITCH	DXCH	EBUF2	
0037					04,2614	52 006 0		DTCH		

1 SYSTEM TEST STANDARD LEAD-INS-

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P0038 E/CALL FOR CALLING A FIXED MEMORY INTERPRETIVE SUBROUTINE FROM ERASABLE AND RETURNING TO ERASABLE.

R0040 THE CALLING SEQUENCE IS...

A0041							RTB			
A0042								E/CALL		
A0043							LADR	ROUTINE		THE INTERPRETIVE SUBROUTINE YOU WANT.
A0044										RETURNS HERE IN INTERPRETIVE.
0045	REF	1			04,2615	22 164 1	E/CALL	LXCH	LOC	ADRES -1 OF CAOR.
0046	REF	33	LAST	356	04,2616	50 001 0		INDEX	L	
0047	REF	34	LAST	371	04,2617	3 0001 0		CA	L	CAOR IN A.
0048	REF	35	LAST	371	04,2620	24 001 0		INCR	L	
0049	REF	36	LAST	371	04,2621	24 001 0		INCR	L	RETURN ADRES IN L.
0050	REF	8	LAST	370	04,2622	53 170 1		DXCH	EBUF2	STORE CAOR AND RETURN.
0051	REF	17	LAST	365	04,2623	0 6037 0		TC	INTPRET	
0052					04,2624	77624 1		CALL		
0053	REF	9	LAST	371	04,2625	01167 0			EBUF2	INDIRECTLY EXECUTE ROUTINE. IT MUST
0054					04,2626	77776 1		EXIT		LEAVE VIA RVO OR EQUIVALENT.
0055	REF	10	LAST	371	04,2627	23 170 0		LXCH	EBUF2 +1	PICK UP RETURN.
0056	REF	18	LAST	371	04,2630	1 6041 0		TCF	INTPRET +2	SET LOC AND RETURN TO CALLER.

L SYSTEM TEST STANDARD LEAD-INS

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P0057 E/JOBWAK FOR WAKING UP ERASABLE MEMORY JOBS.

R0058 THIS ROUTINE MUST BE CALLED IN INTERRUPT OR WITH INTERRUPTS INHIBITED.

R0060 THE CALLING SEQUENCE IS:

A0061

A0062

A0063

A0064

A0065

A0066

A0067

A0068

A0069

A0070

INHINT

CA WAKEADR
TC IDNKCALL
CAOR E/JOBWAK

ADDRESS OF SLEEPING JOB

RETURNS HERE

RELINT

IF YOU DID AN INHINT.

0071 33,2045

0072 REF 2 LAST 370 04,2000

0073 04,2631

BANK 33

SETLOC E/PRDG

BANK

0074 REF 2 LAST 370 TO 372: 27 27*

COUNT* 33/P07

0075 REF 1 04,2631 0 5137 1 F/JOBWAK

0076 REF 17 LAST 255 04,2632 4 4741 0

0077 REF 1 04,2633 50 064 0

0078 REF 2 LAST 371 04,2634 26 164 0

0079 REF 1 04,2635 0 0072 1

TC JOBWAKE

CS BIT11

NDX LOCCTR

ADS LCL

TC RUPTRREG3

ARRIVE INTH ADRES IN A.

KNOCK FIXED MEMORY BIT OUT OF ADRES.

RETURN

1 IMU PERFORMANCE TESTS 2

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R0001 NAME- IMU PERFORMANCE TESTS 2

R0002 DATE- MARCH 20, 1967

R0003 BY- SYSTEM TEST GROUP 864-6900 EXT. 1274

R0004 MODNO.- ZERO

R0005 FUNCTIONAL DESCRIPTION

R0006 POSITIONING ROUTINES FOR THE IMU PERFORMANCE TESTS AS WELL AS SOME OF
 R0007 THE TESTS THEMSELVES. FOR A DESCRIPTION OF THESE SUBROUTINES AND THE
 R0008 OPERATING PROCEDURES (TYPICALLY) SEE STG MEMO 685. THEORETICAL REF. E-1973

0009				33,2045			BANK	33
0010	REF	2	LAST	44	37,2000		SETLOC	IMU2
0011					37,2002		BANK	
0012	REF	2	LAST	127	E5,1416		EBANK	POSITON
00121	REF	2	LAST	44 TO	44:	2	COUNT*	33/PO7
00122	REF	1			37,2002	0 5311 1	TC	NEWMODEX
00124					37,2003	00007-0	MM	07
0021	REF	1			37,2004	0 2325 1	TC	IMUZERR
0022	REF	43	LAST	369	37,2005	3 4755 1	CA	ZERO
0023	REF	2	LAST	127	37,2006	55,414 0	TS	NOXCTP
0024	REF	1			37,2007	55,440 1	TS	TORONDX
0025	REF	2	LAST	373	37,2010	55,441 0	TS	TDRONDX +1
00251	REF	1			37,2011	55,576 0	TS	OVFLOWCK
0026	REF	1			37,2012	3 4361 1	CA	DEC17
0027	REF	1			37,2013	55,571 1	TS	ZERONDX
0028	REF	1			37,2014	3 2476 0	CA	XNBADR
0029	REF	1			37,2015	0 2367 1	TC	ZERDING
0030	REF	3	LAST	334	37,2016	3 4736 1	CA	HALF
0031	REF	1			37,2017	55,664 0	TS	XNB
0032	REF	19	LAST	371	37,2020	0 6037 0	TC	INTERP
0033					37,2021	62545 1	DLAD	SL2
0034	REF	2	LAST	127	37,2022	02403 1		LATITUDE
0035	REF	13	LAST	317	37,2023	15047 0	STODL	DSPTEN1 +1
0036	REF	2	LAST	127	37,2024	02401 0		AZIMUTH
0037					37,2025	77434 1	RTB	EXIT
0038	REF	1			37,2026	21614 1		1STOPS
0039	REF	68	LAST	357	37,2027	56 154 1	XCH	MPAC
0040	REF	14	LAST	373	37,2030	55,045 0	TS	DSPTEN1
0041	REF	1			37,2031	3 2473 0	CAF	VN0641
0042	REF	66	LAST	365	37,2032	0 4616 1	TC	BANKCALL
0043	REF	4	LAST	340	37,2033	20476 0	CADF	GOFLASH
0044	REF	1			37,2034	0 2270 0	TC	ENDTEST1
0045					37,2035	0 2037 1	TC	+2
0046					37,2036	0 2031 1	TC	-5

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0047	REF	20	LAST	373	37,2037	0 6037 0	TC	INTERPT	
0048					37,2040	47135 0	SLOAD	RTB	
0049	REF	15	LAST	373	37,2041	01046 1		DSPTM1	
0050	REF	10	LAST	357	37,2042	21576 0		CDULOGIC	
0051	REF	3	LAST	373	37,2043	02401 0	STORE	AZIMUTH	
0052					37,2044	60535 1	SLOAD	SR2	
0053	REF	16	LAST	374	37,2045	01047 0		DSPTM1 +1	
0054	REF	3	LAST	373	37,2046	02403 1	STORE	LATITUDE	
0055					37,2047	57546 1	CDS	DCOMP	
0056					37,2050	77752 1	SL1		
0057	REF	1			37,2051	16437 0	STODL	WANG1	
0058	REF	4	LAST	374	37,2052	02403 1		LATITUDE	
0059					37,2053	72556 1	SIN	SL1	
0060	REF	1			37,2054	16435 1	STODL	WANG0	
0061	REF	4	LAST	374	37,2055	02401 0		AZIMUTH	
0062					37,2056	73406 1	PUSH	SIN	
0063	REF	1			37,2057	02675 1	STORE	YNB +2	
0064	REF	1			37,2060	16705 1	STODL	ZNB +4	
0065					37,2061	77746 1	CDS		
0066	REF	2	LAST	374	37,2062	02677 0	STORE	YNB +4	
0067					37,2063	77676 0	DCOMP		
0068	REF	2	LAST	374	37,2064	36703 0	POSTGMBL	STCALL	ZNB +2
0069	REF	1			37,2065	47353 1		CALCGA	
0070					37,2066	77776 1	EXIT		
0071	REF	67	LAST	373	37,2067	0 4616 1	TC	BANKCALL	
0072	REF	2	LAST	268	37,2070	17000 1	CADR	IMUADR5	
0073	REF	35	LAST	293	37,2071	3 4736 1	CAD	BIT14	IF BIT14 SET, GIMBAL LOCK
0074	REF	9	LAST	280	37,2072	7 0077 0	MASK	FLAGWRD3	
0075					37,2073	0 0006 1	EXTEND		
0076					37,2074	1 2076 0	BZF	+2	
0077	REF	3	LAST	373	37,2075	25 414 1	INCR	NDXCTR	+1 IF IN GIMBAL LOCK, OTHERWISE 0
0078	REF	26	LAST	340	37,2076	0 5516 0	TC	DOWNFLAG	
0079	REF	1			37,2077	00056 1	ADRES	GLOCKFAIL	RESET GIMBAL LOCK FLAG
0080	REF	1			37,2100	0 2315 1	TC	IMUSLLG	
0081	REF	4	LAST	374	37,2101	11 414 0	CDS	NDXCTR	IF ONE GO AND DO A PIPA TEST ONLY
0082	REF	1			37,2102	0 2126 0	TC	PIPACHK	ALIGN AND MEASURE VERTICAL PIPA RATE
0084	REF	1			37,2103	0 2320 1	TC	MINIMUDD	
0085					37,2104	0 0006 1	EXTEND		
00851	REF	1			37,2105	3 1575 1	DCA	PERFDLAY	
00852	REF	1			37,2106	0 5277 0	TC	LONGCALL	DELAY WHILE SUSPENSION STABILIZES
008525	REF	3	LAST	373	E5,1416		EBANK	POSITON	
00853	REF	1			37,2107	02113 0	ZCADR	GUESTIMS	
00853	REF	1			37,2110	76065 0			
00854	REF	1			37,2111	3 2116 0	CA	ESTICADR	
00855	REF	1			37,2112	0 5133 0	TC	JOBWAKE	
00856	REF	2	LAST	374	37,2113	3 2116 0	GUESTIMS	ESTICADR	
00857	REF	2	LAST	372	37,2114	0 5137 1	TC	JOBWAKE	
00858	REF	7	LAST	369	37,2115	0 5261 1	TC	TASKOVER	
00859	REF	1			37,2116	76500 0	ESTICADR	CADR	ESTIMS
0086	REF	44	LAST	373	37,2117	3 4755 1	TORQUE	CA	ZERO

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0087	REF	7	LAST	317	37,2120	55'050 1	TS	DSPTEN2	
0088	REF	1			37,2121	3 1504 1	CA	DRIFT1	
0089	REF	8	LAST	375	37,2122	55'051 0	TS	DSPTEN2 +1	
0090	REF	4	LAST	374	37,2123	51'416 0	INDEX	POSITION	
0091	REF	2	LAST	127	37,2124	55'420 1	TS	SOUTHDR -1	
0092	REF	1			37,2125	0 2457 0	TC	SHOW	
0093	REF	5	LAST	374	37,2126	51'414 1	PIPCHK	INDEX	NOXCTR
0094					37,2127	0 2130 1	TC	+1	PIPA TEST
0095	REF	1			37,2130	0 2447 1	TC	EARTHRE	
0096	REF	2	LAST	373	37,2131	3 4361 1	CA	DECL7	ALLOW PIP COUNTER TO OVERFLOW 17 TIMES
0097	REF	1			37,2132	55'476 1	TS	DATAPL +4	IN THE ALLOTTED TIME INTERVAL
0098	REF	1			37,2133	3 2474 1	CA	DECS8	
0099	REF	2	LAST	127	37,2134	55'412 0	TS	LENGTHOT	
0100	REF	20	LAST	367	37,2135	3 4753 1	CA	ONE	
0101	REF	1			37,2136	55'537 0	TS	RESULTCT	
0102	REF	45	LAST	374	37,2137	3 4755 1	CA	ZERO	
0103	REF	2	LAST	127	37,2140	51'415 0	INDEX	PIPINDEX	
0104	REF	2	LAST	305	37,2141	54 037 1	TS	PIPAK	
0105	REF	2	LAST	375	37,2142	55'472 0	TS	DATAPL	
0106	REF	1			37,2143	0 2332 1	TC	CHECK6	
0107					37,2144	0 0004 0	INHINT		
0108	REF	16	LAST	367	37,2145	3 4752 0	CAF	TW5	
0109	REF	1			37,2146	0 5173 1	TC	TWIDOLF	
0110	REF	5	LAST	370	E5,1642		EBANK=	XSM	
0111	REF	1			37,2147	02151 0	ADRES	PIPATASK	
0112	REF	33	LAST	368	37,2150	0 5155 0	TC	END-PIPA	
0113					37,2151	0 0006 1	PIPATASK	EXTEND	
0114	REF	3	LAST	375	37,2152	27'412 0	DIR	LENGTHOT	
0115	REF	4	LAST	375	37,2153	3 1412 1	CA	LENGTHOT	
0116					37,2154	0 0006 1	EXTEND		
0117	REF	1			37,2155	6 2161 0	BZMF	STARTPIP	
0118	REF	19	LAST	334	37,2156	3 4742 1	CAF	BIT10	
0119	REF	2	LAST	375	37,2157	0 5173 1	TC	TWIDOLF	
0120	REF	6	LAST	375	E5,1642		EBANK=	XSM	
0121	REF	2	LAST	375	37,2160	02151 0	ADRES	PIPATASK	
0122	REF	2	LAST	269	37,2161	3 4736 1	CAF	PRID20	STARTPIP
0123	REF	14	LAST	368	37,2162	0 5105 0	TC	FINDVAC	
0124	REF	7	LAST	375	E5,1642		EBANK=	XSM	
0125	REF	1			37,2163	02166 1	ZCADR	PIPJOB8	
0125	REF	1			37,2164	76065 0			
0126	REF	8	LAST	374	37,2165	0 5261 1	TC	TASKOVER	
0127	REF	6	LAST	375	37,2166	51'414 1	PIPJOB8	INDEX	NOXCTR
0128					37,2167	0 2170 0	TC	+1	
0129	REF	2	LAST	375	37,2170	0 2447 1	TC	EARTHRE	
0130	REF	5	LAST	375	37,2171	3 1412 1	CA	LENGTHOT	

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0131				37,2172	0 0006 1	EXTEND		
0132				37,2173	6 2175 0	BZMF	+2	
0133	REF	34	LAST	375	37,2174	0 5155 0	TC	ENDOFJOB
0134	REF	7	LAST	261	37,2175	3 4756 1	CA	FIVE
0135	REF	2	LAST	375	37,2176	55 537 0	TS	RESULTCT
0136	REF	2	LAST	375	37,2177	0 2332 1	TC	CHECKG
0137	REF	3	LAST	375	37,2200	11 473 1	CCS	DATAPL +1
0138					37,2201	0 2205 1	TC	+4
0139	REF	1			37,2202	0 5705 0	TC	CCSHOLE
0140	REF	4	LAST	376	37,2203	4 1476 1	CS	DATAPL +4
0141	REF	5	LAST	376	37,2204	55 476 1	TS	DATAPL +4
0142					37,2205	0 0006 1	EXTEND	
0143	REF	6	LAST	376	37,2206	4 1473 1	DCS	DATAPL
0144	REF	7	LAST	376	37,2207	21 477 0	DAS	DATAPL +4
0145	REF	21	LAST	374	37,2210	0 6037 0	TC	INTPRET
0146					37,2211	45345 1	DLOAD	DSU
0147	REF	8	LAST	376	37,2212	02501 1		DATAPL +6
0148	REF	9	LAST	376	37,2213	02475 0		DATAPL +2
0149					37,2214	45044 0	BPL	CALI
0150	REF	1			37,2215	76217 1		AINGDTN
0151	REF	1			37,2216	76275 0		OVERFIX
0152					37,2217	56325 0	AINGDTN	PDDL
0153	REF	10	LAST	376	37,2220	02477 1		DATAPL +4
0154					37,2221	47075 0	DMPR	4TB
0155	REF	1			37,2222	37056 0		DEG585
0156	REF	1			37,2223	21612 1		SGNAGREE
0157	REF	9	LAST	375	37,2224	01051 1	STORE	CSPTM2
0158					37,2225	77776 1	EXIT	
0159	REF	7	LAST	375	37,2226	11 414 0	CCS	NOXCTR
0160	REF	1			37,2227	0 2301 1	TC	CLALIGH
0161	REF	2	LAST	375	37,2230	0 2457 0	TC	SNOW
0162	REF	1			37,2231	3 2471 1	CA	3990DEC
0163	REF	6	LAST	375	37,2232	55 412 0	TS	LENGTH
0164	REF	5	LAST	375	37,2233	51 416 0	INDEX	POSITION
0165	REF	3	LAST	375	37,2234	4 1417 0	CS	SOUTHDR -2
0166	REF	1			37,2235	55 442 0	TS	DRIFT
01661	REF	3	LAST	375	37,2236	11 415 1	CCS	PIPINDEX
01662	REF	1			37,2237	1 2245 1	TCF	PIH4
01663	REF	17	LAST	300	37,2240	4 4747 0	CS	BIT5
01664	REF	1			37,2241	27 565 1	ADS	ERCOMP +2
01665	REF	18	LAST	376	37,2242	3 4747 1	CA	BIT5
01666	REF	2	LAST	376	37,2243	27 567 0	ADS	ERCOMP +4
01667	REF	1			37,2244	1 2251 1	TCF	PIH
01668	REF	19	LAST	376	37,2245	4 4747 0	CS	BIT5
01669	REF	3	LAST	376	37,2246	27 565 1	ADS	ERCOMP +2
016691	REF	20	LAST	376	37,2247	3 4747 1	CA	BIT5
016692	REF	4	LAST	376	37,2250	27 563 1	ADS	ERCOMP
0167	REF	3	LAST	375	37,2251	0 2447 1	TC	EARTH*

DEG585 HAS BEEN REDEFINED FOR LER

TAKE PLATFORM OUT OF GIMBAL LOCK

ABOUT 1 HOUR VERTICAL DRIFT TEST

OFFSET PLATFORM TO MISS PIP DEAD-ZONES

Z UP IN POS 4

X UP

L IMU PERFORMANCE TESTS 2

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ALLOW ONLY SOUTH GYRO EARTH RATE COMPENS

0168	REF	46	LAST	375	37.2252	3 4755 1	CA	ZERO
0169	REF	2	LAST	127	37.2253	55.404 1	TS	ERVECTOR
0170	REF	3	LAST	377	37.2254	55.405 0	TS	ERVECTOR +1
0171	REF	4	LAST	219	37.2255	3 4733 1	CAF	PDSMAX
0172	REF	3	LAST	373	37.2256	55.440 1	TS	TORQNDX
0173	REF	4	LAST	377	37.2257	55.441 0	TS	TORQNDX +1
0174	REF	8	LAST	557	37.2260	3 0032 0	CA	CDUX
0175	REF	2	LAST	127	37.2261	55.413 1	TS	LOSVEC
0176	REF	2	LAST	374	37.2262	0 2500 0	TC	ESTIMS
0177	REF	1			37.2263	3 1502 1	CA	DRIFTU
0178	REF	10	LAST	376	37.2264	55.051 0	TS	DSPTM2 +1
0179	REF	47	LAST	377	37.2265	3 4755 1	CA	ZERO
0180	REF	11	LAST	377	37.2266	55.050 1	TS	DSPTM2
0181	REF	3	LAST	376	37.2267	0 2457 0	TC	SHOW

0182	REF	27	LAST	374	37.2270	0 5516 0	ENDTEST1	TC	DOWNFLAG
0183	REF	3	LAST	287	37.2271	00007 0	ADRES	IMUSE	
0184	REF	48	LAST	377	37.2272	4 4755 0	CS	ZERO	
0185	REF	2	LAST	232	37.2273	0 5314 1	TC	NEWMODEA	
0186	REF	29	LAST	340	37.2274	0 5472 0	TC	ENDEXT	

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0187				37,2275	43215 0	OVERFFIX-DAD	DAD
0188	REF	3	LAST	300	37,2276	06530 1	UPPDSMAX
0189	REF	1			37,2277	37064 1	ONELPP
0190					37,2300	77616 0	RVQ

0191					37,2301	0 0006 1	COAALIGN	EXTEND	COARSE ALIGN SUBROUTINE
0192	REF	2	LAST	373	37,2302	23 571 0	QXCH	ZERONDX	
0193	REF	49	LAST	377	37,2303	3 4755 1	CA	ZERO	
0194	REF	7	LAST	305	37,2304	54 321 0	TS	THETAD	
0195	REF	8	LAST	378	37,2305	54 322 0	TS	THETAD +1	
0196	REF	9	LAST	378	37,2306	54 323 1	TS	THETAD +2	
0197	REF	68	LAST	374	37,2307	0 4616 1	TC	BANKCALL	
0198	REF	3	LAST	374	37,2310	17000 1	CADR	IMUCARS	
0199	REF	69	LAST	378	37,2311	0 4616 1	ALIGNCOA	TC	BANKCALL
0200	REF	7	LAST	333	37,2312	17716 1	CADR	IMUSTALL	
0201	REF	1			37,2313	0 3047 1	TC	SOMERR2	
0202	REF	3	LAST	378	37,2314	0 1571 0	TC	ZERONDX	

0203					37,2315	0 0006 1	IMUSLLL	EXTEND	
0204	REF	4	LAST	378	37,2316	23 571 0	QXCH	ZERONDX	
0205	REF	1			37,2317	0 2311 0	TC	ALIGNCOA	

0206					37,2320	0 0006 1	FINIMUDD	EXTEND	
0207	REF	5	LAST	378	37,2321	23 571 0	QXCH	ZERONDX	
0208	REF	70	LAST	378	37,2322	0 4616 1	TC	BANKCALL	
0209	REF	2	LAST	273	37,2323	17210 1	CADR	IMUFINE	
0210	REF	2	LAST	378	37,2324	0 2311 0	TC	ALIGNCOA	

0211					37,2325	0 0006 1	IMUZERR	EXTEND	
0212	REF	6	LAST	378	37,2326	23 571 0	QXCH	ZERONDX	
0213	REF	71	LAST	378	37,2327	0 4616 1	TC	BANKCALL	
0214	REF	3	LAST	265	37,2330	16714 1	CADR	IMUZERR	
0215	REF	3	LAST	378	37,2331	0 2311 0	TC	ALIGNCOA	

0216					37,2332	0 0006 1	CHECKG	EXTEND	PIP PULSE CATCHING ROUTINE
0217	REF	4	LAST	290	37,2333	23 417 1	QXCH	QPLAGE	
0218					37,2334	0 2342 0	TC	+6	
0219					37,2335	0 0003 1	CHECKG1	RELINT	
0220	REF	2	LAST	221	37,2336	3 0067 0	CA	NEWJTB	
0221					37,2337	0 0006 1	EXTEND		
0222					37,2340	6 2346 1	BZNF	+6	
0223	REF	1			37,2341	0 5122 0	TC	CHANG1	
0224					37,2342	0 0004 0	INHINT		
0225	REF	4	LAST	376	37,2343	51 415 0	INDEX	PIPINDEX	
0226	REF	3	LAST	375	37,2344	4 0037 1	CS	PIPAK	
0227	REF	7	LAST	378	37,2345	55 571 1	TS	ZERONDX	
0228					37,2346	0 0004 0	INHINT		

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0229	REF	5	LAST	378	37.2347	51.415 0	INDEX	PIPINDEX
0230	REF	4	LAST	378	37.2350	3.0037 0	CA	PIPAX
0231	REF	8	LAST	378	37.2351	6.1571 0	AD	ZERONEX
0232					37.2352	0.0006 1	EXTEND	
0233	REF	1			37.2353	1.2335 1	DZF	CHECKG1
0234	REF	6	LAST	379	37.2354	51.415 0	INDEX	PIPINDEX
0235	REF	5	LAST	379	37.2355	3.0037 0	CA	PIPAX
0236	REF	5	LAST	376	37.2356	51.537 1	INDEX	RESULTCT
0237	REF	11	LAST	376	37.2357	55.472 0	TS	DATAPL
0238	REF	1			37.2360	0.4102 0	TC	FINETIME
0239	REF	4	LAST	379	37.2361	51.537 1	INDEX	RESULTCT
0240	REF	12	LAST	379	37.2362	55.473 1	TS	DATAPL +1
0241	REF	5	LAST	379	37.2363	51.537 1	INDEX	RESULTCT
0242	REF	13	LAST	379	37.2364	23.474 1	LXCH	DATAPL +2
0243					37.2365	0.0003 1	RELINT	
0244	REF	5	LAST	378	37.2366	0.1417 1	ENDCHKG	TC OPLACE
0245	REF	37	LAST	371	37.2367	54.001 1	ZERGING	TS L
0246					37.2370	1.2372 1	TCF	+2
0247	REF	9	LAST	379	37.2371	55.571 1	ZERGING1	TS ZERINDX
0248	REF	50	LAST	378	37.2372	3.4755 1	CAF	ZERD
0249	REF	38	LAST	379	37.2373	50.001 0	INDEX	L
0250					37.2374	54.000 0	TS	0
0251	REF	39	LAST	379	37.2375	24.001 0	INCK	L
0252	REF	10	LAST	379	37.2376	11.571 1	CCS	ZERONDX
0253	REF	1			37.2377	1.2371 1	TCF	ZERGING1
0254	REF	41	LAST	366	37.2400	0.0002 0	TC	0

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Line	REF	1	5	LAST	374	37,2401	65345 0	ERTHRVSE	DLOAD	PDDL	PD24 = (SIN	-COS	01 (CM/MS)
0258						37,2401	65345 0	ERTHRVSE	DLOAD	PDDL			
0259	REF	1				37,2402	37057 1			SCHZERDS			
0260	REF	5	LAST	374		37,2403	02403 1			LATITUDE			
0261						37,2404	57546 1	LOS	DCOMP				
0262						37,2405	73525 1	PDDL	SIN				
0263	REF	6	LAST	380		37,2406	02403 1			LATITUDE			
0264						37,2407	74266 0	VDEF	VXSC				
0265	REF	1				37,2410	36001 0			CM/MS			
0266	REF	4	LAST	377		37,2411	02405 1	STORE	ERVECTOR				
0267						37,2412	77634 0	RTB					
0268	REF	3	LAST	339		37,2413	21573 0			LOADTIME			
0269	REF	2	LAST	127		37,2414	76433 1	STOVL	TMARK				
0270	REF	2	LAST	380		37,2415	37057 1			SCHZERDS			
0271	REF	5	LAST	376		37,2416	02564 1	STORE	ERCOMP				
0272						37,2417	77616 0	RVQ					
0276						37,2420	47020 0	EARTH	ITA	RTB			
0277	REF	3	LAST	323		37,2421	00051 0			S2			
0278	REF	4	LAST	380		37,2422	21573 0			LOADTIME			
0279	REF	2	LAST	127		37,2423	02431 0	STORE	TEMPTIME				
0280						37,2424	51025 1	DSU	BPL				
0281	REF	3	LAST	380		37,2425	02433 1			TMARK			
0282	REF	1				37,2426	76431 0			ERTHR			
0283						37,2427	77624 1	CALL					
0284	REF	2	LAST	376		37,2430	76275 0			OVERFIX			
0285						37,2431	74261 1	ERTHR	SL	VXSC			
0286						37,2432	20212 1			9D			
0287	REF	5	LAST	380		37,2433	02405 1			ERVECTOR			
0288						37,2434	53321 1	MXV	VAD				
0289	REF	4	LAST	375		37,2435	02643 1			XSM			
0290	REF	6	LAST	380		37,2436	02564 1			ERCOMP			
0291	REF	7	LAST	380		37,2437	16564 1	STOVL	ERCOMP				
0292	REF	3	LAST	380		37,2440	02431 0			TEMPTIME			
0293	REF	4	LAST	380		37,2441	02433 1	STORE	TMARK				
0294						37,2442	47170 1	AXT.1	RTB				
0295	REF	8	LAST	380		37,2443	02563 0	ECADR	ERCOMP				
0296	REF	1				37,2444	21705 0			PULSEIMU			
0297						37,2445	77650 1	GOTO					
0298	REF	4	LAST	380		37,2446	00051 0						
02991						37,2447	0 0006 1	EARTH*	EXTEND				
02992	REF	2	LAST	127		37,2450	231420 0	QXCH	QPLACES				
02993	REF	22	LAST	376		37,2451	0 6037 0	TC	INTPRET				
02994						37,2452	77624 1	CALL					
02995	REF	1				37,2453	76420 0			EARTH			
02996						37,2454	77776 1	EXIT					
02997	REF	2	LAST	374		37,2455	0 2315 1	TC	IMUSLLG				
02998	REF	3	LAST	380		37,2456	0 1420 0	TC	QPLACES				
0300						37,2457	0 0006 1	SHDW	EXTEND				

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0301	REF	6	LAST	379	37,2460	23,417 1	QXCH	QPLACE	
0302	REF	6	LAST	376	37,2461	3 1416 0	CA	POSITION	
0303	REF	12	LAST	377	37,2462	55,052 0	TS	DSPTEN2 +2	
0304	REF	1			37,2463	3 2472 1	CA	V806N98	
0305	REF	72	LAST	378	37,2464	0 4616 1	TC	BANKCALL	
0306	REF	5	LAST	373	37,2465	20476 0	CADR	GOFASH	
0307	REF	2	LAST	373	37,2466	0 2270 0	TC	ENDTEST1	V 34
0308	REF	7	LAST	381	37,2467	0 1417 1	TC	QPLACE	V33
0309	REF	1			37,2470	1 2461 1	TCF	SHOW1	

0311					37,2471	07626 1	3990DEC	DEC	3990
0312					37,2472	01542 0	V806N98	VN	0698
0313					37,2473	01451 0	VN0641	VN	0641
0315	REF	1			4361		DEC17	=	ND1
0316					37,2474	00072 1	DEC58	DEC	58
0317	REF	9	LAST	317	37,2475	02737 0	OGCPL	ECADR	OGC
0318	REF	3	LAST	300	4777		15ECX	=	1SEC
0319	REF	2	LAST	373	37,2476	01664 1	XNBADR	GENADR	XNB
0320	REF	9	LAST	380	37,2477	01642 0	XSMADR	GENADR	XSM
0322					4102			BLOCK	2
0323	REF	1						COUNT*	11/P07
0324					4102	0 0004 0	FINETIME	INHINT	
0325					4103	0 0006 1		EXTEND	
0326	REF	1			4104	00 004 0		READ	LOSCALAR
0327	REF	40	LAST	379	4105	54 001 1		TS	L
0328					4106	0 0006 1		EXTEND	
0329	REF	2	LAST	381	4107	06 004 0		RXOR	LOSCALAR
0330					4110	0 0006 1		EXTEND	
0331					4111	1 4115 1		BZF	+4
0332					4112	0 0006 1		EXTEND	
0333	REF	3	LAST	381	4113	00 004 0		READ	LOSCALAR
0334	REF	41	LAST	381	4114	54 001 1		TS	L
0335	REF	5	LAST	377	4115	4 4733 0	+4	CS	POSHAX
0336	REF	42	LAST	381	4116	6 0001 0		AD	L
0337					4117	0 0006 1		EXTEND	
0338	REF	2	LAST	379	4120	1 4103 0		BZF	FINETIME +1
0339					4121	0 0006 1		EXTEND	
0340	REF	1			4122	00 003 1		READ	HISCALAR
0341	REF	42	LAST	379	4123	0 0002 0		TC	0

RETURNS WITH INTERRUPT INHIBITED

L --IMU PERFORMANCE TESTS 4

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R0001 PROGRAM-IMU PERFORMANCE TESTS 4
R0002 DATE-NOV 15, 1966
R0003 BY- GEORGE SCHMIDT IL7-146 EXT 1126
R0004 MOD-NO-ZERO

R0005 FUNCTIONAL DESCRIPTION

R0006 THIS SECTION CONSISTS OF THE FILTER FOR THE GYRO DRIFT TESTS. NO COMPASS
R0007 IS DONE IN LEM. FOR A DESCRIPTION OF THE FILTER SEE E-1973. THIS
R0008 SECTION IS ENTERED FROM IMU 2. IT RETURNS THERE AT END OF TEST.

R0009 EARTH², UGC ZERO, EPTHRVSE

R0010 NORMAL EXIT

R0011 LENGTHOUT GOES TO ZERO-RETURN TO IMU PERF TESTS 2 CONTROL

R0012 ALARMS

R0013 1600 OVERFLOW IN DRIFT TEST

R0014 1601 BAD IMU MODING IN ANY ROUTINE THAT USES IMUSTALL

R0015 OUTPUT

R0016 FLASHING DISPLAY OF RESULTS-CONTROLLED IN IMU PERF TESTS 2

R0017 DEBRIS

R0018 ALL CENTRALS-ALL OF EBANK XSM

L IMU PERFORMANCE TESTS 4

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0019 33.2045 BANK 33
 0020 REF 1 37.2000 SETLOC IMU4
 0021 37.2500 BANK
 0022 REF 3 LAST 373 TO 381 318 320* CCOUNT* 16/P07
 0023 REF 10 LAST 381 ES.1642 EBANK= XSM

0024				37.2500	0 0004 0	ESTIMS	INHINT	
0025	REF	1		37.2501	31.572 0		CAE	1SEEXT
0026	REF	3	LAST	375	37.2502	0 5173 1	TC	TWIDDLE
0027	REF	11	LAST	383	ES.1642		EBANK=	XSM
0028	REF	1		37.2503	02536 0		ADRES	ALLOUP
0029	REF	51	LAST	379	37.2504	3 4755 1	CAF	ZERO
0030	REF	6	LAST	379	37.2505	54 037 1	TS	PIPAZ
0031	REF	1		37.2506	54 040 1		TS	PIPAY
0032	REF	1		37.2507	54 041 0		TS	PIPAZ
0033				37.2510	0 0003 1		RELINT	
0034	REF	1		37.2511	3 3075 0		CA	77DECML
0035	REF	11	LAST	379	37.2512	55.571 1	TS	ZERONDX
0036	REF	1		37.2513	3 3076 0		CA	ALXXXZ
0037	REF	2	LAST	373	37.2514	0 2367 1	TC	ZERUING
0038	REF	23	LAST	380	37.2515	0 6037 0	TC	INTPRET
0039				37.2516	77735 0		SLOAD	
0040	REF	3	LAST	380	37.2517	37057 1		SCHZERDS
0041	REF	10	LAST	336	37.2520	25477 1	STOVL	GCOMPSW -1
0042	REF	1		37.2521	37070 1			INTVAL +2
0043	REF	1		37.2522	26445 0		STOVL	ALXIS
0044	REF	4	LAST	383	37.2523	37057 1		SCHZERDS
0045	REF	6	LAST	329	37.2524	00325 0	STORE	DELUX
0046	REF	23	LAST	337	37.2525	01472 1	STORE	GCOMP
00461				37.2526	77735 0		SLOAD	
00462	REF	4	LAST	377	37.2527	02441 1		TORONDX
00463				37.2530	50076 0		DCOMP	BHN
00464	REF	1		37.2531	76534 1			VERTSKIP
0047				37.2532	77624 1		CALL	
00471	REF	1		37.2533	76401 0			ERTHRVSE
00472				37.2534	77776 1	VERTSKIP	EXIT	
0048	REF	1		37.2535	0 3035 1		TC	SLEEP1E +1

ZERO THE PIPAS

L IMJ PERFORMANCE TESTS 4

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00481	REF	2	LAST	373	37,2536	3 1576 1	ALLOP	CA	OVFLOWCK	
004815					37,2537	0 0006 1		EXTEND		
00482					37,2540	1 2542 1		BZF	+2	
00483	REF	9	LAST	375	37,2541	0 5261 1		TC	TASKOVER	
0049	REF	1			37,2542	11 530 1		CCS	ALTIM	
0050	REF	101	LAST	367	37,2543	3 0000 1		CA	4	SHOULD NEVER HIT THIS LOCATION
0051	REF	1			37,2544	55 531 0		TS	ALTIMS	
0052	REF	102	LAST	384	37,2545	4 0000 0		CS	A	
0053	REF	2	LAST	384	37,2546	55 530 1		TS	ALTIM	
00531	REF	21	LAST	375	37,2547	4 4753 0		CS	ONE	
00532	REF	1			37,2550	6 1562 1		AD	CEOCOMPS	
00533					37,2551	0 0006 1		EXTEND		
00534					37,2552	1 2556 1		BZF	+4	
0054	REF	7	LAST	376	37,2553	3 1412 1		CA	LENGTHDT	
0055					37,2554	0 0006 1		EXTEND		
0056					37,2555	6 2562 1		BZMF	+5	
0057	REF	2	LAST	383	37,2556	31 572 0		CAE	1 SECXT	
0058	REF	4	LAST	383	37,2557	0 5173 1		TC	TWIDOLE	
0059	REF	12	LAST	383	E5,1642			EBANK=	XSM	
0060	REF	2	LAST	383	37,2560	02536 0		ADRES	ALLOP	
0061	REF	52	LAST	383	37,2561	3 4755 1		CAF	ZERD	
0062	REF	7	LAST	383	37,2562	56 037 0		XCH	PIPAK	
0063	REF	7	LAST	383	37,2563	54 324 0		TS	DELVX	
0064	REF	53	LAST	384	37,2564	3 4755 1		CAF	ZERD	
0065	REF	2	LAST	383	37,2565	56 040 0		XCH	PIPAY	
0066	REF	4	LAST	329	37,2566	54 326 1		TS	DELVY	
0067	REF	54	LAST	384	37,2567	3 4755 1		CAF	ZERD	
0068	REF	2	LAST	383	37,2570	56 041 1		XCH	PIPAZ	
0069	REF	3	LAST	330	37,2571	54 330 0		TS	DELVZ	
0070	REF	3	LAST	375	37,2572	3 4736 1	SPECSTS	CAF	PRIC20	
0071	REF	15	LAST	375	37,2573	0 5105 0		TC	FINDVAC	
0072	REF	13	LAST	384	E5,1642			EBANK=	XSM	
0073	REF	1			37,2574	02577 0		2CADR	ALFLT	START THE JOB
0073	REF	1			37,2575	76065 0				
0074	REF	10	LAST	384	37,2576	0 5261 1		TC	TASKOVER	

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0075	REF	2	LAST	384	37.2577	11'562 0	ALFLT	CCS	GEODCMPS
0076					37.2600	0 2602 1		TC	+2
00761	REF	1			37.2601	0 2604 1		TC	NORMLOP
0077	REF	73	LAST	381	37.2602	0 4616 1		TC	BANKCALL
0078	REF	1			37.2603	15263 1		CADR	1/PIPA
0079	REF	24	LAST	383	37.2604	0 6037 0	NORMLOP	TC	INTPRET
0080					37.2605	77745 1		DLOAD	
0081	REF	2	LAST	383	37.2606	37066 0			INTVAL
0082	REF	5	LAST	362	37.2607	24051 0		STOVL	SI
00821	REF	8	LAST	384	37.2610	00325 0			DEL VX
00822					37.2611	76505 0		VXH	VSL1
008231	REF	14	LAST	384	37.2612	02643 1			XSM
008232					37.2613	57545 1		DLOAD	DCOMP
008233	REF	69	LAST	373	37.2614	00160 0			MPAC +3
008234	REF	1			37.2615	16523 1		STOVL	DPIPAY
008235	REF	70	LAST	385	37.2616	00162 1			MPAC +5
008236	REF	1			37.2617	02527 0		STORE	DPIPAZ
008237					37.2620	76001 1		SETPD	AXT,1
00824					37.2621	00001 0			0
00825					37.2622	00010 0			8D
00826					37.2623	57535 0		SLOAD	DCOMP
00827	REF	3	LAST	385	37.2624	02563 0			GEODCMPS
00828					37.2625	77640 0		BMN	
00829	REF	1			37.2626	76772 1			PERFERAS
0083					37.2627	50135 0	ALCGKK	SLOAD	BMN
0084	REF	2	LAST	384	37.2630	02532 1			ALTIME
0085	REF	1			37.2631	76644 0			ALFLT3
0086					37.2632	72174 0	ALKCG	AXT,2	LXA,1
0087					37.2633	00014 1			12D
0088	REF	2	LAST	383	37.2634	02444 1			ALXIS
0089					37.2635	62143 0	ALKCG2	DLOAD*	INCR,1
0090	REF	1			37.2636	02243 0			ALFDR +1440,1
0091					37.2637	77775 1		DEC	-2
0092	REF	1			37.2640	12545 0		STORE	ALDK +100,2
0093					37.2641	66104 1		TIX,2	SXA,1
0094	REF	1			37.2642	76635 0			ALKCG2
0095	REF	3	LAST	385	37.2643	02444 1			ALXIS
01074					37.2644	77770 1	ALFLT3	AXT,1	
01075					37.2645	00010 0			8D
0108					37.2646	41343 0	DELMHP	DLOAD*	DMP
0109	REF	2	LAST	385	37.2647	02533 0			DPIPAY +80,1
0110	REF	1			37.2650	37100 1			PIPASC
0111					37.2651	43661 1		SLR	BDSU*
0112					37.2652	21212 0			SD
0113	REF	1			37.2653	02501 1			INTY +80,1
0114	REF	2	LAST	385	37.2654	06501 0		STORE	INTY +80,1
0115					37.2655	40725 0		PDDL	DMP*
0116	REF	1			37.2656	37102 0			VELSC

LOADS SLOPES AND TIME CONSTANTS AT RQST

I. IMU PERFORMANCE TESTS 4

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0117	REF	1		37,2657	02521 0		VLAUN +80.1
0118				37,2660	77732 1	SL2R	
0119				37,2661	45425 0	DSU	STADK
0120	REF	1		37,2662	71216 1	STORE	DELM +80.1
0121	REF	2	LAST 386	37,2663	06563 1	STORE	DELM +100.1
0122				37,2664	77100 0	TIX,1	AXT,2
0123	REF	1		37,2665	76646 1		DELM LP
0124				37,2666	00004 0		4
0125				37,2667	56743 1	ALILP	DLOAD* DMPR*
0126	REF	2	LAST 128	37,2670	75324 0		ALK +4.2
0127	REF	2	LAST 385	37,2671	75240 0		ALDK +4.2
0128	REF	3	LAST 386	37,2672	12453 0	STORE	ALK +4.2
0129				37,2673	77104 1	TIX,2	AXT,2
0130	REF	1		37,2674	76667 1		ALILP
0131				37,2675	00010 0		80
0132				37,2676	66140 1	ALKLP	LXC,1
0133	REF	1		37,2677	02445 0		SXA,1
0134	REF	2	LAST 386	37,2700	02445 0		CMPI
0135				37,2701	56743 1	DLOAD*	DMPR*
0136	REF	4	LAST 386	37,2702	02450 1		ALK +1.1
0137	REF	3	LAST 386	37,2703	75216 0		DELM +80.2
0138				37,2704	77613 0	DAD*	
0139	REF	3	LAST 385	37,2705	75276 0		INTY +80.2
0140	REF	4	LAST 386	37,2706	12501 0	STORE	INTY +80.2
0141				37,2707	42743 1	DLOAD*	DAD*
0142	REF	5	LAST 386	37,2710	75314 0		ALK +120.2
0143	REF	3	LAST 386	37,2711	75230 1		ALDK +120.2
0144	REF	6	LAST 386	37,2712	12463 0	STORE	ALK +120.2
0145				37,2713	42673 0	DMPR*	DAD*
0146	REF	4	LAST 386	37,2714	75216 0		DELM +80.2
0147	REF	5	LAST 386	37,2715	75266 1		INTY +160.2
0148	REF	6	LAST 386	37,2716	12511 1	STORE	INTY +160.2
0149				37,2717	40743 0	DLOAD*	DMPR*
0150	REF	1		37,2720	37105 1		ALK +1.1
0151	REF	5	LAST 386	37,2721	75216 0		DELM +80.2
0152				37,2722	42772 0	SLIR	DAD*
0153	REF	2	LAST 386	37,2723	75256 1		VLAUN +80.2
0154	REF	3	LAST 386	37,2724	12521 1	STORE	VLAUN +80.2
0155				37,2725	76104 0	TIX,2	AXT,1
0156	REF	1		37,2726	76676 1		ALKLP
0157				37,2727	00010 0		80

0158				37,2730	64743 0	LOOSE	DLOAD* PDDL*
0159	REF	1		37,2731	02523 1		ACGWD +80.1
0160	REF	4	LAST 386	37,2732	02521 0		VLAUN +80.1
0161				37,2733	55523 0	PDDL*	VDEF
0162	REF	1		37,2734	02531 1		PUSNV +80.1
0163				37,2735	76521 0	MXV	VSL1
0164	REF	2	LAST 117	37,2736	02001 1		TRANS1

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0165			37,2737	77745 1	DLOAD	
0166	REF 71	LAST 385	37,2740	00155 0		MPAC
0167	REF 2	LAST 386	37,2741	06531 0	STORE	PDSNV +80.1
0168			37,2742	77745 1	DLOAD	
0169	REF 72	LAST 387	37,2743	00160 0		MPAC +3
0170	REF 5	LAST 386	37,2744	06521 1	STORE	VLAUN +80.1
0171			37,2745	77745 1	DLOAD	
0172	REF 73	LAST 387	37,2746	00162 1		MPAC +5
0173	REF 2	LAST 386	37,2747	06523 0	STORE	ACCWD +80.1
0174			37,2750	77700 0	TIX,1	
0175	REF 1		37,2751	76730 1		LGDSF
0176			37,2752	76174 1	AXT.2	AXT.1 EVALUATE SINES AND COSINES
0177			37,2753	00006 1		6
0178			37,2754	00002 0		2
0179			37,2755	57343 1	DLOAD*	DRPP
0180	REF 1		37,2756	02503 0		ANGX +2.1
0181	REF 1		37,2757	37110 0		GEORGEJ
0182			37,2760	77722 0	SR2R	
0183			37,2761	73406 1	PUSH	SIN
0184			37,2762	56072 1	SL3R	XAD,1
0185	REF 2	LAST 252	37,2763	00046 0		X1
0186			37,2764	10021 0	STORE	160.2
0187			37,2765	77745 1	DLOAD	
0188			37,2766	77746 1	COS	
0189			37,2767	10027 0	STORE	220.2 COSINES
0190			37,2770	77704 1	TIX.2	
0191	REF 1		37,2771	76755 1		BOOP
0192			37,2772	77776 1	PERFERAS	EXIT
0193	REF 1		37,2773	3 5016 0	CA	EBANK7
0194	REF 11	LAST 336	37,2774	54 003 0	TS	EBANK
0195	REF 1		E7,1400		EBANK=	ATIGINC
0196	REF 2	LAST 387	37,2775	0 1400 1	TC	ATIGINC GOTO ERASABLE TO CALCULATE ONLY TO RETN

R0197 CAUTION

R0198 THE ERASABLE PROGRAM THAT DOES THE CALCULATIONS MUST BE LOADED
 R0199 BEFORE ANY ATTEMPT IS MADE TO RUN THE IMU PERFORMANCE TEST

01995	REF 5	LAST 374	E5,1400		EBANK=	AZIMUTH
0290	REF 8	LAST 384	37,2776	11'412 0	CCS	LENGTHDT
0291	REF 2	LAST 383	37,2777	0 3034 0	TC	SLEEPIE
0292	REF 6	LAST 383	37,3000	11'440 1	CCS	TORONDX
0293			37,3001	1 3003 0	TCF	+2
0294	REF 1		37,3002	0 3005 1	TC	SETUPER1
0295	REF 9	LAST 377	37,3003	3 0032 0	CA	LDUX
0296	REF 3	LAST 377	37,3004	55'414 0	TS	LUSVEC +1 FOR TROUBLESHOOTING VD POSNS 244

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0297	REF	-25	LAST	385	37,3005	0 6037 0	SETUPR1	TC	INTPRET	
0298					37,3006	65345 0		DLOAD	PDDL	ANGLES FROM DRIFT TEST ONLY
0299	REF	1			37,3007	02473 0			ANGZ	
0300	REF	1			37,3010	02477 1			ANGY	
0301					37,3011	55525 0		PDDL	VDEF	
0302	REF	2	LAST	387	37,3012	02501 1			ANGX	
0303					37,3013	74276 1		VCDMP	VXSC	
0304	REF	2	LAST	387	37,3014	37110 0			GEORGEJ	
0305					37,3015	74521 1		MXV	VSR1	
0306	REF	15	LAST	385	37,3016	02643 1			XSM	
0307	REF	10	LAST	381	37,3017	02740 0		STORE	UGC	
0308					37,3020	77776 1		EXIT		

0309	REF	1			37,3021	3 2475 0		CA	DGCPL	
0310	REF	74	LAST	385	37,3022	0 4616 1		TC	BANKCALL	
0311	REF	3	LAST	333	37,3023	17323 0		CADR	IMUPULSE	
0312	REF	3	LAST	380	37,3024	0 2315 1		TC	IMUSLLG	
0313	REF	7	LAST	387	37,3025	11'440 1	GEOSTR4	LCS	TORQNDX	ONLY POSITIVE IF IN VERTICAL DRIFT TEST
0314	REF	1			37,3026	0 2263 1		TC	VALMIS	
0315	REF	26	LAST	388	37,3027	0 6037 0		TC	INTPRET	
03151					37,3030	77624 1		CALL		
03152	REF	2	LAST	383	37,3031	76401 0			ERTHRVSE	
03153					37,3032	77776 1		EXIT		
0316	REF	1			37,3033	0 2117 1		TC	TORQUE	

0317	REF	9	LAST	387	37,3034	55'412 0	SLEEPIE	TS	LENGTHOT	TEST NOT OVER-DECREMENT LENGTHOT
0318	REF	8	LAST	388	37,3035	11'440 1		CCS	TORQNDX	ARE WE DOING VERTDRIFT
0319	REF	4	LAST	376	37,3036	0 2447 1		TC	EARTH*	
0320	REF	35	LAST	376	37,3037	0 5155 0		TC	ENDOFJOB	

0321	REF	1			37,3040	3 5014 1	SOMEERRR	CA	EBANK5	
03211	REF	12	LAST	387	37,3041	54 093 0		TS	EBANK	
03212	REF	22	LAST	384	37,3042	3 4753 1		CA	ONE	
03213	REF	3	LAST	384	37,3043	55'576 0		TS	OVFLOWCK	STOP ALLOOP FROM CALLING ITSELF
03214	REF	20	LAST	363	37,3044	0 5567 0		TC	ALARM	
0322					37,3045	01600 0		OCT	1600	
0323	REF	3	LAST	381	37,3046	0 2270 0		TC	ENDTEST1	
0324	REF	1			37,3047	3 3054 0	SOMERR2	CAF	OCT1601	
0325	REF	2	LAST	180	37,3050	0 5744 0		TC	VARALARM	
0330	REF	28	LAST	377	37,3051	0 5516 0		TC	DOWNFLAG	
0331	REF	4	LAST	377	37,3052	00007 0		ADRES	IMUSE	
0332	REF	36	LAST	388	37,3053	0 5155 0		TC	ENDOFJOB	

0333					37,3054	01601 1	OCT1601	DCT	01601	
0334					37,3055	06200 0	DEC585	DCT	06200	3200 8+14 ORDER IS IMPORTANT
0335					37,3056	00000 1	SCHZERDS	2DEC	.00000000	
0335					37,3057	00000 1				

L IMU PERFORMANCE TESTS 4

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0336		37.3060	00000 1		2DEC	.00000000	
0336		37.3061	00000 1				
0337		37.3062	00000 1		DCT	00000	
0338		37.3063	00000 1	ONEDPP	DCT	00000	ORDER IS IMPORTANT
0339		37.3064	00001 0		DCT	00001	
0340		37.3065	00004 0	INTVAL	UCT	4	
0341		37.3066	00002 0		DCT	1	
0342		37.3067	00220 1		DEC	144	
0343		37.3070	77776 1		DEC	-1	
0344		37.3071	35730 0	SOUPLY	2DEC	.93505870	INITIAL GAINS FOR PIP OUTPUTS
0344		37.3072	00035 1				
0345		37.3073	10317 0		2DEC	.26266423	INITIAL GAINS/4 FOR ERECTION ANGLES
0345		37.3074	17550 1				
0346		37.3075	00115 1	77DECML	DEC	77	
0347	REF 4 LAST 385	37.3076	01443 0	ALXXXZ	GENADR	ALX15 -1	
0348		37.3077	04133 1	PIPASC	2DEC	.13055869	
0348		37.3100	02265 1				
0349		37.3101	57223 0	VELSC	2DEC	-.52223476	512/980.402
0349		37.3102	66451 1				
0350		37.3103	05427 0	ALSK	2DEC	-.17329931	SSWAY VEL GAIN X 980.402/4096
0350		37.3104	12577 1				
0351		37.3105	77567 0		2DEC	-.00845370	SSWAY ACCEL GAIN X 980.402/4096
0351		37.3106	44202 1				
0352		37.3107	24276 1	GEORGEJ	2DEC	.63661977	
0352		37.3110	14066 1				
0353		37.3111	23073 1	GEORGEK	2DEC	.59737013	
0353		37.3112	11773 1				

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R0001 PROGRAM NAME - KEYBOARD AND DISPLAY PROGRAM

R0002 MOD NO - 4 DATE - 27 APRIL 1967 ASSEMBLY - PINDANCE-REV-18

R0003 MOD BY - FILENE

R0004 LOG SECTION - PINBALL GAME BUTTONS AND LIGHTS

R0009 FUNCTIONAL DESCRIPTION-

R0010 THE KEYBOARD AND DISPLAY SYSTEM PROGRAM OPERATES UNDER EXECUTIVE

R0011 CONTROL AND PROCESSES INFORMATION EXCHANGED BETWEEN THE AGC AND THE

R0012 COMPUTER OPERATOR. THE INPUTS TO THE PROGRAM ARE FROM THE KEYBOARD,

R0013 FROM INTERNAL PROGRAMS, AND FROM THE UPLINK.

R0014 THE LANGUAGE OF COMMUNICATION WITH THE PROGRAM IS A PAIR OF WORDS

R0015 KNOWN AS VERB AND NOUN. EACH OF THESE IS REPRESENTED BY A 2 CHARACTER

R0016 DECIMAL NUMBER. THE VERB CODE INDICATES WHAT ACTION IS TO BE TAKEN. THE

R0017 NOUN CODE INDICATES TO WHAT THIS ACTION IS APPLIED. NOUNS USUALLY

R0018 REFER TO A GROUP OF ERASABLE REGISTERS.

R0020 VERBS ARE GROUPED INTO DISPLAYS, LOADS, MONITORS (DISPLAYS THAT ARE

R0021 UPDATED ONCE PER SECOND), SPECIAL FUNCTIONS, AND EXTENDED VERBS (THESE

R0022 ARE OUTSIDE OF THE DOMAIN OF PINBALL AND CAN BE FOUND UNDER LOG SECTION

R0023 :EXTENDED VERBS:).

R0024 A LIST OF VERBS AND NOUNS IS GIVEN IN LOG SECTION :ASSEMBLY AND

R0025 OPERATION INFORMATION:.

R0026 CALLING SEQUENCES-

R0027 KEYBOARD:

R0028 EACH DEPRESSION OF A KEYBOARD BUTTON ACTIVATES INTERRUPT KEYRUPT1

R0029 AND PLACES THE 5 BIT KEY CODE INTO CHANNEL 15. KEYRUPT1 PLACES THE KEY

R0030 CODE INTO MPAC, ENTERS AN EXECUTIVE REQUEST FOR THE KEYBOARD AND DISPLAY

R0031 PROGRAM (AT:CHARIN:), AND EXECUTES A RESUME.

R0032 UPLINK:

R0033 EACH WORD RECEIVED BY THE UPLINK ACTIVATES INTERRUPT UPRUPT WHICH

R0034 PLACES THE 5 BIT KEY CODE INTO MPAC, ENTERS AN EXECUTIVE REQUEST FOR THE

R0035 KEYBOARD AND DISPLAY PROGRAM (AT:CHARIN:) AND EXECUTES A RESUME.

R0036 INTERNAL PROGRAMS:

R0037 INTERNAL PROGRAMS CALL PINBALL AT :NVSUB: WITH THE DESIRED VERB/NOUN

R0038 CODE IN A (LOW 7 BITS FOR NOUN, NEXT 7 BITS FOR VERB). DETAILS

R0039 DESCRIBED ON REMARKS CARDS JUST BEFORE :NVSUB: AND :NVSUBWAIT: (SEE

R0040 SYMBOL TABLE FOR PAGE NUMBERS).

R0045 NORMAL EXIT MODES-

R0046 IF PINBALL WAS CALLED BY EXTERNAL ACTION, THERE ARE FOUR EXITS:

R004605 1) ALL BUT (2), (3), AND (4) EXIT DIRECTLY TO ENDOFJOB.

R00461 2) EXTENDED VERBS GO TO THE EXTENDED VERB PAN AS PART OF THE

L PINBALL GAME BUTTONS AND LIGHTS

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R004615 PINBALL EXECUTIVE JOB WITH PRIORITY 30000. IT IS THE
 R00462 RESPONSIBILITY OF THE EXTENDED VERB CALLED TO EVENTUALLY
 R00463 CHANGE PRIORITY (IF NECESSARY) AND DO AN ENDJOB.
 R004635 ALSO PINBALL IS A NOVAC JOB. EBANK SET FOR COMMON.
 R00464 3) VERB 37, CHANGE OF PROGRAM (MAJOR MODE) CALLS :V27: IN THE
 R00465 SERVICE ROUTINES AS PART OF THE PINBALL EXEC JOB WITH PRI
 R00466 30000. THE NEW PROGRAM CODE (MAJOR MODE) IS LEFT IN A.
 R00467 4) KEY RELEASE BUTTON CALLS :PINBRNCH: IN THE DISPLAY INTERFACE
 R00468 ROUTINES AS PART OF THE PINBALL EXEC JOB WITH PRI 30000 IF
 R00469 THE KEY RELEASE LIGHT IS OFF AND :CADRSTOR: IS NOT 0.

R0047 IF PINBALL WAS CALLED BY INTERNAL PROGRAMS, EXIT FROM PINBALL IS BACK
 R0048 TO CALLING ROUTINE. DETAILS DESCRIBED IN REMARKS CARDS JUST BEFORE
 R0049 :NVSUB: AND :NVSWAIT: (SEE SYMBOL TABLE FOR PAGE NUMBERS).

R0050 ALARM OR ABORT EXIT MODES-

R0051 EXTERNAL INITIATION:

R0052 IF SOME IMPROPER SEQUENCE OF KEY CODES IS DETECTED, THE OPERATOR
 R0053 ERROR LIGHT IS TURNED ON AND EXIT IS TO :ENDJOB:.

R0054 INTERNAL PROGRAM INITIATION:

R0055 IF AN ILLEGAL V/N COMBINATION IS ATTEMPTED, AN ABORT IS CAUSED
 R0056 (WITH OCTAL 01501).

R00561 IF A SECOND ATTEMPT IS MADE TO GO TO SLEEP IN PINBALL, AN ABORT IS
 R00562 CAUSED (WITH OCTAL 01206). THERE ARE TWO WAYS TO GO TO SLEEP IN PINBALL:

- R00563 1) ENDIDLE OR DATAWAIT.
- R00564 2) NVSWAIT, PRENVBSY, OR NVSUBUSY.

R0057 CONDITIONS LEADING TO THE ABOVE ARE DESCRIBED IN FORTHCOMING #17/18

R0058 E-REPORT DESCRIBING KEYBOARD AND DISPLAY OPERATION FOR 278.

R0059 OUTPUT-

R0060 INFORMATION TO BE SENT TO THE DISPLAY PANEL IS LEFT IN THE :DSPTAB:
 R0061 BUFFERS-REGISTERS (UNDER EXEC CONTROL). :DSPOUT: (A PART OF T4RUPT)
 R0062 HANDLES THE PLACING OF THE :DSPTAB: INFORMATION INTO OUTPUT CHANNEL 10
 R0063 IN INTERRUPT.

R0064 ERASABLE INITIALIZATION-

R0065 FRESH START AND RESTART INITIALIZE THE NECESSARY E REGISTERS FOR
 R0066 PINBALL IN :STARTSUB:. REGISTERS ARE: DSPTAB BUFFER, CADRSTOR,
 R0067 REQRET, CLPASS, DSPLOCK, MONSAVE, MONSAVE1, VERBREG, HOURREG, DSPLIST,
 R0068 DSPCOUNT, NOUT.

R0069 A COMPLETE LIST OF ALL THE ERASABLES (BOTH RESERVED AND TEMPORARIES) FOR

L PINBALL GAME BUTTONS AND LIGHTS

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R0070 ~~PINBALL IS GIVEN BELOW.~~

R0071 THE FOLLOWING ARE OF GENERAL INTEREST-

R0072 REMARKS CARDS PRECEDE THE REFERENCED SYMBOL DEFINITION. SEE SYMBOL
R0073 TABLE TO FIND APPROPRIATE PAGE NUMBERS.

R0074 NVSUB CALLING POINT FOR INTERNAL USE OF PINBALL.
R0075 ~~OF RELATED INTEREST~~ NVSDWAIT
R0076 NVSUBUSY
R0077 PRENVBSY

R0083 ENDIDLE ROUTINE FOR INTERNAL PROGRAMS WISHING TO GO TO SLEEP WHILE
R0084 AWAITING OPERATORS RESPONSE.

R00851 DSPMM ROUTINE BY WHICH AN INTERNAL PROGRAM MAY DISPLAY A DECIMAL
R00852 PROGRAM CODE (MAJOR MODE) IN THE PROGRAM (MAJOR MODE) LIGHTS.
R008525 (DSPMM DOES NOT DISPLAY DIRECTLY BUT ENTERS EXEC REQUEST
R008527 FOR DSPMMJB WITH PRID 30000 AND RETURNS TO CALLER.)

R00853 BLANKSUB ROUTINE BY WHICH AN INTERNAL PROGRAM MAY BLANK ANY
R00854 COMBINATION OF THE DISPLAY REGISTERS R1, R2, R3.

R00855 JAMTERM ROUTINES BY WHICH AN INTERNAL PROGRAM MAY PERFORM THE
R00856 JAMPROC TERMINATE (V 34) OR PROCEED (V 33) FUNCTION.

R0086 MONITOR VERBS FOR PERIODIC (1 PER SEC) DISPLAY.

R00861 PLEASE PERFORM. PLEASE MARK SITUATIONS
R00862 REMARKS DESCRIBING HOW AN INTERNAL ROUTINE SHOULD HANDLE
R00863 THESE SITUATIONS CAN BE FOUND JUST BEFORE :NVSUB: (SEE
R00864 SYMBOL TABLE FOR PAGE NUMBER).

R0087 THE NOUN TABLE FORMAT IS DESCRIBED ON A PAGE OF REMARKS CARDS JUST
R0088 BEFORE :DSPABC: (SEE SYMBOL TABLE FOR PAGE NUMBER).

R0089 THE NOUN TABLES THEMSELVES ARE FOUND IN LOG SECTION :PINBALL NOUN
R00891 TABLES:

R0090 FOR FURTHER DETAILS ABOUT OPERATION OF THE KEYBOARD AND DISPLAY SYSTEM
R0091 PROGRAM, SEE THE MISSION PLAN AND/OR MIT/IL E-2129
R0092 DESCRIBING KEYBOARD AND DISPLAY OPERATION FOR 278.

R0150 THE FOLLOWING QUOTATION IS PROVIDED THROUGH THE COURTESY OF THE AUTHORS.

R0151 ::IT WILL BE PROVED TO THY FACE THAT THOU HAST MEN ABOUT THEE THAT
R0152 USUALLY TALK OF A NOUN AND A VERB, AND SUCH ABOMINABLE WORDS AS NO

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R0153 CHRISTIAN EAR CAN ENDURE TO HEAR.1:

R0154 HENRY 6, ACT 2, SCENE 4

R0155 THE FOLLOWING ASSIGNMENTS FOR PINBALL ARE MADE ELSEWHERE

R0156 RESERVED FOR PINBALL EXECUTIVE ACTION

R0157	DSPCOUNT	ERASE		DISPLAY POSITION INDICATOR
R0158	DECURNCH	ERASE		+DEC, - DEC. GLT INDICATOR
R0159	VERBREG	ERASE		VERB CODE
R0160	NOUNREG	ERASE		NOUN CODE
R0161	XREG	ERASE		R1 INPUT BUFFER
R0162	YREG	ERASE		R2 INPUT BUFFER
R0163	ZREG	ERASE		R3 INPUT BUFFER
R0164	XREGCLP	ERASE		LO PART OF XREG (FOR DEC CONV ONLY)
R0165	YREGCLP	ERASE		LO PART OF YREG (FOR DEC CONV ONLY)
R0166	HITEMOUT	=	YREGCLP	TEMP FOR DISPLAY OF HRS, MIN, SEC MUST = LOTEMOUT-1.
R0167				
R0168	ZREGCLP	ERASE		LO PART OF ZREG (FOR DEC CONV ONLY)
R0169	LOTEMOUT	=	ZREGCLP	TEMP FOR DISPLAY OF HRS, MIN, SEC MUST = HITEMOUT+1.
R0170				
R0171	MODREG	ERASE		MODE CODE
R0172	DSPLOCK	ERASE		KEYBOARD/SUBROUTINE CALL INTERLOCK
R0173	REQRET	ERASE		RETURN REGISTER FOR LOAD
R0174	LOADSTAT	ERASE		STATUS INDICATOR FOR LOADTST
R0175	CI PASS	ERASE		PASS INDICATOR CLEAR
R0176	NOUT	ERASE		ACTIVITY COUNTER FOR DSPTAB
R0177	NOUNCADR	ERASE		MACHINE CADR FOR NOUN
R0178	MONSAVE	ERASE		N/V CODE FOR MONITOR. (= MONSAVE1-1)
R0179	MONSAVE1	ERASE		NOUNCADR FOR MONITOR (HATSS) = MONSAVE +1
R01795	MONSAVE2	ERASE		NVMONPT OPTIONS
R0180	DSPTAB	ERASE	+130	0-10, DISPLAY PANEL BUFFER. 11-13, C RELAYS
R0181	CADKSTOR	ERASE		ENDTILE STORAGE
R0182	NVQTEM	ERASE		NVSUB STORAGE FOR CALLING ADDRESS MUST = NVBNKTEM-1
R0183				
R0184	NVBNKTEM	ERASE		NVSUB STORAGE FOR CALLING BANK MUST = NVQTEM+1
R0185				
R0186	VERBSAVE	ERASE		NEEDED FOR RECYCLE
R0187	OSPLIST	ERASE		WAITING REG FOR DSP SYST INTERNAL USE
R0188	EXTVACT	ERASE		EXTENDED VERB ACTIVITY INTERLOCK
R0189	DSPTEM1	ERASE	+2	BUFFER STORAGE AREA 1 (MOSTLY FOR TIME)
R0190	DSPTEM2	ERASE	+2	BUFFER STORAGE AREA 2 (MOSTLY FOR DEG)
R0191	END OF ERASABLES			RESERVED FOR PINBALL EXECUTIVE ACTION

R0192 TEMPORARIES FOR PINBALL EXECUTIVE ACTION

L PINBALL GAME BUTTONS AND LIGHTS

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R0193	DSEXIT	=	INTB15+	RETURN FOR DSPIN
R0194	EXITEM	=	INTB15+	RETURN FOR SCALE FACTOR ROUTINE SELECT
R0195	BLANKRET	=	INTB15+	RETURN FOR 2BLANK
R0196	WRDRET	=	INTBIT15	RETURN FOR 5BLANK
R0197	WDRET	=	INTBIT15	RETURN FOR DSPWD
R0198	DECRET	=	INTBIT15	RETURN FOR PUTCOM(DEC LOAD)
R0199	21/22REG	=	INTBIT15	TEMP FOR CHARIN
R0200	UPDATRET	=	POLISH	RETURN FOR UPDATNN, UPDATVB
R0201	CHAR	=	POLISH	TEMP FOR CHARIN
R0202	ERRCNT	=	POLISH	COUNTER FOR ERROR LIGHT RESET
R0203	DECOUNT	=	POLISH	COUNTER FOR SCALING AND DISPLAY (DEC)
R0204	SGNON	=	VBUF	TEMP FOR +,- ON
R0205	NOUNTEM	=	VBUF	COUNTER FOR MIXNOUN FETCH
R0206	DISTEM	=	VBUF	COUNTER FOR OCTAL DISPLAY VERBS
R0207	DECTEM	=	VBUF	COUNTER FOR FETCH (DEC DISPLAY VERBS)
R0208	SGNOFF	=	VBUF +1	TEMP FOR +,- ON
R0209	NVTEMP	=	VBUF +1	TEMP FOR NVSUB
R0210	SFTEMP1	=	VBUF +1	STORAGE FOR SF CONST HI PART(=SFTEMP2-1)
R0211	HITEMIN	=	VBUF +1	TEMP FOR LOAD OF HRS, MIN, SEC
R0212				MUST = LITEMIN-1.
R0213	CODE	=	VBUF +2	FOR DSPIN
R0214	SFTEMP2	=	VBUF +2	STORAGE FOR SF CONST LO PART(=SFTEMP1+1)
R0215	LOTEMIN	=	VBUF +2	TEMP FOR LOAD OF HRS, MIN, SEC
R0216				MUST = HITEMIN+1.
R0217	MIXTEMP	=	VBUF +3	FOR MIXNOUN DATA
R0218	SIGNRET	=	VBUF +3	RETURN FOR +,- ON
R0219	ALSO MIXTEMP+1 = VBUF+4, MIXTEMP+2 = VBUF+5.			
R0220	ENTRET	=	DOTINC	EXIT FROM ENTER
R0221	WDCNT	=	DOTRET	CHAR COUNTER FOR DSPWD
R0222	INREL	=	DOTRET	INPUT BUFFER SELECTOR (X,Y,Z, REG)
R0223	DSPRMTEM	=	HATING	DSPCOUNT SAVE FOR DSPMW
R0224	MIXBR	=	HATING	INDICATOR FOR MIXED OR NORMAL NOUN
R0225	TEM1	ERASE		EXEC TEMP
R0226	DSREL	=	TEM1	REL ADDRESS FOR DSPIN
R0227	TEM2	ERASE		EXEC TEMP
R0228	DSMAG	=	TEM2	MAGNITUDE STORE FOR DSPIN
R0229	IDADDTEM	=	TEM2	MIXNOUN INDIRECT ADDRESS STORAGE
R0230	TEM3	ERASE		EXEC TEMP
R0231	COUNT	=	TEM3	FOR DSPIN

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R0232	TEM4	ERASE	EXEC TEMP
R0233	LSTPTR	= TEM4	LIST POINTER FOR GRABUSY
R0234	RELRET	= TEM4	RETURN FOR RELDSP
R0235	FREERET	= TEM4	RETURN FOR FREEDSP
R0236	DSPWDRET	= TEM4	RETURN FOR DSPSIGN
R0237	SEPSCRET	= TEM4	RETURN FOR SEPSEC
R0238	SEPMNRET	= TEM4	RETURN FOR SEPMIN
R0239	TEM5	ERASE	EXEC TEMP
R0240	NOUNAOD	= TEM5	TEMP STORAGE FOR NOUN ADDRESS
R0241	NNADTEM	ERASE	TEMP FOR NOUN ADDRESS TABLE ENTRY
R0242	NNTYPTM	ERASE	TEMP FOR NOUN TYPE TABLE ENTRY
R0243	IDAD1TEM	ERASE	TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)
R0244			MUST = IDAD2TEM-1, = IDAD3TEM-2.
R0245	IDAD2TEM	ERASE	TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)
R0246			MUST = IDAD1TEM+1, = IDAD3TEM-1.
R0247	IDAD3TEM	ERASE	TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)
R0248			MUST = IDAD1TEM+2, = IDAD2TEM+1.
R0249	RUTXTEM	ERASE	TEMP FOR SF ROUT TABLE ENTRY(MIXNN ONLY)
R0250	END OF TEMPORARIES FOR PINBALL EXECUTIVE ACTION		

R02501 ADDITIONAL TEMPORARIES FOR PINBALL EXECUTIVE ACTION

R02502	MPAC.	THRU MPAC +C
R02503	BUF.	+1, +2
R02504	BUF2.	+1, +2
R02506	MPTEMP	
R02507	ADDRWD	
R02509	END OF ADDITIONAL TEMPS FOR PINBALL EXEC ACTION	

R0251 RESERVED FOR PINBALL INTERRUPT ACTION

R0252	DSPCNT	ERASE	COUNTER FOR DSPOUT
R0253	UPLOCK	ERASE	BIT1 = UPLINK INTERLOCK (ACTIVATED BY
A0254			RECEPTION OF A BAD MESSAGE IN UPLINK)
R0255	END OF ERASABLES RESERVED FOR PINBALL INTERRUPT ACTION		

R0256 TEMPORARIES FOR PINBALL INTERRUPT ACTION

R0257	KEYTEMP1	= WAITEXIT	TEMP FOR KEYRUPT, UPRUPT
R0258	DSRUPTM	= WAITEXIT	TEMP FOR DSPOUT
R0259	KEYTEMP2	= RUPTAGN	TEMP FOR KEYRUPT, UPRUPT
R0260	END OF TEMPORARIES FOR PINBALL INTERRUPT ACTION		

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R0261 THE INPUT CODES ASSUMED FOR THE KEYBOARD ARE,

R0262	0	10000
R0263	1	00001
R0264	9	01001
R0265	VERB	10001
R0266	ERROR RES	10010
R0267	KEY RLSE	11001
R0268	+	11010
R0269	-	11011
R0270	ENTER	11100
R0271	CLEAR	11110
R0272	NOON	11111

R0273 OUTPUT FORMAT FOR DISPLAY PANEL. SET DUTO TO AAAABCCCCCDDDDO.

R0274 A-S SELECT A RELAYWORD. THIS DETERMINES WHICH PAIR OF CHARACTERS ARE
R0275 ENERGIZED.

R0276 B FOR SPECIAL RELAYS SUCH AS SIGNS ETC.

R0277 C-S 5 BIT RELAY CODE FOR LEFT CHAR OF PAIR SELECTED BY RELAYWORD

R0278 D-S 5 BIT RELAY CODE FOR RIGHTCHAR OF PAIR SELECTED BY RELAYWORD.

R0279 THE PANEL APPEARS AS FOLLOWS,

R0280	MD1	MD2			(MAJOR MODE)
R0281	VD1	VD2 (VERB)	ND1	ND2	(NOON)
R0282	R1D1	R1D2	R1D3	R1D4	R1D5 (R1)
R0283	R2D1	R2D2	R2D3	R2D4	R2D5 (R2)
R0284	R3D1	R3D2	R3D3	R3D4	R3D5 (R3)

R0285 EACH OF THESE IS GIVEN A DSPCOUNT NUMBER FOR USE WITHIN COMPUTATION ONLY

R0286	MD1	25	R2D1	11	ALL ARE OCTAL
R0287	MD2	24	R2D2	10	
R0288	VD1	23	R2D3	7	
R0289	VD2	22	R2D4	6	
R0290	ND1	21	R2D5	5	
R0291	ND2	20	R3D1	4	
R0292	R1D1	16	R3D2	3	
R0293	R1D2	15	R3D3	2	
R0294	R1D3	14	R3D4	1	
R0295	R1D4	13	R3D5	0	
R0296	R1D5	12			

R0297 THERE IS AN 11 REGISTER TABLE (DSPTAB) FOR THE DISPLAY PANEL.

R0298	DSPTAB RELAYWD	BIT11	BITS 10-6	BITS 5-1
R0299	RELADD			
R0300	10	1011	MD1 (25)	MD2 (24)
R0301	9	1010	VD1 (23)	VD2 (22)
R0302	8	1001	ND1 (21)	ND2 (20)
R0303	7	1000		R1D1 (16)

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R0304	6	0111	+R1	R102 (15)	R103 (14)
R0305	5	0110	-R1	R104 (13)	R105 (12)
R0306	4	0101	+R2	R201 (11)	R202 (10)
R0307	3	0100	-R2	R203 (7)	R204 (6)
R0308	2	0011		R205 (5)	R301 (4)
R0309	1	0010	+R3	R302 (3)	R303 (2)
R0310	0	0001	-R3	R304 (1)	R305 (0)
R0311		0000	NO DELAYWORD		

R0312 THE 5 BIT OUTPUT RELAY CODES ARE:

R0313	BLANK	00000
R0314	0	10101
R0315	1	00011
R0316	2	11001
R0317	3	11011
R0318	4	01111
R0319	5	11110
R0320	6	11100
R0321	7	10011
R0322	8	11101
R0323	9	11111

R03231 OUTPUT BITS USED BY PINBALL:

R03232	KEY RELEASE LIGHT	- BIT 5 OF CHANNEL 11
R03233	VERB/NOU FLASH	- BIT 6 OF CHANNEL 11
R03234	OPERATOR ERROR LIGHT	- BIT 7 OF CHANNEL 11

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PO324 START OF EXECUTIVE SECTION OF PINBALL

0325	40,2077
032501-REF - 2 LAST-299	40,2000
032502	40,2077

BANK 40
SETLOC PINBALL1
BANK

REF	LAST	398	40,2077	3 4753	1	CHARIN
03258	REF	1				
0330	REF	23	LAST 398	40,2077	3 4753	1 CHARIN
0331	REF	2	LAST 222	40,2100	57 012	0
0332	REF	1		40,2101	54 115	0
03321	REF	2	LAST 222	40,2102	11 042	1
03322				40,2103	0 2105	1
03323	REF	1		40,2104	0 2112	1
03324	REF	1		40,2105	4 2156	0
03325	REF	74	LAST 387	40,2106	6 0154	1
03326				40,2107	0 0006	1
03327	REF	2	LAST 398	40,2110	1 2112	0
03328	REF	1		40,2111	0 4374	0
0333	REF	75	LAST 398	40,2112	56 154	1 CHARIN
0334	REF	1		40,2113	54 117	1
0335	REF	103	LAST 384	40,2114	50 000	1
0336				40,2115	0 2116	0
0337	REF	1		40,2116	0 3434	1
0338	REF	1		40,2117	0 2175	0
0339	REF	2	LAST 398	40,2120	0 2175	0
0340	REF	3	LAST 398	40,2121	0 2175	0
0341	REF	4	LAST 398	40,2122	0 2175	0
0342	REF	5	LAST 398	40,2123	0 2175	0
0343	REF	6	LAST 398	40,2124	0 2175	0
0344	REF	7	LAST 398	40,2125	0 2175	0
0345	REF	1		40,2126	0 2161	0
0346	REF	2	LAST 398	40,2127	0 2161	0
0347	REF	2	LAST 398	40,2130	0 3434	1
0348	REF	2	LAST 398	40,2131	0 3434	1
0349	REF	4	LAST 398	40,2132	0 3434	1
0350	REF	5	LAST 398	40,2133	0 3434	1
0351	REF	6	LAST 398	40,2134	0 3434	1
0352	REF	7	LAST 398	40,2135	0 3434	1
0353	REF	8	LAST 398	40,2136	0 2173	0
0354	REF	1		40,2137	0 2354	1
0355	REF	1		40,2140	0 3603	1
0356	REF	8	LAST 398	40,2141	0 3434	1
0357	REF	9	LAST 398	40,2142	0 3434	1
0358	REF	10	LAST 398	40,2143	0 3434	1
0359	REF	11	LAST 398	40,2144	0 3434	1
0360	REF	12	LAST 398	40,2145	0 3434	1
0361	REF	13	LAST 398	40,2146	0 3434	1
0362	REF	1		40,2147	0 3461	1
0363	REF	1		40,2150	0 2407	0

COUNT*	\$\$/FIN
OAF	ONE
XCH	DSPLOCK
TS	21/22REG
CCS	CADRSTOR
TC	+2
TC	CHARINZ
CS	ELRCODEI
AD	MPAC
EXTEND	
BZF	CHARINZ
TC	RELDSPON
XCH	MPAC
TS	CHAR
INDEX	A
TC	+1
TC	CHARALRM
TC	NUM
TC	NUM
TC	NUM
TC	NUM
TC	NUM
TC	NUM
TC	NUM
TC	99TEST
TC	99TEST
TC	CHARALRM
TC	CHARALRM
TC	CHARALRM
TC	CHARALRM
TC	CHARALRM
TC	CHARALRM
TC	NUM
TC	VERB
TC	EFLCK
TC	CHARALRM
TC	CHARALRM
TC	CHARALRM
TC	CHARALRM
TC	CHARALRM
TC	CHARALRM
TC	VBRELDSP
TC	PUSON!

BLOCK-DISPLAY SYST
MAKE DSP SYST BUSY. BUT SAVE OLD
C(DSPLOCK) FOR ERROR LIGHT RESET.
ALL KEYS EXCEPT ER TURN ON KR LITE IF
CADRSTOR IS FULL. THIS REMINDS OPERATOR
TO RE-ESTABLISH A FLASHING DISPLAY
WHICH HE HAS OBSCURED WITH DISPLAYS OF
HIS OWN (SEE REMARKS PRECEDING ROUTINE
VBRELDSP).

INPUT CODE	FUNCTION
0	
1	
2	
3	
4	
5	
6	
7	
10	8
11	9
12	
13	
14	
15	
16	
17	
20	0
21	VERB
22	ERROR LIGHT RESET
23	
24	
25	
26	
27	
30	
31	KEY RELEASE
32	+

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0364	REF	1		40,2151	0 2374 0	TC	NEGSGN	33	
0365	REF	1		40,2152	0 2157 0	TC	ENTERJMP	34	ENTER
0366	REF	14	LAST 398	40,2153	0 3434 1	TC	CHARALRM	35	
0367	REF	1		40,2154	0 2467 0	TC	CLEAR	36	CLEAR
0368	REF	1		40,2155	0 2370 1	TC	NDUN	37	NDUN
03685				40,2156	00022 1	ELRCODE1	OCT	22	
0369	REF	17	LAST 299	40,2157	0 4635 0	ENTERJMP	TC	POSTJUMP	
0370	REF	1		40,2160	62002 1	CADR		ENTER	
0371	REF	8	LAST 222	40,2161	10 777 1	89TEST	CLS	DSPCOUNT	
0372				40,2162	0 2166 1	TC	+4		
0373				40,2163	0 2166 1	TC	+3		+0
0374	REF	37	LAST 388	40,2164	0 5155 0	TC	ENDOFJOB		- BLOCK DATA IN IF DSPCOUNT IS - OR -0
0375	REF	38	LAST 399	40,2165	0 5155 0	TC	ENDOFJOB		-0
0376	REF	4	LAST 339	40,2166	3 6245 1	CAF	THREE		
0377	REF	1		40,2167	7 1000 1	MASK	DECBRNCH		
0378	REF	104	LAST 398	40,2170	10 000 0	CLS	A		
0379	REF	9	LAST 398	40,2171	0 2175 0	TC	NUM		IF DECBRNCH IS +, 8 OR 9 OK
0380	REF	15	LAST 399	40,2172	0 3434 1	TC	CHARALRM		IF DECBRNCH IS +0, REJECT 8 OR 9

R0381 NUM ASSEMBLES OCTAL 3 BITS AT A TIME. FOR DECIMAL IT CONVERTS INCOMING
 R0382 WORD AS A FRACTION, KEEPING RESULTS TO DP.
 R0383 OCTAL RESULTS ARE LEFT IN XREG, YREG, OR ZREG. HI PART OF DEC IN XREG.
 R0384 YREG, ZREG. THE LOW PARTS IN XREGLP, YREGLP, OR ZREGLP
 R0385 DECBRNCH IS LEFT AT +0 FOR OCT, +1 FOR + DEC, +2 FOR - DEC.
 R0386 IF DSPCOUNT WAS LEFT -, NO MORE DATA IS ACCEPTED.

0387	REF	55	LAST 384	40,2173	3 4755 1	CAF	ZERO		
0388	REF	2	LAST 398	40,2174	54 117 1	TS	CHAR		
0389	REF	4	LAST 399	40,2175	10 777 1	CLS	DSPCOUNT		
0390				40,2176	0 2202 0	TC	+4		+
0391				40,2177	0 2202 0	TC	+3		+0
0392				40,2200	0 2201 0	TC	+1		- BLOCK DATA IN IF DSPCOUNT IS -
0393	REF	39	LAST 399	40,2201	0 5155 0	TC	ENDOFJOB		-0
0394	REF	1		40,2202	0 2324 0	TC	GETINREL		
0395	REF	2	LAST 222	40,2203	11 015 0	CLS	CLPASS		IF CLPASS IS + OR +0, MAKE IT +0.
0396	REF	56	LAST 399	40,2204	3 4755 1	CAF	ZERO		
0397	REF	3	LAST 399	40,2205	55 015 0	TS	CLPASS		
0398				40,2206	0 2207 0	TC	+1		
0399	REF	3	LAST 399	40,2207	50 117 0	INDEX	CHAR		
0400	REF	2	LAST 157	40,2210	3 4066 0	CAF	FELTAB		
0401	REF	1		40,2211	7 4346 0	MASK	LOW5		
0402	REF	1		40,2212	54 124 1	TS	CODE		
0403	REF	5	LAST 399	40,2213	3 0777 0	CA	DSPCOUNT		
0404	REF	1		40,2214	54 143 0	TS	COUNT		
0405	REF	1		40,2215	0 3322 1	TC	DSPIN		
0406	REF	5	LAST 399	40,2216	3 6245 1	CAF	THREE		

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0407	REF	2	LAST	399	40,2217	7 1000 1	MASK	DECRANCH	
0408	REF	105	LAST	399	40,2220	10 000 0	CCS	A	+0, OCTAL. +1, + DEC. +2, - DEC.
0409	REF	1			40,2221	0 2232 0	TC	DECTOBIN	+
0410	REF	1			40,2222	50 137 1	INDEX	INREL	+0 OCTAL
0411	REF	2	LAST	222	40,2223	57 001 1	XCH	VERBREG	
0412	REF	1			40,2224	54 022 0	TS	CYL	
0413	REF	2	LAST	400	40,2225	4 0022 0	CS	CYL	
0414	REF	3	LAST	400	40,2226	4 0022 0	CS	CYL	
0415	REF	4	LAST	400	40,2227	56 022 1	XCH	CYL	
0416	REF	4	LAST	399	40,2230	6 0117 0	AD	CHAR	
0417	REF	1			40,2231	0 2247 1	TC	ENDNMTST	
0418	REF	2	LAST	400	40,2232	50 137 1	DECTOBIN INDEX	INREL	
0419	REF	3	LAST	400	40,2233	57 001 1	XCH	VERBREG	
0420	REF	76	LAST	398	40,2234	54 154 0	TS	MPAC	SUM X 2EXP-14 IN MPAC
0421	REF	57	LAST	399	40,2235	3 4755 1	CAF	ZERO	
0422	REF	77	LAST	400	40,2236	54 155 1	TS	MPAC	+1
0423	REF	4	LAST	221	40,2237	3 4363 0	CAF	TEN	10 X 2EXP-14
0424	REF	1			40,2240	0 7307 1	TC	SHORTMP	10SUM X 2EXP-28 IN MPAC. MPAC+1
0425	REF	78	LAST	400	40,2241	56 155 0	XCH	MPAC	+1
0426	REF	5	LAST	400	40,2242	6 0117 0	AD	CHAR	
0427	REF	79	LAST	400	40,2243	54 155 1	TS	MPAC	+1
0428	REF	2	LAST	400	40,2244	0 2247 1	TC	ENDNMTST	NO OF
0429	REF	80	LAST	400	40,2245	26 154 0	ADS	MPAC	OF MUST BE 9TH CHAR
0430	REF	1			40,2246	0 2265 1	TC	DECEND	
0431	REF	3	LAST	400	40,2247	50 137 1	ENDNMTST INDEX	INREL	
0432	REF	4	LAST	400	40,2250	55 001 0	TS	VERBREG	
0433	REF	6	LAST	399	40,2251	4 0777 1	CS	DSPCOUNT	
0434	REF	4	LAST	400	40,2252	50 137 1	INDEX	INREL	
0435	REF	1			40,2253	6 2315 1	AD	CRITCON	
0436					40,2254	0 0006 1	EXTEND		
0437	REF	1			40,2255	1 2257 1	BZF	ENDNUM	-0, DSPCOUNT = CRITCON
0438	REF	1			40,2256	0 2312 0	TC	MORNUM	- , DSPCOUNT - G/ CRITCON
0439	REF	6	LAST	399	40,2257	3 6245 1	ENDNUM CAF	THREE	
0440	REF	3	LAST	400	40,2260	7 1000 1	MASK	DECRANCH	
0441	REF	106	LAST	400	40,2261	10 000 0	CCS	A	
0442	REF	2	LAST	400	40,2262	0 2265 1	TC	DECEND	
0443	REF	7	LAST	400	40,2263	4 0777 1	ENDALL CS	DSPCOUNT	BLOCK NUMIN BY PLACING DSPCOUNT
0444	REF	2	LAST	400	40,2264	0 2313 1	TC	MORNUM	+1 NEGATIVELY
0445	REF	24	LAST	398	40,2265	4 4753 0	DECEND CS	ONE	
0446	REF	5	LAST	400	40,2266	6 0137 1	AD	INREL	
0447					40,2267	0 0006 1	EXTEND		
0448	REF	1			40,2270	6 2263 1	BZMF	ENDALL	IF INREL=0,1(VBREG,NNREG), LEAVE WHOLE
0449	REF	1			40,2271	0 7103 1	TC	DMP	IF INREL=2,3,4(R1,R2,R3). CONVERT TO FRAC
AC450									MULT SUM X 2EXP-28 IN MPAC. MPAC+1 BY
0451	REF	1			40,2272	02322 0	AD+TS	DECUM	2EXP14/10EXP5. GIVES (SUM/10EXP5)X2EXP-14
0452	REF	7	LAST	400	40,2273	3 6245 1	CAF	THREE	IN MPAC, +1, +2.
0453	REF	4	LAST	400	40,2274	7 1000 1	MASK	DECRANCH	
0454	REF	107	LAST	400	40,2275	50 000 1	INDEX	A	
0455					40,2276	0 2276 0	TC	+0	
0456	REF	1			40,2277	0 2303 0	TC	+DEC SIGN	

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0457				40.2300	0 0006 1	EXTEND		- CASE
0458	REF 81	LAST 400		40.2301	4 0156 1	DCS	MPAC	+1
0459	REF 82	LAST 401		40.2302	52 156 1	DXCH	MPAC	+1
0460	REF 83	LAST 401		40.2303	56 156 0	XCH	MPAC	+2
0461	REF 6	LAST 400		40.2304	50 137 1	INDEX	INREL	
0462	REF 1			40.2305	55 004 0	TS	XREGLP	-2
0463	REF 84	LAST 401		40.2306	56 155 0	XCH	MPAC	+1
0464	REF 7	LAST 401		40.2307	50 137 1	INDEX	INREL	
0465	REF 5	LAST 400		40.2310	55 001 0	TS	VERBREG	
0466	REF 2	LAST 400		40.2311	0 2263 1	TC	ENDALL	
0467	REF 8	LAST 400		40.2312	10 777 1	CCS	DSPCOUNT	DECREMENT DSPCOUNT
0468	REF 9	LAST 401		40.2313	54 777 1	TS	DSPCOUNT	
0469	REF 40	LAST 399		40.2314	0 5155 0	TC	ENDOFJOB	

0470				40.2315	00022 1	CRITCON	OCT	22	(DEC 18)
0471				40.2316	00020 0		OCT	20	(DEC 16)
0472				40.2317	00012 1		OCT	12	(DEC 10)
0473				40.2320	00005 1		OCT	5	
0474				40.2321	00000 1		OCT	0	

0475				40.2322	05174 0	DECON	2DEC	F-5 514	2EXP14/10EXP5 = .16384 DEC
0475				40.2323	13261 0				

R0476 GETINREL GETS PROPER DATA REG REL ADDRESS FOR CURRENT C(DSPCOUNT) AND
 R0477 PUTS IN INTO INREL. +0 VERBREG, 1 NDUNREG, 2 XREG, 3 YREG, 4 ZREG.

0478	REF 10	LAST 401		40.2324	50 777 0	GETINREL	INDEX	DSPCOUNT
0479	REF 1			40.2325	3 2330 0	CAF	INRELTAB	
0480	REF 8	LAST 401		40.2326	54 137 0	TS	INREL	(A TEMP. REG)
0481	REF 43	LAST 381		40.2327	0 0002 0	TC	0	

0482				40.2330	00004 0	INRELTAB	OCT	4	R3D5 (DSPCOUNT = 0)
0483				40.2331	00004 0		OCT	4	R3D4 = (1)
0484				40.2332	00004 0		OCT	4	R3D3 = (2)
0485				40.2333	00004 0		OCT	4	R3D2 = (3)
0486				40.2334	00004 0		OCT	4	R3D1 = (4)
0487				40.2335	00003 1		OCT	3	R2D5 = (5)
0488				40.2336	00003 1		OCT	3	R2D4 = (6)
0489				40.2337	00003 1		OCT	3	R2D3 = (7)
0490				40.2340	00003 1		OCT	3	R2D2 = (8)
0491				40.2341	00003 1		OCT	3	R2D1 = (9)
0492				40.2342	00002 0		OCT	2	R1D5 = (100)
0493				40.2343	00002 0		OCT	2	R1D4 = (110)
0494				40.2344	00002 0		OCT	2	R1D3 = (120)
0495				40.2345	00002 0		OCT	2	R1D2 = (130)
0496				40.2346	00002 0		OCT	2	R1D1 = (140)
0497	REF 2	LAST 376		40.2347	0 5705 0	TC	CCSHOLE		NO DSPCOUNT NUMBER = 150
0498				40.2350	00001 0		OCT	1	ND2 = (160)
0499				40.2351	00001 0		OCT	1	ND1 = (170)

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0500				40,2352	00000 1		DCT	0	VD2	=(180)
0501				40,2353	00000 1		DCT	0	VD1	=(190)
0502	REF	58	LAST	400	40,2354	3 4755 1	VERB	CAF	ZERO	
0503	REF	6	LAST	401	40,2355	55'001 0		TS	VERBKREG	
0504	REF	2	LAST	222	40,2356	3 4360 0		CAF	VD1	
0505	REF	11	LAST	401	40,2357	54 777 1	NVCOM	TS	DSPCOUNT	
0506	REF	1			40,2360	0 2601 1		TC	2BLANK	
0507	REF	25	LAST	400	40,2361	3 4753 1		CAF	ONE	
0508	REF	5	LAST	400	40,2362	55'000 1		TS	DECBRNCH	SET FOR DEC V/N CODE
0509	REF	59	LAST	402	40,2363	3 4755 1		CAF	ZERO	
0510	REF	2	LAST	222	40,2364	55'013 0		TS	REQRET	SET FOR ENTPASO
0511	REF	1			40,2365	3 4217 1		CAF	ENDINST	IF DSPALARM OCCURS BEFORE FIRST ENTPASO
0512	REF	1			40,2366	54 136 1		TS	ENTRET	OR NVSUB, ENTRET MUST ALREADY BE SET
0513	REF	1								TO TC ENDOFJOB
0514	REF	41	LAST	401	40,2367	0 5155 0		TC	ENDOFJOB	
0515	REF	60	LAST	402	40,2370	3 4755 1	NOUN	CAF	ZERO	
0516	REF	7	LAST	304	40,2371	55'002 0		TS	NOUNREG	
0517	REF	2	LAST	381	40,2372	3 4361 1		CAF	ND1	ND1, OCT 21 (DEC 17)
0518	REF	1			40,2373	0 2357 1		TC	NVCOM	
0519	REF	1			40,2374	0 2446 0	NEGSGN	TC	SIGNTEST	
0520	REF	1			40,2375	0 2433 1		TC	+ON	
0521	REF	17	LAST	375	40,2376	3 4752 0		CAF	TWO	
0522	REF	9	LAST	401	40,2377	50 137 1	BOTHSGN	INDEX	INREL	SET DEC COMP BIT TO 1 (IN DECBRNCH)
0523	REF	18	LAST	191	40,2400	6 4745 0		AD	BIT7	BIT 5 FOR R1, BIT 4 FOR R2,
0524	REF	6	LAST	402	40,2401	27'000 1		ADS	DECBRNCH	BIT 3 FOR R3.
0525	REF	4	LAST	399	40,2402	11'015 0	FIXCLPAS	CLS	CLPASS	IF CLPASS IS + OR +0, MAKE IT +0.
0526	REF	61	LAST	402	40,2403	3 4755 1		CAF	ZERO	
0527	REF	5	LAST	402	40,2404	55'015 0		TS	CLPASS	
0528					40,2405	0 2406 1		TC	+1	
0529	REF	42	LAST	402	40,2406	0 5155 0		TC	ENDOFJOB	
0530	REF	2	LAST	402	40,2407	0 2446 0	POSIGN	TC	SIGNTEST	
0531	REF	1			40,2410	0 2413 0		TC	+ON	
0532	REF	26	LAST	402	40,2411	3 4753 1		CAF	ONE	
0533	REF	1			40,2412	0 2377 0		TC	BOTHSGN	
0534	REF	44	LAST	401	40,2413	22 002 0	+ON	LXCH	0	
0535	REF	2	LAST	399	40,2414	0 2324 0		TC	GETINREL	
0536	REF	10	LAST	402	40,2415	50 137 1		INDEX	INREL	
0537	REF	1			40,2416	3 2441 1		CAF	SGNTAB -2	
0538	REF	1			40,2417	54 123 0		TS	SGNOFF	
0539	REF	27	LAST	402	40,2420	6 4753 1		AD	ONE	
0540	REF	1			40,2421	54 122 1		TS	SGNON	
0541	REF	62	LAST	402	40,2422	3 4755 1	SGNCOM	CAF	ZERO	
0542	REF	2	LAST	399	40,2423	54 124 1		TS	CODE	
0543	REF	2	LAST	402	40,2424	56 123 1		XCH	SGNOFF	

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0544	REF	1		40,2425	0 3404 1	TC	110SPIN	
0545	REF	18	LAST	372	40,2426	3 4741 1	CAF	BIT11
0546	REF	3	LAST	402	40,2427	54 124 1	TS	CODE
0547	REF	2	LAST	402	40,2430	56 122 0	XCH	SGNON
0548	REF	2	LAST	403	40,2431	0 3404 1	TC	110SPIN
0549	REF	43	LAST	381	40,2432	0 0001 0	TC	L
0550	REF	45	LAST	402	40,2433	22 002 0	LXCH	Q
0551	REF	3	LAST	402	40,2434	0 2324 0	TC	GETINREL
0552	REF	11	LAST	402	40,2435	50 137 1	INDEX	INREL
0553	REF	2	LAST	402	40,2436	3 2441 1	CAF	SGNTAB -2
0554	REF	3	LAST	403	40,2437	54 122 1	TS	SGNON
0555	REF	28	LAST	402	40,2440	6 4753 1	AD	ONE
0556	REF	3	LAST	402	40,2441	54 123 0	TS	SGNOFF
0557	REF	1			40,2442	0 2422 1	TC	SGNCOM
0558					40,2443	00005 1	SGNTAB	DCT 5 -R1
0559					40,2444	00003 1		DCT 3 -R2
0560					40,2445	00000 1		DCT 0 -R3

0561	REF	46	LAST	403	40,2446	22 002 0	SIGNTST	LXCH	Q	ALLOWS +,- ONLY WHEN DSPCOUNT=R101, R201, OR R301. ALLOWS ONLY FIRST OF CONSECUTIVE +/- CHARACTERS. IF LOW2 BITS OF DECBRNCH NOT= 0, SIGN FOR THIS WORD ALREADY IN. REJECT.
0562	REF	8	LAST	400	40,2447	3 6245 1	CAF	THREE		
0563	REF	7	LAST	402	40,2450	7 1000 1	MASK	DECBRNCH		
0564	REF	108	LAST	400	40,2451	10 000 0	CCS	A		
0565	REF	43	LAST	402	40,2452	0 5155 0	TC	ENDOFJOB		
0566	REF	1			40,2453	4 4317 1	CS	R101		
0567	REF	1			40,2454	0 2462 0	TC	SGNTST1		
0568	REF	1			40,2455	4 4320 0	CS	R201		
0569	REF	2	LAST	403	40,2456	0 2462 0	TC	SGNTST1		
0570	REF	1			40,2457	4 4321 1	CS	R301		
0571	REF	3	LAST	403	40,2460	0 2462 0	TC	SGNTST1		
0572	REF	44	LAST	403	40,2461	0 5155 0	TC	ENDOFJOB		NO MATCH FOUND. SIGN ILLEGAL
0573	REF	12	LAST	402	40,2462	6 0777 0	SGNTST1	AD	-DSPCOUNT	
0574					40,2463	0 0006 1	EXTEND			
0575					40,2464	1 2466 0	BZF	+2		MATCH FOUND
0576	REF	47	LAST	403	40,2465	0 0002 0	TC	0		
0577	REF	44	LAST	403	40,2466	0 0001 0	TC	L		SIGN LEGAL

R0578 CLEAR BLANKS WHICH R1, R2, R3 IS CURRENT OR LAST TO BE DISPLAYED (PERTINE
 R0579 NT XREG, YREG, ZREG IS CLEARED). SUCCESSIVE CLEARS TAKE CARE OF EACH RX
 R0580 L/ RC UNTIL R1 IS DONE. THEN NO FURTHER ACTION

R0581 THE SINGLE COMPONENT LOAD VERBS ALLOW ONLY THE SINGLE MC THAT IS
 R0582 APPROPRIATE TO BE CLEARED.

R0583 CLPASS +0 PASS0, CAN BE BACKED UP
 R0584 +N1 HIPASS, CAN BE BACKED UP
 R0585 -N1 PASS0, CANNOT BE BACKED UP

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0586	REF	13	LAST	403	40,2467	10 777 1	CLEAR	CCS	DSPCOUNT	
0587	REF	29	LAST	403	40,2470	6 4753 1		AD	DNE	
0588					40,2471	0 2473 0		TC	+2	
0589	REF	30	LAST	404	40,2472	6 4753 1		AD	DNE	
0590	REF	109	LAST	403	40,2473	50 000 1		INDEX	A	DO NOT CHANGE DSPCOUNT BECAUSE MAY LATER
0591	REF	2	LAST	401	40,2474	3 2330 0		CAF	INRELTAB	FAIL LEGALTST.
0592	REF	12	LAST	403	40,2475	54 137 0		TS	INREL	MUST SET INREL, EVEN FOR HIPASS.
0593	REF	6	LAST	402	40,2476	11 015 0		CCS	CLPASS	
0594	REF	1			40,2477	0 2505 0		TC	CLPASHI	
0595					40,2500	0 2502 1		TC	+2	+0 IF CLPASS IS +0 OR -, IT IS PASSO
0596					40,2501	0 2502 1		TC	+1	
0597	REF	13	LAST	404	40,2502	3 0137 1		CA	INREL	
0598	REF	1			40,2503	0 2527 0		TC	LEGALTST	
0599	REF	1			40,2504	0 2522 0		TC	CLEAR1	
0600	REF	14	LAST	404	40,2505	10 137 0	CLPASHI	CCS	INREL	
0601	REF	15	LAST	404	40,2506	54 137 0		TS	INREL	
0602	REF	2	LAST	404	40,2507	0 2527 0		TC	LEGALTST	
0603	REF	1			40,2510	3 2577 0		CAF	DOUBLK +2	+3 TO - NUMBER. BACKS DATA REQUESTS.
0604	REF	3	LAST	402	40,2511	27 013 0		ADS	REQRET	
0605	REF	16	LAST	404	40,2512	3 0137 1		CA	INREL	
0606	REF	1			40,2513	54 125 0		TS	MIXTEMP	TEMP STORAGE FOR INREL
0607					40,2514	0 0006 1		EXTEND		
0608	REF	7	LAST	402	40,2515	27 001 0		DIM	VERBREG	DECREMENT VERB AND RE-DISPLAY
0609	REF	75	LAST	388	40,2516	0 4616 1		TC	BANKCALL	
0610	REF	1			40,2517	62340 1		CAOR	UPDATVR	
0611	REF	2	LAST	404	40,2520	3 0125 1		CA	MIXTEMP	
0612	REF	17	LAST	404	40,2521	54 137 0		TS	INREL	RESTORE INREL
0613	REF	1			40,2522	0 2525 1	CLEAR1	TC	CLR5	
0614	REF	7	LAST	404	40,2523	25 015 1		INCH	CLPASS	ONLY IF CLPASS IS + OR +0.
0615	REF	45	LAST	403	40,2524	0 5155 0		TC	ENDGFJDB	SET FOR HIGHER PASS.
0616	REF	48	LAST	403	40,2525	22 002 0	CLR5	LXCH	Q	USES SBLANK BUT AVOIDS ITS TC GETINREL
0617	REF	1			40,2526	0 2540 1		TC	SBLANK +2	
0618	REF	2	LAST	230	40,2527	6 7746 0	LEGALTST	AD	NEG2	
0619	REF	110	LAST	404	40,2530	10 000 0		CCS	A	
0620	REF	49	LAST	404	40,2531	0 0002 0		TC	Q	LEGAL INREL G/ 2
0621	REF	3	LAST	401	40,2532	0 5705 0		TC	CCSHOLE	
0622	REF	46	LAST	404	40,2533	0 5155 0		TC	ENDGFJDB	ILLEGAL INREL = 0.1
0623	REF	50	LAST	404	40,2534	0 0002 0		TC	Q	LEGAL INREL = 2

R0624 SBLANK BLANKS 5 CHAR DISPLAY WORD IN R1, R2, OR R3. IT ALSO ZEROES XREG,
 R0625 YREG, OR ZREG. PLACE ANY + DSPCOUNT NUMBER FOR PERTINENT RC INTO DSPCOUNT
 R0626 DSPCOUNT IS LEFT SET TO LEFT MOST DSP NUMB FOR RC JUST BLANKED.

0627	REF	14	LAST	404	40,2535	54 777 1		TS	DSPCOUNT	NEEDED FOR BLANKSUB
0628	REF	51	LAST	404	40,2536	22 002 0	SBLANK	LXCH	Q	
0629	REF	4	LAST	403	40,2537	0 2324 0		TC	GETINREL	
0630	REF	63	LAST	402	40,2540	3 4755 1		CAF	ZERO	
0631	REF	18	LAST	404	40,2541	50 137 1		INDEX	INREL	
0632	REF	8	LAST	404	40,2542	55 001 0		TS	VERBREG	ZERO X, Y, Z REG.

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0633	REF	19	LAST	404	40,2543	50 137 1	INDEX	INREL		
0634	REF	2	LAST	401	40,2544	55 004 0	TS	XREGLP -2		
0635	REF	4	LAST	403	40,2545	54 124 1	TS	CODE		
0636	REF	20	LAST	405	40,2546	50 137 1	INDEX	INREL	ZERO PERTINENT DEC COMP BIT.	
0637	REF	19	LAST	402	40,2547	4 4745 1	CS	RIT7	PROTECT OTHERS	
0638	REF	8	LAST	403	40,2550	7 1000 1	MASK	DECBANCH		
0639	REF	1			40,2551	7 2600 1	MASK	BRNCHCON	ZERO LOW 2 BITS.	
0640	REF	9	LAST	405	40,2552	55 000 1	TS	DECBANCH		
0641	REF	21	LAST	405	40,2553	50 137 1	INDEX	INREL		
0642	REF	1			40,2554	3 2570 1	CAF	SINELANK -2	BLANK ISOLATED CHAR SEPARATELY	
0643	REF	2	LAST	399	40,2555	54 143 0	TS	COUNT		
0644	REF	2	LAST	399	40,2556	0 3522 1	TC	DSPIN		
0645	REF	22	LAST	405	40,2557	50 137 1	INDEX	INREL		
0646	REF	2	LAST	404	40,2560	3 2573 1	CAF	DOUBLK -2		
0647	REF	15	LAST	404	40,2561	54 777 1	TS	DSPCOUNT		
0648	REF	2	LAST	402	40,2562	0 2601 1	TC	2BLANK		
0649	REF	18	LAST	402	40,2563	4 4752 1	CS	TWO		
0650	REF	16	LAST	405	40,2564	26 777 1	ADS	DSPCOUNT		
0651	REF	3	LAST	405	40,2565	0 2601 1	TC	2BLANK		
0652	REF	23	LAST	405	40,2566	50 137 1	INDEX	INREL		
0653	REF	2	LAST	403	40,2567	3 4315 1	CAF	RID1 -2		
0654	REF	17	LAST	405	40,2570	54 777 1	TS	DSPCOUNT	SET DSPCOUNT TO LEFT MOST DSP NUMBER	
0655	REF	45	LAST	403	40,2571	0 0001 0	TC	L	OF REG. JUST BLANKED	
0656					40,2572	00016 0	SINBLANK	OCT	16	DEC 14
0657					40,2573	00005 1		OCT	5	
0658					40,2574	00004 0		OCT	4	
0659					40,2575	00015 0	DOUBLK	OCT	15	DEC 13
0660					40,2576	00011 1		OCT	11	DEC 9
0661					40,2577	00003 1		OCT	3	
0662					40,2600	77774 0	BRNCHCON	OCT	77774	
0663	2BLANK	BLANKS TWO CHAR.	PLACE DSP NUMBER OF LEFT CHAR	OF THE PAIR INTO						
0664	DSPCOUNT.	THIS NUMBER IS LEFT IN DSPCOUNT								
0665	REF	18	LAST	405	40,2601	3 0777 0	2BLANK	CA	DSPCOUNT	
0666	REF	1			40,2602	54 021 0	TS	SH		
0667	REF	1			40,2603	4 2614 1	CS	BLANKCON		
0668					40,2604	0 0004 0	INHINT			
0669	REF	2	LAST	405	40,2605	50 021 1	INDEX	SR		
0670	REF	23	LAST	221	40,2606	57 023 1	XCH	DSPTAB		
0671					40,2607	0 0006 1	EXTEND			
0672					40,2610	6 2612 0	BZHF	+2	IF OLD CONTENTS --, NOUT OK	
0673	REF	6	LAST	222	40,2611	25 016 1	INCF	NOUT	IF OLD CONTENTS +, +1 TO NOUT	
0674					40,2612	0 0003 1	RECINT		IF --, NOUT OK	
0675	REF	52	LAST	404	40,2613	0 0002 0	TC	Q		
0676					40,2614	04000 0	BLANKCON	OCT	4000	

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P0677 ENTER PASS 0 IS THE EXECUTE FUNCTION. HIGHER ORDER ENTERS ARE TO LOAD
 R0678 DATA. THE SIGN OF REQRET DETERMINES THE PASS, + FOR PASS 0, - FOR HIGHER
 R0679 PASSES.

R0680 MACHINE ADDR TO BE SPECIFIED (MCTBS) NOUNS DESIRE AN ADDR TO BE LOADED
 R0681 WHEN USED WITH LOAD VERBS, MONITOR VERBS, OR DISPLAY VERBS (EXCEPT
 R0682 VERR = FIXED MEMORY DISPLAY, WHICH REQUIRES AN FCADR).

0683				41,2000			BANK 41			
068301	REF	1		41,2000			SETLOC	PINBALL2		
068302				41,2000			BANK			
06835	REF	1					COUNT*	51/PIN		
0684	REF	1		41,2000	0 3544 1	NVSUBR	TC	NVSUBR	STANDARD LEAD INS. DONT MOVE.	
0685	REF	1		41,2001	0 2775 0	LOADLV1	TC	LOADLV		
A0686									END OF STANDARD LEAD INS.	
0687	REF	64	LAST	404	41,2002	3 4755 1	ENTER	CAF	ZERO	
0688	REF	8	LAST	404	41,2003	55'015 0		TS	CLPASS	
0689	REF	2	LAST	402	41,2004	3 4217 1		CAF	ENDINST	
0690	REF	2	LAST	402	41,2005	54 136 1		TS	ENTRET	
0691	REF	4	LAST	404	41,2006	11'013 0		CLS	REQRET	
0692	REF	1			41,2007	0 2035 0		TC	ENTPASS	IF +, PASS 0
0693	REF	2	LAST	406	41,2010	0 2035 0		TC	ENTPASS	IF +, PASS 0
0694					41,2011	0 2012 0		TC	+1	IF -, NOT PASS 0
0695	REF	1			41,2012	3 2033 0	ENTPASS1	CAF	MMADREF	
0696	REF	5	LAST	406	41,2013	6 1013 1		AD	REQRET	IF L/ 2 CHAR IN FOR MM CODE, ALARM
0697					41,2014	0 0006 1		EXTEND		AND RECYCLE(DECIDE AT MMCHANG+1).
0698	REF	1			41,2015	1 2027 1		BZF	ACCEPTWD	
0699	REF	9	LAST	403	41,2016	3 6245 1		CAF	THREE	IF DEC, ALARM IF L/ 5 CHAR IN FOR DATA,
0700	REF	10	LAST	405	41,2017	7 1000 1		MASK	DECORCH	BUT LEAVE REQRET - AND FLASH ON. SO
0701	REF	11	LAST	404	41,2020	10 000 0		CLS	4	OPERATOR CAN SUPPLY MISSING NUMERICAL
0702					41,2021	0 2023 1		TC	+2	CHARACTERS AND CONTINUE.
0703	REF	2	LAST	406	41,2022	0 2027 0		TC	ACCEPTWD	OCTAL. ANY NUMBER OF CHAR OK.
0704	REF	19	LAST	405	41,2023	10 777 1		CLS	DSPCOUNT	
0705	REF	1			41,2024	0 2351 1		TC	GOODPALM	LESS THAN 5 CHAR DEC(DSPCOUNT IS +)
0706	REF	2	LAST	406	41,2025	0 2351 1		TC	GOODPALM	LESS THAN 5 CHAR DEC(DSPCOUNT IS +)
0707					41,2026	0 2027 0		TC	+1	5 CHAR IN (DSPCOUNT IS -)
0708	REF	6	LAST	406	41,2027	4 1013 0	ACCEPTWD	CS	REQRET	5 CHAR IN (DSPCOUNT IS -)
0709	REF	7	LAST	406	41,2030	55'013 0		TS	REQRET	SET REQRET +.
0710	REF	2	LAST	274	41,2031	0 4433 1		TC	FLASHOFF	
0711	REF	8	LAST	406	41,2032	0 1013 1		TC	REQRET	
0712	REF	3	LAST	406	0136		ENTEXIT	=	ENTRET	
0713	REF	1			41,2033	03431 1	MMADREF	ADRES	MMCHANG +1	ASSUMES TC REQMM AT MMCHANG.

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0714				41,2034	00034 D	LOWVERB	DEC	28	LOWER VERB THAT AVOIDS NOUN TEST.	
0715	REF	65	LAST	406	41,2035	3 4755 1	ENTPASO	CAF	ZERI	NOUN VERB SUB ENTERS HERE
0716	REF	11	LAST	406	41,2036	55 000 1		TS	DECBRNCH	
0717	REF	3	LAST	402	41,2037	4 4360 1		CS	VD1	BLOCK FURTHER NUM CHAR. SO THAT STRAY
0718	REF	20	LAST	406	41,2040	54 777 1		TS	DSPCOUNT	CHAR DO NOT GET INTO VERB OR NOUN LTS.
0719	REF	9	LAST	404	41,2041	4 1001 0	TESTVR	CS	VERBREG	IF VERB IS G/E LOWVB, SKIP NOUN TEST.
0720	REF	1			41,2042	55 041 1		TS	VERBSAVE	SAVE VERB FOR POSSIBLE RECYCLE.
0721	REF	1			41,2043	6 2034 1		AD	LOWVERB	LOWVERB - VB
0722					41,2044	0 0006 1		EXTEND		
0723	REF	1			41,2045	6 2133 1		BZMF	VERBFAN	VERB G/E LOWVERB
0724					41,2046	0 0006 1	TESTNN	EXTEND		VERB L/ LOWVERB
0725	REF	1			41,2047	3 2114 1		DCA	LODNNLUC	SWITCH BANKS TO NOUN TABLE READING
0726	REF	3	LAST	305	41,2050	52 006 0		DXCH	Z	ROUTINE.
0727	REF	3	LAST	304	41,2051	50 140 1		INDEX	MIXBR	
0728					41,2052	0 2052 1		TC	+0	
0729					41,2053	0 2055 0		TC	+2	NORMAL
0730	REF	1			41,2054	0 2221 1		TC	MIXNOUN	MIXED
0731	REF	3	LAST	304	41,2055	10 146 0		CCS	NNADTEM	NORMAL
0732	REF	2	LAST	407	41,2056	0 2131 0		TC	VERBFAN -2	NORMAL IF +
0733	REF	3	LAST	406	41,2057	0 2351 1		TC	GOODSPALM	NOT IN USE IF +0
0734	REF	1			41,2060	0 2064 1		TC	REQADD	SPECIFY MACHINE CADR IF -
0735	REF	1			41,2061	25 017 0		INCR	NOUNCADR	AUGMENT MACHINE CADR IF -0
0736	REF	1			41,2062	0 4311 0		TC	SETHADD	ECADR FROM NOUNCADR. SETS EB. NOUNADD.
0737	REF	1			41,2063	0 2120 0		TC	INTMCTBS +2	
0738	REF	20	LAST	293	41,2064	3 4735 1	REQADD	CAF	BIT15	SET CLPASS FOR PASSO ONLY
0739	REF	9	LAST	406	41,2065	55 015 0		TS	CLPASS	
0740	REF	3	LAST	406	41,2066	4 4217 0		CS	ENDINST	TEST IF REACHED HERE FROM INTERNAL OR
0741	REF	1			41,2067	6 0136 0		AD	ENTEXIT	FROM EXTERNAL
0742					41,2070	0 0006 1		EXTEND		
0743					41,2071	1 2073 0		BZF	+2	EXTERNAL MACH CADR TO BE SPECIFIED
0744	REF	2	LAST	407	41,2072	0 2116 0		TC	INTMCTBS	
0745	REF	1			41,2073	0 2307 1		TC	REQDATZ	EXTERNAL MACH CADR TO BE SPECIFIED
0746	REF	12	LAST	407	41,2074	11 000 1		CCS	DECBRNCH	ALARM AND RECYCLE IF DECIMAL USED
0747	REF	1			41,2075	0 4145 0		TC	ALMCYCLE	FOR MCTBS.
0748	REF	4	LAST	407	41,2076	4 4360 1		CS	VD1	OCTAL USED OK
0749	REF	21	LAST	407	41,2077	54 777 1		TS	DSPCOUNT	BLOCK NUM CHAR IN
0750	REF	3	LAST	398	41,2100	11 042 1		CCS	GADRSTOR	
0751					41,2101	0 2104 0		TC	+3	EXTERNAL MCTBS DISPLAY WILL LEAVE FLASH
0752	REF	1			41,2102	0 2105 1		TC	USEADD	ON IF ENDIDLE NOT = +0.
0753					41,2103	0 2104 0		TC	+1	
0754	REF	1			41,2104	0 4427 1		TC	FLASHON	
0755	REF	1			41,2105	57 005 0	USEADD	XCH	ZREG	
0756	REF	1			41,2106	0 4303 0		TC	SETNADR	ECADR INTO NOUNCADR. SET EB. NOUNADD.
0757					41,2107	0 0006 1		EXTEND		
0758	REF	2	LAST	407	41,2110	3 2114 1		DCA	LODNNLUC	SWITCH BANKS TO NOUN TABLE READING
0759	REF	4	LAST	407	41,2111	52 006 0		DXCH	Z	ROUTINE.
0760	REF	3	LAST	407	41,2112	0 2133 1		TC	VERBFAN	
0761	REF	22	LAST	407	4777				EBANK = DSPCOUNT	

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0762	REF	1		41,2113	02103 1	LODNNLOC	2CADR	LODNNTAB		
0762	REF	1		41,2114	64101 0					
0763				41,2115	77772 0	NEG5	DCT	77772		
0764	REF	85	LAST	401	41,2116	3 0156 0	INTMCTBS	CA	MPAC +2	INTERNAL MACH CADR TO BE SPECIFIED.
0765	REF	2	LAST	407	41,2117	0 4303 0		TC	SETNCADR	ECADR INTO NOUNCADR. SET. FC. NOUNADD.
0766	REF	8	LAST	376	41,2120	4 4756 0		CS	FIVE	NVSUB CALL LEFT CADR IN MPAC+2 FOR MACH
0767	REF	10	LAST	407	41,2121	6 1001 1		AD	VERBAEG	CADR TO BE SPECIFIED.
0768					41,2122	0 0006 1		EXTEND		
0769	REF	4	LAST	407	41,2123	1 2133 0		BZF	VERBFAN	DONT DISPLAY CADR IF VB = 05.
0770	REF	2	LAST	403	41,2124	3 4321 0		CAF	R3D1	VB NOT = 05. DISPLAY CADR.
0771	REF	23	LAST	407	41,2125	54 777 1		TS	DSPDCUNT	
0772	REF	2	LAST	407	41,2126	3 1017 0		CA	NOUNCADR	
0773	REF	1			41,2127	0 3363 1		TC	DSPDCTWD	
0774	REF	5	LAST	408	41,2130	0 2133 1		TC	VERBFAN	
0775	REF	31	LAST	404	41,2131	6 4753 1		AD	ONE	
0776	REF	3	LAST	408	41,2132	0 4303 0		TC	SETNCADR	ECADR INTO NOUNCADR. SET. FC. NOUNADD.
0777	REF	1			41,2133	4 2145 1	VERBFAN	CS	LST2CON	
0778	REF	11	LAST	408	41,2134	6 1001 1		AD	VERBAEG	VERB-LST2CON
0779	REF	112	LAST	406	41,2135	10 000 0		CCS	A	
0780	REF	32	LAST	408	41,2136	6 4753 1		AD	ONE	VERB G/ LST2CON
0781					41,2137	0 2141 1		TC	+2	
0782	REF	1			41,2140	0 2146 0		TC	VBFAANDIR	VERB L/ LST2CON
0783	REF	86	LAST	408	41,2141	54 154 0		TS	MPAC	
0784	REF	4	LAST	232	41,2142	0 4457 0		TC	RELDSP	RELEASE DISPLAY SYST
0785	REF	18	LAST	399	41,2143	0 4635 0		TC	POSTJUMP	GO TO GOEXTVB WITH VB=40 IN MPAC.
0786	REF	1			41,2144	66000 1		CADR	GOEXTVB	
0788					41,2145	00050 1	LST2CON	DEC	40	FIRST LIST2 VERB (EXTENDED VERB)
0790	REF	12	LAST	408	41,2146	51 001 1	VBFAANDIR	INDEX	VERBAEG	
0791	REF	1			41,2147	3 2151 0		CAF	VERBTAB	
0792	REF	2	LAST	271	41,2150	0 4640 1		TC	BANKJUMP	
0793	REF	4	LAST	407	41,2151	62351 1	VERBTAB	CADR	GODSPALM	VB00 ILLEGAL
0794	REF	1			41,2152	62365 0		CADR	DSPA	VB01 DISPLAY OCT COMP 1 (R1)
0795	REF	1			41,2153	62373 1		CADR	DSPB	VB02 DISPLAY OCT COMP 2 (R1)
0796	REF	1			41,2154	62400 1		CADR	DSPC	VB03 DISPLAY OCT COMP 3 (R1)
0797	REF	1			41,2155	62360 0		CADR	DSPAB	VB04 DISPLAY OCT COMP 1,2 (R1,R2)
0798	REF	1			41,2156	62353 0		CADR	DSPBC	VB05 DISPLAY OCT COMP 1,2,3 (R1,R2,R3)
0799	REF	1			41,2157	62523 1		CADR	DECDSP	VB06 DECIMAL DISPLAY
0800	REF	1			41,2160	60771 0		CADR	D-PDPDEC	VB07 DP DECIMAL DISPLAY (R1,R2)
0801	REF	5	LAST	408	41,2161	62351 1		CADR	GODSPALM	VB08 SPARE
0802	REF	6	LAST	408	41,2162	62351 1		CADR	GODSPALM	VB09 SPARE
0803	REF	1			41,2163	61420 0		CADR	DSPALARM	VB10 SPARE
0804	REF	1			41,2164	63230 0		CADR	MONITOR	VB11 MONITOR OCT COMP 1 (R1)
0805	REF	2	LAST	408	41,2165	63230 0		CADR	MONITOR	VB12 MONITOR OCT COMP 2 (R1)
0806	REF	3	LAST	408	41,2166	63230 0		CADR	MONITOR	VB13 MONITOR OCT COMP 3 (R1)
0807	REF	4	LAST	408	41,2167	63230 0		CADR	MONITOR	VB14 MONITOR OCT COMP 1,2 (R1,R2)

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0808	REF	5	LAST	408	41,2170	63230 0	CADR	MONITOR	VB15	MONITOR OCT COMP 1,2,3 (R1,R2,R3)
0809	REF	6	LAST	409	41,2171	63230 0	CADR	MONITOR	VB16	MONITOR DECIMAL
0810	REF	7	LAST	409	41,2172	63230 0	CADR	MONITOR	VB17	MONITOR DP DEC (R1,R2)
0811	REF	7	LAST	408	41,2173	62351 1	CADR	GODSPALM	VB18	SPARE
0812	REF	8	LAST	409	41,2174	62351 1	CADR	GODSPALM	VB19	SPARE
0813	REF	9	LAST	409	41,2175	62351 1	CADR	GODSPALM	VB20	SPARE
0814	REF	1			41,2176	62732 0	CADR	ALOAD	VB21	LOAD COMP 1 (R1)
0815	REF	1			41,2177	62743 0	CADR	BLOAD	VB22	LOAD COMP 2 (R2)
0816	REF	1			41,2200	62760 1	CADR	CLDAD	VB23	LOAD COMP 3 (R3)
0817	REF	1			41,2201	62703 1	CADR	ABLOAD	VB24	LOAD COMP 1,2 (R1,R2)
0818	REF	1			41,2202	62616 1	CADR	ABCLDAD	VB25	LOAD COMP 1,2,3 (R1,R2,R3)
0819	REF	10	LAST	409	41,2203	62351 1	CADR	GODSPALM	VB26	SPARE
0820	REF	1			41,2204	63353 1	CADR	DSPFNEH	VB27	FIXED MEMORY DISPLAY
A0821										THE FOLLOWING VERBS MAKE NO NOUN TEST
0822	REF	11	LAST	409	41,2205	62351 1	CADR	GODSPALM	VB28	SPARE
0823	REF	12	LAST	409	41,2206	62351 1	CADR	GODSPALM	VB29	SPARE
0824	REF	1			41,2207	63466 0	REQEXLOC CADR	VBRQEXFC	VB30	REQUEST EXECUTIVE
0825	REF	1			41,2210	63512 1	CADR	VBRQWAIT	VB31	REQUEST WAITLIST
0826	REF	1			41,2211	61457 0	CADR	VBRESEQ	VB32	RESEQUENCE
0827	REF	1			41,2212	61442 1	CADR	VBRPDC	VB33	PROCEED WITHOUT DATA
0828	REF	1			41,2213	61450 1	CADR	VBTERR	VB34	TERMINATE CURRENT TEST OR LOAD REQ
0829	REF	1			41,2214	63613 0	CADR	VBTSTLTS	VB35	TEST LIGHTS
0830	REF	1			41,2215	12447 0	CADR	SLAP1	VB36	FRESH START
0831	REF	2	LAST	406	41,2216	63430 0	CADR	HMCHANG	VB37	CHANGE MAJOR MODE
0832	REF	13	LAST	409	41,2217	62351 1	CADR	GODSPALM	VB38	SPARE
0833	REF	14	LAST	409	41,2220	62351 1	CADR	GODSPALM	VB39	SPARE

R0834 THE LIST2 VERBFAN IS LOCATED IN THE EXTENDED VERB BANK.

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PO835 NNADTAB CONTAINS A RELATIVE ADDRESS, IOADDREL (IN LOW 10 BITS), REFERRING
RO836 TO WHERE 3 CONSECUTIVE ADDRESSES ARE STORED (IN IOADDTAB).
RO837 MIXNOUN GETS DATA AND STORES IN MIXTEMP.+1.+2. IT SETS NOUNADD FOR
RO838 MIXTEMP.

0839	REF	4	LAST	407	41,2221	10 146 0	MIXNOUN	CCS	NNADTEM	
0840					41,2222	0 2226 0		TC	+4	+ IN USE
0841	REF	15	LAST	409	41,2223	0 2351 1		TC	GOODSPALM	+0 NOT IN USE
0842					41,2224	0 2226 0		TC	+2	- IN USE
0843					41,2225	0 2226 0		TC	+1	-0 IN USE
0844	REF	10	LAST	279	41,2226	4 6242 1		CS	SIX	
0845	REF	13	LAST	408	41,2227	6 1001 1		AD	VERBREG	
0846					41,2230	0 0006 1		EXTEND		
0847					41,2231	6 2233 1		BZMF	+2	VERB L/E 6
0848	REF	6	LAST	408	41,2232	0 2133 1		TC	VERBFAN	AVOID MIXNOUN SWAP IF VB NOT = DISPLAY
0849	REF	19	LAST	405	41,2233	3 4752 0		CAF	TWO	
0850	REF	1			41,2234	54 117 1	MIXNN1	TS	DECOUNT	
0851	REF	1			41,2235	6 2260 1		AD	MIXAD	
0852	REF	1			41,2236	54 145 0		TS	NOUNADD	SET NOUNADD TO MIXTEMP + K
0853	REF	2	LAST	410	41,2237	50 117 0		INDEX	DECOUNT	GET IOADDTAB ENTRY FOR COMPONENT 7
0854	REF	2	LAST	304	41,2240	3 0150 0		CA	IOADITEM	OF NOUN.
0855	REF	1			41,2241	54 122 1		TS	NOUNTEM	
A0856										TEST FOR DP (FOR OCT DISPLAY). IF SD, GET
A0857										MINOR PART ONLY.
0858	REF	1			41,2242	0 3034 0		TC	SFRUTMIX	GET SF ROUT NUMBER IN A
0859	REF	1			41,2243	0 2261 0		TC	DPTEST	
0860	REF	1			41,2244	0 2246 0		TC	MIXNN2	NO DP
0861	REF	2	LAST	410	41,2245	24 122 0		INCR	NOUNTEM	DP GET MINOR PART
0862	REF	3	LAST	410	41,2246	3 0122 0	MIXNN2	LA	NOUNTEM	
0863	REF	3	LAST	157	41,2247	7 4356 1		MASK	LOW11	ESUBK (NO DP) OR (ESUBK)+1 FLR DP
0864	REF	1			41,2250	0 4313 1		TC	SETEBANK	SET EBANK, LEAVE EADRES IN A.
0865	REF	113	LAST	408	41,2251	50 000 1		INDEX	A	PICK UP C(ESUBK) NOT DP
0866					41,2252	3 0000 1		CA	0	OR C(ESUBK)+1 FOR DP MINOR PART
0867	REF	2	LAST	410	41,2253	50 145 1		INDEX	NOUNADD	
0868					41,2254	56 000 1		XCH	0	STORE IN MIXTEM + K
0869	REF	3	LAST	410	41,2255	10 117 1		CCS	DECOUNT	
0870	REF	1			41,2256	0 2234 0		TC	MIXNN1	
0871	REF	7	LAST	410	41,2257	0 2133 1		TC	VERBFAN	
0872	REF	3	LAST	404	41,2260	0 0125 1	MIXAD	TC	MIXTEMP	
RO873	DPTEST									ENTER WITH SF ROUT NUMBER IN A.
RO874										RETURNS TO L+1 IF NO DP.
RO875										RETURNS TO L+2 IF DP.
0876	REF	114	LAST	410	41,2261	50 000 1	DPTEST	INDEX	A	
0877					41,2262	1 2263 0		TCF	+1	
0878	REF	53	LAST	405	41,2263	0 0002 0		TC	0	OCTAL ONLY NO DP
0879	REF	54	LAST	410	41,2264	0 0002 0		TC	0	FRACT NO DP

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0880	REF	55	LAST	410	41,2265	0 0002 0		TC	Q	DEG NO DP
0881	REF	56	LAST	411	41,2266	0 0002 0		TC	Q	ARITH NO DP
0882	REF	1			41,2267	1 2301 0		TCF	DPTEST1	DP1OUT
0883	REF	2	LAST	411	41,2270	1 2301 0		TCF	DPTEST1	DP2OUT
0884	REF	57	LAST	411	41,2271	0 0002 0		TC	Q	LKPOSOUT NO DP (DATA IN CHANNEL 33)
0885	REF	3	LAST	411	41,2272	1 2301 0		TCF	DPTEST1	DP3OUT
0886	REF	58	LAST	411	41,2273	0 0002 0		TC	Q	HMS NO DP
0887	REF	59	LAST	411	41,2274	0 0002 0		TC	Q	M/S NO DP
0888	REF	4	LAST	411	41,2275	1 2301 0		TCF	DPTEST1	DP4OUT
08881	REF	60	LAST	411	41,2276	0 0002 0		TC	Q	ARITH1 NO DP
08882	REF	61	LAST	411	41,2277	0 0002 0		TC	Q	2INTOUT NO DP TO GET HI PART IN #PAC
08883	REF	62	LAST	411	41,2300	0 0002 0		TC	Q	360-CDU NO DP
0889	REF	63	LAST	411	41,2301	50 002 0	DPTEST1	INDEX	Q	
0890					41,2302	0 0001 0		TC	1	RETURN TO L+2
0891	REF	3	LAST	405	41,2303	3 4317 0	REQDATX	CAF	R1D1	
0892	REF	1			41,2304	1 2310 0		TCF	REQCOM	
0893	REF	2	LAST	403	41,2305	3 4320 1	REQDATY	CAF	P2D1	
0894	REF	2	LAST	411	41,2306	1 2310 0		TCF	REQCOM	
0895	REF	3	LAST	408	41,2307	3 4321 0	REQDATZ	CAF	P3D1	
0896	REF	24	LAST	408	41,2310	54 777 1	REQCOM	TS	DSPLCOUNT	
0897	REF	64	LAST	411	41,2311	4 0002 1		CS	Q	
0898	REF	9	LAST	406	41,2312	55 013 0		TS	REQRET	
0899	REF	76	LAST	404	41,2313	0 4616 1		TC	BANKCALL	
0900	REF	2	LAST	404	41,2314	60536 1		CADR	SBLANK	
0901	REF	2	LAST	407	41,2315	0 4427 1		TC	FLASHON	
0902	REF	2	LAST	407	41,2316	0 0136 0	ENDREQDAT	TC	ENTEXIT	
0903	REF	8	LAST	402	41,2317	55 002 0		TS	NOUNREG	
0904	REF	65	LAST	411	41,2320	56 002 0	UPDATNN	XCH	Q	
0905	REF	1			41,2321	54 117 1		TS	UPDATRET	
0906					41,2322	0 0006 1		EXTEN		
0907	REF	3	LAST	407	41,2323	3 2114 1		DCA	LODNNLOC	SWITCH BANKS TO NOUN TABLE READING
0908	REF	5	LAST	407	41,2324	52 006 0		DXCH	Z	ROUTINE.
0909	REF	5	LAST	410	41,2325	10 146 0		CCS	NNADTEN	
0910	REF	33	LAST	408	41,2326	6 4753 1		AD	ONE	NORMAL
0911	REF	1			41,2327	1 2332 0		TCF	PUTADD	
0912	REF	2	LAST	411	41,2330	1 2333 1		TCF	PUTADD +1	ACTBS DONT CHANGE NOUNADD
0913	REF	3	LAST	411	41,2331	1 2333 1		TCF	PUTADD +1	ACTBI DONT CHANGE NOUNADD
0914	REF	4	LAST	408	41,2332	0 4303 0	PUTADD	TC	SETRCADR	ECADR INTO NOUNCADR. SETS FB. NOUNADD.
0915	REF	3	LAST	402	41,2333	3 4361 1		CAF	ND1	
0916	REF	25	LAST	411	41,2334	54 777 1		TS	DSPLCOUNT	
0917	REF	9	LAST	411	41,2335	3 1002 1		CA	NOUNREG	
0918	REF	1			41,2336	1 2345 0		TCF	UPDAT1	
0919	REF	14	LAST	410	41,2337	55 001 0		TS	VERBREG	
0920	REF	66	LAST	411	41,2340	56 002 0	UPDATVB	XCH	Q	
0921	REF	2	LAST	411	41,2341	54 117 1		TS	UPDATRET	
0922	REF	5	LAST	407	41,2342	3 4360 0		CAF	VD1	

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0923	REF	26	LAST	411	41,2343	54	777	1	TS	DSPCOUNT	
0924	REF	15	LAST	411	41,2344	3	1001	1	CA	VERBREG	
0925	REF	19	LAST	408	41,2345	0	4635	0	TC	POSTJUMP	CANT USE SWCALL TO GO TO DSPDECVN, SINCE
0926	REF	1			41,2346		61317	0	CADR	GOVNUPT	UPDATVB CAN ITSELF BE CALLED BY SWCALL.
0927	REF	3	LAST	411	41,2347	0	0117	0	TC	UPDATRET	
0928	REF	2	LAST	407	41,2350	0	4145	0	GOALMCYC TC	ALMCYCLE	NEEDED BECAUSE BANKJUMP CANT HANDLE F/P.
0929	REF	20	LAST	412	41,2351	0	4635	0	GODSPALM TC	POSTJUMP	
0930	REF	2	LAST	408	41,2352		61420	0	CADR	DSPALARM	

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R0931 NOUN TABLES
R0932 NOUN CODE L/40, NORMAL NOUN CASE. NOUN CODE G/E 40, MIXED NOUN CASE.
R0933 FOR NORMAL CASE, NNADTAB CONTAINS ONE ECADR FOR EACH NOUN.
R0934 +0 INDICATES NOUN NOT USED. - ENTRY INDICATES MACHINE CADR (E OR F) TO
R0935 BE SPECIFIED. -1 INDICATES CHANNEL TO BE SPECIFIED. -0 INDICATES AUGMENT
R0936 OF LAST MACHINE CADR SUPPLIED.

R0937 FOR MIXED CASE, NNADTAB CONTAINS ONE INDIRECT ADDRESS (IDADDREL) IN LOW
R0938 10 BITS, AND THE COMPONENT CODE NUMBER IN THE HIGH 5 BITS.

R0939 NNTYPTAB IS A PACKED TABLE OF THE FORM MMMMMNNNNNPPPPP.

R0940 FOR THE NORMAL CASE, M-S ARE THE COMPONENT CODE NUMBER.
R0941 N-S ARE THE SF ROUTINE CODE NUMBER.
R0942 P-S ARE THE SF CONSTANT CODE NUMBER.

R0943 MIXED CASE, M-S ARE THE SF CONSTANT 3 CODE NUMBER 3 COMPONENT CASE
R0944 N-S ARE THE SF CONSTANT 2 CODE NUMBER
R0945 P-S ARE THE SF CONSTANT 1 CODE NUMBER
R0946 N-S ARE THE SF CONSTANT 2 CODE NUMBER 2 COMPONENT CASE
R0947 P-S ARE THE SF CONSTANT 1 CODE NUMBER
R0948 P-S ARE THE SF CONSTANT 1 CODE NUMBER 1 COMPONENT CASE

R0949 THERE IS ALSO AN INDIRECT ADDRESS TABLE (IDADDTAB) FOR MIXED CASE ONLY.
R0950 EACH ENTRY CONTAINS ONE ECADR. IDADDREL IS THE RELATIVE ADDRESS OF
R0951 THE FIRST OF THESE ENTRIES.
R0952 THERE IS ONE ENTRY IN THIS TABLE FOR EACH COMPONENT OF A MIXED NOUN
R0953 THEY ARE LISTED IN ORDER OF ASCENDING K.

R0954 THERE IS ALSO A SCALE FACTOR ROUTINE NUMBER TABLE (RUTMTAB) FOR MIXED
R0955 CASE ONLY. THERE IS ONE ENTRY PER MIXED NOUN. THE FORM IS.
R0956 QQQQRRRRKRSSSS
R0957 Q-S ARE THE SF ROUTINE 3 CODE NUMBER 3 COMPONENT CASE
R0958 R-S ARE THE SF ROUTINE 2 CODE NUMBER
R0959 S-S ARE THE SF ROUTINE 1 CODE NUMBER
R0960 R-S ARE THE SF ROUTINE 2 CODE NUMBER 2 COMPONENT CASE
R0961 S-S ARE THE SF ROUTINE 1 CODE NUMBER

R0962 IN OCTAL DISPLAY AND LOAD (OCT OR DEC) VERBS. EXCLUDE USE OF VERBS WHOSE
R0963 COMPONENT NUMBER IS GREATER THAN THE NUMBER OF COMPONENTS IN NOUN.
R0964 (ALL MACHINE ADDRESS TO BE SPECIFIED NOUNS ARE 3 COMPONENT.)

R0967 IN MULTI-COMPONENT LOAD VERBS. NO MIXING OF OCTAL AND DECIMAL DATA
R0968 COMPONENT WORDS IS ALLOWED. ALARM IF VIOLATION.

R0969 IN DECIMAL LOADS OF DATA, 5 NUMERICAL CHARACTERS MUST BE KEYED IN
R0970 BEFORE EACH ENTER. IF NOT, ALARM.

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P0971	DISPLAY VERBS									
0972	REF	20	LAST	410	41,2353	4 4752 1	DSPABC	CS	TWO	
0973	REF	1			41,2354	0 2424 1		TC	COMPTST	
0974	REF	3	LAST	410	41,2355	50 145 1		INDEX	NOUNADD	
0975					41,2356	4 0002 1		CS	2	
0976	REF	41	LAST	336	41,2357	56 132 1		XCH	BUF +2	
0977	REF	34	LAST	411	41,2360	4 4753 0	DSPAB	CS	ONE	
0978	REF	2	LAST	414	41,2361	0 2424 1		TC	COMPTST	
0979	REF	4	LAST	414	41,2362	50 145 1		INDEX	NOUNADD	
0980					41,2363	4 0001 1		CS	1	
0981	REF	42	LAST	414	41,2364	56 131 1		XCH	BUF +1	
0982	REF	1			41,2365	0 2443 0	DSPA	TC	DECTEST	
0983	REF	1			41,2366	0 2466 1		TC	TSTFORDP	
0984	REF	5	LAST	414	41,2367	50 145 1		INDEX	NOUNADD	
0985					41,2370	4 0000 0		CS	0	
0986	REF	43	LAST	414	41,2371	56 130 0	DSPCOM1	XCH	BUF	
0987	REF	1			41,2372	0 2405 1		TC	DSPCOM2	
0988	REF	35	LAST	414	41,2373	4 4753 0	DSPB	CS	ONE	
0989	REF	1			41,2374	0 2437 0		TC	DCOMPTST	
0990	REF	6	LAST	414	41,2375	50 145 1		INDEX	NOUNADD	
0991					41,2376	4 0001 1		CS	1	
0992	REF	1			41,2377	0 2371 0		TC	DSPCOM1	
0993	REF	21	LAST	414	41,2400	4 4752 1	DSPC	CS	TWO	
0994	REF	2	LAST	414	41,2401	0 2437 0		TC	DCOMPTST	
0995	REF	7	LAST	414	41,2402	50 145 1		INDEX	NOUNADD	
0996					41,2403	4 0002 1		CS	2	
0997	REF	2	LAST	414	41,2404	0 2371 0		TC	DSPCOM1	
0998	REF	22	LAST	414	41,2405	4 4752 1	DSPCOM2	CS	TWO	A B C AB ARC
0999	REF	16	LAST	412	41,2406	6 1001 1		AD	VERREG	-1 -0 +1 +2 +3 IN A
1000	REF	115	LAST	410	41,2407	10 000 0		CCS	A	+0 +0 +0 +1 +2 IN A AFTER CCS
1001	REF	1			41,2410	0 2413 0		TC	DSPCOM3	
1002	REF	3	LAST	411	41,2411	0 0136 0		TC	ENTEXIT	
1003					41,2412	0 2413 0		TC	+1	
1004	REF	1			41,2413	54 122 1	DSPCOM3	TS	DISTEM	+0,+1,+2 INTO DISTEM
1005	REF	116	LAST	414	41,2414	50 000 1		INDEX	A	
1006	REF	4	LAST	411	41,2415	3 4317 0		CAF	R101	
1007	REF	27	LAST	412	41,2416	54 777 1		TS	DSPCOUNT	
1008	REF	2	LAST	414	41,2417	50 122 0		INDEX	DISTEM	
1009	REF	44	LAST	414	41,2420	4 0130 1		CS	BUF	
1010	REF	2	LAST	408	41,2421	0 3363 1		TC	DSPCTWO	
1011	REF	3	LAST	414	41,2422	56 122 0		XCH	DISTEM	
1012	REF	2	LAST	414	41,2423	0 2407 0		TC	DSPCOM2 +2	
R1013	COMPTST ALARMS IF COMPONENT NUMBER OF VERB(LOAD OR OCT DISPLAY) IS									
R1014	GREATER THAN THE HIGHEST COMPONENT NUMBER OF NOUN.									
1016	REF	4	LAST	305	41,2424	54 123 0	COMPTST	TS	SFTEMP1	- VERB COMP
1017	REF	67	LAST	411	41,2425	22 002 0		LXCH	0	
1022	REF	1			41,2426	0 2515 1	COMPTST1	TC	GETCOMP	
1023	REF	1			41,2427	0 4331 1		TC	LEFT5	
1024	REF	10	LAST	406	41,2430	7 6245 0		MASK	THREE	NOUN COMP

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1025	REF	5	LAST	414	41.2431	6 0123 1	AD	SFTEMP1	NOUN COMP - VERB COMP
1026	REF	117	LAST	414	41.2432	10 000 0	CCS	A	
1027	REF	46	LAST	405	41.2433	0 0001 0	TC	L	NOUN COMP G/ VERB COMP
1028	REF	4	LAST	404	41.2434	0 5705 0	TC	CUSHOLE	
1029	REF	16	LAST	410	41.2435	0 2351 1	TC	GODSPALM	NOUN COMP L/ VERB COMP
1030	REF	47	LAST	415	41.2436	0 0001 0	NDCMPTST TC	L	NOUN COMP = VERB COMP

R1031 DCOMPTST ALARMS IF DECIMAL ONLY BIT (BIT4 OF COMP CODE NUMBER) = 1.
 R1032 IF NOT, IT PERFORMS REGULAR COMPTST.

1033	REF	6	LAST	415	41.2437	54 123 0	DCOMPTST TS	SFTEMP1	- VERB COMP
1034	REF	68	LAST	414	41.2440	22 002 0	LXCH	Q	
1035	REF	2	LAST	414	41.2441	0 2443 0	TC	DECTEST	
1036	REF	1			41.2442	0 2426 0	TC	COMPTST1	

1037					41.2443	0 0006 1	DECTEST	EXTEND	ALARMS IF DEC ONLY BIT = 1 (BIT4 OF COMP CODE NUMBER). RETURNS IF NOT.
1038	REF	87	LAST	408	41.2444	22 156 0	QXCH	MPAC +2	
1039	REF	2	LAST	414	41.2445	0 2515 1	TC	GETCOMP	
1040	REF	36	LAST	374	41.2446	7 4736 0	MASK	BIF14	
1041	REF	118	LAST	415	41.2447	10 000 0	CCS	A	
1042	REF	17	LAST	415	41.2450	0 2351 1	TC	GODSPALM	
1043	REF	88	LAST	415	41.2451	0 0156 0	TC	MPAC +2	

1044	REF	69	LAST	415	41.2452	22 002 0	DCTSTCYC	LXCH	Q	ALARMS AND RECYCLES IF DEC ONLY BIT = 1 (BIT4 OF COMP CODE NUMBER). RETURNS IF NOT. USED BY LOAD VERBS.
1045	REF	3	LAST	415	41.2453	0 2515 1	TC	GETCOMP		
1046	REF	37	LAST	415	41.2454	7 4736 0	MASK	BIF14		
1047	REF	119	LAST	415	41.2455	10 000 0	CCS	A		
1048	REF	3	LAST	412	41.2456	0 4145 0	TC	ALMCYCLE		
1049	REF	48	LAST	415	41.2457	0 0001 0	TC	L		

R1050 NOUNTEST ALARMS IF NO-LOAD BIT (BIT5 OF COMP CODE NUMBER) = 1.
 R1051 IF NOT, IT RETURNS.

1052	REF	70	LAST	415	41.2460	22 002 0	NOUNTEST	LXCH	Q
1053	REF	4	LAST	415	41.2461	0 2515 1	TC	GETCOMP	
1054	REF	120	LAST	415	41.2462	10 000 0	CCS	A	
1055	REF	49	LAST	415	41.2463	0 0001 0	TC	L	
1056	REF	50	LAST	415	41.2464	0 0001 0	TC	L	
1057	REF	18	LAST	415	41.2465	0 2351 1	TC	GODSPALM	

1058	REF	71	LAST	415	41.2466	22 002 0	TSTFOROP	LXCH	Q	TEST FOR OP. IF SO, GET MINOR PART ONLY.
1059	REF	6	LAST	411	41.2467	3 0146 1	CA	NNADTEM		
1060	REF	26	LAST	414	41.2470	6 4753 1	AD	ONE		IF NNADTEM = -1, CHANNEL TO BE SPECIFIED
1061					41.2471	0 0006 1	EXTEND			
1062	REF	1			41.2472	1 2504 0	BZF	CHANDSP		
1063	REF	4	LAST	407	41.2473	50 140 1	INDEX	MIXBR		
1064					41.2474	0 2474 1	TC	+0		
1065					41.2475	0 2477 1	TC	+2		NORMAL

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1066	REF	51	LAST	415	41,2476	0 0001 0	TC	L	MIXED CASE ALREADY HANDLED IN MIXNOUN
1067	REF	1			41,2477	0 3026 0	TC	SFRUTNDR	
1068	REF	2	LAST	410	41,2500	0 2261 0	TC	DPTEST	
1069	REF	52	LAST	416	41,2501	0 0001 0	TC	L	NO DP
1070	REF	8	LAST	414	41,2502	24 145 1	INCR	NOUNADD	DP E+1 INTO NOUNADD FOR MINOR PART.
1071	REF	53	LAST	416	41,2503	0 0001 0	TC	L	
1072	REF	3	LAST	408	41,2504	3 1017 0	CHANDSP	CA	NOUNCADR
1073	REF	6	LAST	269	41,2505	7 5004 1		MASK	LOW9
10731					41,2506	0 0006 1		EXTEND	
10732	REF	121	LAST	415	41,2507	5 0000 1		INDEX	A
1074					41,2510	00 000 1		READ	0
1075	REF	122	LAST	416	41,2511	4 0000 0		CS	A
1076	REF	3	LAST	414	41,2512	1 2371 1		TCF	DSPCOM1
1077	REF	2	LAST	304	41,2513	00147 0	COMPICK	ADRES	NNTYPTM
1078	REF	7	LAST	415	41,2514	00146 1		ADRES	NNADTEM
1079	REF	5	LAST	415	41,2515	50 140 1	GETCOMP	INDEX	MIXBR
1080	REF	1			41,2516	3 2512 0		CAF	COMPICK -1
1081	REF	123	LAST	416	41,2517	50 000 1		INDEX	A
1082					41,2520	3 0000 1		CA	0
1083	REF	4	LAST	232	41,2521	7 4350 1		MASK	H15
1084	REF	72	LAST	415	41,2522	0 0002 0		TC	0
1085	REF	5	LAST	415	41,2523	0 2515 1	DECDSP	TC	GETCOMP
1086	REF	2	LAST	414	41,2524	0 4331 1		TC	LEFT5
1087	REF	11	LAST	414	41,2525	7 6245 0		MASK	THREE
1088	REF	4	LAST	410	41,2526	54 117 1		TS	DECCUNT
1089	REF	1			41,2527	54 122 1	DSPDCGET	TS	DECTEM
1090	REF	9	LAST	416	41,2530	6 0145 1		AD	NOUNADD
1091	REF	124	LAST	416	41,2531	50 000 1		INDEX	A
1092					41,2532	4 0000 0		CS	0
1093	REF	2	LAST	416	41,2533	50 122 0		INDEX	DECTEM
1094	REF	2	LAST	305	41,2534	57 003 0		XCH	XREG
1095	REF	3	LAST	416	41,2535	10 122 1		CCS	DECTEM
1096	REF	1			41,2536	0 2527 0		TC	DSPDCGET
1097	REF	66	LAST	407	41,2537	3 4755 1	DSPDCPUT	CAF	ZERO
1098	REF	89	LAST	415	41,2540	54 155 1		TS	MPAC +1
1099	REF	90	LAST	416	41,2541	54 156 1		TS	MPAC +2
1100	REF	5	LAST	416	41,2542	50 117 0		INDEX	DECCUNT
1101	REF	5	LAST	414	41,2543	3 4317 0		CAF	H101
1102	REF	28	LAST	414	41,2544	54 777 1		TS	DSPDCUNT
1103	REF	6	LAST	416	41,2545	50 117 0		INDEX	DECCUNT
1104	REF	3	LAST	416	41,2546	4 1003 1		CS	XREG
1105	REF	91	LAST	416	41,2547	54 154 0		TS	MPAC
1106	REF	1			41,2550	0 3047 1		TC	SFCONUM

2X(SF CON NUMB) IN A

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1107	REF	7	LAST	415	41,2551	54 123 0	TS	SFTEMP1	
1108					41,2552	0 0006 1	EXTEND		SWITCH BANKS TO SF CONSTANT TABLE
1109	REF	1			41,2553	3 2565 0	DCA	GTSFOUT1	FEADING ROUTINE.
1110	REF	6	LAST	411	41,2554	52 006 0	DXCH	Z	LOADS SFTEMP1, SFTEMP2.
1111	REF	6	LAST	416	41,2555	50 140 1	INDEX	MIXER	
1112					41,2556	0 2556 0	TC	+0	
1113	REF	1			41,2557	0 2562 1	TC	DSPSFNDP	
1114	REF	2	LAST	410	41,2560	0 3034 0	TC	SFRUTHIX	
1115	REF	1			41,2561	0 2575 1	TC	DECDSP3	
1116	REF	2	LAST	416	41,2562	0 3026 0	DSPSFNDP TC	SFRUTNDP	
1117	REF	2	LAST	417	41,2563	0 2575 1	TC	DECDSP3	
1118	REF	29	LAST	416	0777		EBANK=	DSPCOUNT	
1119	REF	1			41,2564	02141 1	GTSFOUTL 2CADR	GTSFOUT	
1119	REF	1			41,2565	64101 0			
1120	REF	77	LAST	411	41,2566	0 4616 1	DSPDCEND TC	BANKCALL	ALL SFOUT ROUTINES END HERE
1121	REF	1			41,2567	61226 0	CADR	DSPDECHD	
1122	REF	7	LAST	416	41,2570	10 117 1	CCS	DECCOUNT	
1123					41,2571	0 2573 1	TC	+2	
1124	REF	4	LAST	414	41,2572	0 0136 0	TC	ENTEXIT	
1125	REF	8	LAST	417	41,2573	54 117 1	TS	DECCOUNT	
1126	REF	1			41,2574	0 2537 1	TC	DSPDCPUT	MORE TO DISPLAY
1127	REF	125	LAST	416	41,2575	50 000 1	DECDSP3 INDEX	A	
1128	REF	1			41,2576	3 2600 0	CAF	SFOUTABR	
1129	REF	3	LAST	408	41,2577	0 4640 1	TC	BANKJUMP	
1130	REF	1			41,2600	61416 0	SFOUTABR CADR	PREDSPAL	ALARM IF DEC DISP WITH DCTAL ONLY HOUN
1131	REF	1			41,2601	62566 0	CADR	DSPDCEND	
1132	REF	1			41,2602	60615 0	CADR	DEGOUTSF	
1133	REF	1			41,2603	60677 1	CADR	ARTEUTSF	
1134	REF	1			41,2604	60710 1	CADR	DP1OUTSF	
1135	REF	1			41,2605	60715 1	CADR	DP2OUTSF	
1136	REF	1			41,2606	60635 1	CADR	LRPOSOUT	
1137	REF	1			41,2607	60717 0	CADR	DP3OUTSF	
1138	REF	1			41,2610	65230 0	CADR	HMSOUT	
1139	REF	1			41,2611	65303 1	CADR	H/SCUT	
1140	REF	2	LAST	417	41,2612	60715 1	CADR	DP2OUTSF	
11401	REF	1			41,2613	60704 1	CADR	AROUT15F	
11402	REF	1			41,2614	60732 1	CADR	2INTOUT	
11403	REF	1			41,2615	60623 0	CADR	360-CDUG	
1141					41,2616		ENDRTOUT	EQUALS	

R1142 THE FOLLOWING IS ATYPICAL SF ROUTINE . IT USES MPAC. LEAVES RESU
 R1143 LTS IN MPAC. MPAC+1. ENDS WITH TC DSPDCEND

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1144	REF	2	LAST	405	40.2615		SETLOC	BLANKCON +1	
11445	REF	2	LAST	398 TO 406:	334 334*		COUNT*	33/PIN	
R1145									
R1146									
1147	REF	67	LAST	416	40.2615	3 4755 1	DEGOUTSF	CAF	ZERO
1148	REF	92	LAST	416	40.2616	54 156 1	TS	MPAC	+2
1149	REF	1			40.2617	0 2652 1	TC	FIXRANGE	
1150					40.2620	0 2622 0	TC	+2	
1151	REF	1			40.2621	0 2645 1	TC	SETAUG	
11511	REF	1			40.2622	0 2663 0	TC	DEGCON	
R1152									
R11521									
11522	REF	1			40.2623	0 2625 1	360-CDUG	TC	360-CDU
11523	REF	2	LAST	417	40.2624	0 2615 1	TC		DEGOUTSF
11524	REF	93	LAST	418	40.2625	3 0154 1	360-CDU	CA	MPAC
11525	REF	6	LAST	381	40.2626	7 4733 0		MASK	POS MAX
11526					40.2627	0 0006 1		EXTEND	
11527	REF	1			40.2630	1 2634 0		BZF	360-CDUE
11528	REF	94	LAST	418	40.2631	4 0154 0		CS	MPAC
11529	REF	37	LAST	415	40.2632	6 4753 1		AD	GNF
115291	REF	95	LAST	418	40.2633	54 154 0		TS	MPAC
115292	REF	73	LAST	416	40.2634	0 0002 0	360-CDUE	TC	C
R1153									
R1154									
1155					40.2635	0 0006 1	LRPOSOUT	EXTEND	
1156	REF	6	LAST	277	40.2636	00 033 1		READ	CHAN33
1157					40.2637	0 0006 1		EXTEND	
1158	REF	20	LAST	375	40.2640	7 4742 0		MP	BIT10
1159					40.2641	4 0000 0		COM	
1160	REF	12	LAST	416	40.2642	7 6245 0		MASK	THREE
1161	REF	96	LAST	418	40.2643	54 154 0		TS	MPAC
1162	REF	2	LAST	417	40.2644	0 2677 0		TC	ARTLOUSE
1174					40.2645	0 0006 1	SETAUG	EXTEND	
1175	REF	97	LAST	418	40.2646	5 0156 0		INDEX	MPAC
1176	REF	1			40.2647	3 2674 0		DCA	DEGTAB
1177	REF	8	LAST	417	40.2650	52 124 1		DXCH	SFTENP1
1178	REF	74	LAST	418	40.2651	0 0002 0		TC	Q
1179	REF	98	LAST	418	40.2652	10 154 0	FIXRANGE	CCS	MPAC
1180	REF	75	LAST	418	40.2653	0 0002 0		TC	Q
1181	REF	76	LAST	418	40.2654	0 0002 0		TC	Q
1182					40.2655	1 2656 1		TCF	+1

DEGOUTSF SCALES BY .18 THE LOW 14 BITS OF ANGLE . ADDING .18 FOR NUMBERS IN THE NEGATIVE (AGC) RANGE.

360-CDU COMPUTES 360 - CDU ANGLE IN MPAC, STORES RESULT IN MPAC AND GOES TO DEGOUTSF.

360-CDU TC 360-CDU

IF ANGLE IS 0 OR 180 DEGREES, DO NOTHING

COMPUTE 360 DEGREES MINUS ANGLE

LRPOSOUT DISPLAYS +0,1,2,OR 3 (WHOLE) FOR CHANNEL 33,BITS 7-6 = 11,10, 01.00 RESPECTIVELY.

HITS 7-6 TO BITS 2-1

DISPLAY AS WHOLE

LOADS SFTENP1 AND SFTENP2 WITH THE DP AUGMENTER CONSTANT

IF MPAC IS + RETURN TO L+1
IF MPAC IS - RETURN TO L+2 AFTER MASKING OUT THE SIGN BIT

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1183	REF 21	LAST 407	40,2656	4 4735 0	CS	BIT15	
1184	REF 99	LAST 418	40,2657	7 0154 0	MASK	MPAC	
1185	REF 100	LAST 419	40,2660	54 154 0	TS	MPAC	
1186	REF 77	LAST 418	40,2661	50 002 0	INDEX	0	
1187			40,2662	0 0001 0	TC	1	
1188			40,2663	0 0006 1	DEGCOF	EXTEND	LOADS MULTIPLIER, DOES SHORTMP, AND
1189	REF 101	LAST 419	40,2664	5 0156 0	INDEX	MPAC +2	ADDS AUGMENTER.
1190	REF 2	LAST 418	40,2665	3 2674 0	DCA	DEGTAB	
1191	REF 102	LAST 419	40,2666	52 155 1	DXCH	MPAC	ADJUSTED ANGLE IN A
1192	REF 2	LAST 400	40,2667	0 7307 1	TC	SHORTMP	
1193	REF 9	LAST 418	40,2670	52 124 1	DXCH	SFTEMP1	
1194	REF 103	LAST 419	40,2671	20 155 1	DAS	MPAC	
1195	REF 1		40,2672	0 2702 0	TC	SCOUTEND	
1196			40,2673	05605 1	DEGTAB	DCT	05605 HI PART OF .18
1197			40,2674	03656 1		DCT	03656 LOW PART OF .18
1198			40,2675	16314 0		DCT	16314 HI PART OF .45
1199			40,2676	31463 1		DCT	31463 LO PART OF .45
1201	REF 10	LAST 419	40,2677	52 124 1	ARTOUTSF	DXCH	SFTEMP1 ASSUMES POINT AT LEFT OF DP SECOND
1202	REF 104	LAST 419	40,2700	52 155 1		DXCH	MPAC
1203	REF 1		40,2701	0 4415 0		TC	PFSHRTMP IF C(A) = -0. SHORTMP FAILS TO GIVE -0.
1204	REF 21	LAST 412	40,2702	0 4635 0	SCOUTEND	TC	POSTJUMP
1205	REF 2	LAST 417	40,2703	62566 0		CADR	DEPDCEAD
12051	REF 11	LAST 419	40,2704	52 124 1	ARTOUTSF	DXCH	SFTEMP1 ASSUMES POINT BETWEEN HI AND LO PARTS OF
12052	REF 105	LAST 419	40,2705	52 155 1		DXCH	MPAC DP SECOND. SHIFTS RESULTS LEFT 14. BY
12053	REF 2	LAST 419	40,2706	0 4415 0		TC	PFSH-TMP TAKING RESULTS FROM MPAC+1, MPAC+2.
12054	REF 1		40,2707	0 2711 1		TC	L14/OUT
1206	REF 1		40,2710	0 2723 0	DP1OUTSF	TC	DP1OUT SCALES MPAC, MPAC +1 BY DP SCALE FACTOR
1207	REF 106	LAST 419	40,2711	56 156 0	L14/OUT	XCH	MPAC +2 IN SFTEMP1, SFTEMP2. THEN SCALE RESULT
1208	REF 107	LAST 419	40,2712	56 155 0		XCH	MPAC +1 BY B14.
1209	REF 108	LAST 419	40,2713	54 154 0		TS	MPAC
1210	REF 2	LAST 419	40,2714	0 2702 0		TC	SCOUTEND
1211	REF 2	LAST 419	40,2715	0 2723 0	DP2OUTSF	TC	DP2OUT SCALES MPAC, MPAC +1 BY DP SCALE FACTOR
1212	REF 3	LAST 419	40,2716	0 2702 0		TC	SCOUTEND
1213	REF 3	LAST 419	40,2717	0 2723 0	DP3OUTSF	TC	DP3OUT ASSUMES POINT BETWEEN BITS 7-8 OF HIGH
1214	REF 11	LAST 410	40,2720	3 6242 0		CAP	SIX LEFT BY 7. ROUNDS MPAC+2 INTO MPAC+1.
1215	REF 1		40,2721	0 3153 0		TC	TPLEFTN SHIFT LEFT 7.
1216	REF 4	LAST 419	40,2722	0 2702 0		TC	SCOUTEND

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12165 REF 109 LAST 419 0162 MPAC+6 = MPAC +6 USE MPAC +6 INSTEAD OF OVFINO

1217 REF 78 LAST 419 40,2723 56 002 0 DPBUT XCH Q
 1218 REF 1 40,2724 54 162 0 TS MPAC+6
 1219 REF 1 40,2725 0 2747 1 TC READLO GET FRESH DATA FOR BOTH HI AND LO.
 1220 REF 2 LAST 275 40,2726 0 7257 0 TC TPAGREE MAKE DP DATA AGREE
 1221 REF 2 LAST 400 40,2727 0 7103 1 TC DMP
 1222 REF 12 LAST 419 40,2730 00123 1 ADRES SETEMP1
 1223 REF 2 LAST 420 40,2731 0 0162 1 TC MPAC+6
 R12231 THE FOLLOWING ROUTINE DISPLAYS TWO CONTIGUOUS SP POSITIVE INTEGERS
 R12232 AS TWO POSITIVE DECIMAL INTEGERS IN RXD1-RXD2 AND RXD4-RXD5 (RXD3 IS
 R12233 BLANKED). THE INTEGER IN THE LOWER-NUMBERED ADDRESS IS DISPLAYED IN
 R12234 RXD1-RXD2.

12235 REF 3 LAST 411 40,2732 0 2536 0 2INTOUT TC SBLANK TO BLANK RXD3
 122355 REF 2 LAST 402 40,2733 0 2413 0 TC +DN TURN ON + SIGN
 12236 REF 110 LAST 420 40,2734 3 0154 1 CA MPAC
 12237 REF 1 40,2735 0 3306 1 TC DSPDECVN DISPLAY 1ST INTEGER (LIKE VERB AND NOUN)
 122371 REF 13 LAST 418 40,2736 4 6245 0 GS THREE
 122372 REF 9 LAST 417 40,2737 50 117 0 INDEX DECCUNT
 122373 REF 6 LAST 416 40,2740 6 4317 0 AD RID1 RXD4
 122374 REF 30 LAST 417 40,2741 54 777 1 TS DSPCOUNT
 122375 REF 2 LAST 420 40,2742 0 2747 1 TC READLO GET 2ND INTEGER
 122376 REF 111 LAST 420 40,2743 3 0155 0 CA MPAC +1
 122377 REF 2 LAST 420 40,2744 0 3306 1 TC DSPDECVN DISPLAY 2ND INTEGER (LIKE VERB AND NOUN)
 122378 REF 22 LAST 419 40,2745 0 4635 0 TC POSTJUMP
 122379 REF 3 LAST 419 40,2746 62570 1 GADR DSPDCEND +2

R1224 READLO PICKS UP FRESH DATA FOR BOTH HI AND LO AND LEAVES IT IN
 R1225 MPAC, MPAC+1. THIS IS NEEDED FOR TIME DISPLAY. IT ZEROES MPAC+2, BUT
 R1226 DOES NOT FORCE TPAGREE.

1227 REF 79 LAST 420 40,2747 56 002 0 READLO XCH Q
 1228 REF 8 LAST 98 40,2750 54 144 1 TS TEN4
 1229 REF 7 LAST 417 40,2751 50 140 1 INDEX MIXBR
 1230 40,2752 0 2752 0 TC +C
 1231 REF 1 40,2753 0 2767 0 TC HOLDNR
 1232 REF 10 LAST 420 40,2754 50 117 0 INDEX DECCUNT
 1233 REF 3 LAST 410 40,2755 3 0150 0 CA LOADITEM GET LOADTAB ENTRY FOR COMP K OF NOUN.
 1234 REF 4 LAST 410 40,2756 7 4356 1 MASK LOW11 E SUBK
 1235 REF 2 LAST 410 40,2757 0 4313 1 TC SETEBANK SET EB, LEAVE EADRES IN A.
 1236 40,2760 0 0006 1 READLO1 EXTEND MIXED NORMAL
 1237 REF 126 LAST 417 40,2761 5 0000 1 INDEX A C(ESUBK) C(E)
 1238 40,2762 3 0001 0 DCA 0 C((E SUBK)+1) C(E+1)
 1239 REF 112 LAST 420 40,2763 52 155 1 DXCH MPAC
 1240 REF 68 LAST 418 40,2764 3 4755 1 CAF ZERO
 1241 REF 113 LAST 420 40,2765 54 156 1 TS MPAC +2
 1242 REF 9 LAST 420 40,2766 0 0144 0 TC TEN4

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1243	REF	10	LAST	416	40,2767	3 0145 1	RDLOROR	CA	NOURADD	E
1244	REF	1			40,2770	0 2760 1	ENDRDLO	TC	REARLO1	

1245					42,3230			BANK	42	
124501	REF	3	LAST	304	42,2000			SETLOC	PINBALL3	
124502					42,3230			BANK		

12455	REF	1						COUNT*	15/PIN	
1246	REF	78	LAST	417	42,3230	0 4616 1	HMSDUT	TC	BANKCALL	READ FRESH DATA FOR HI AND LO INTO MPAC, MPAC+1.
1247	REF	3	LAST	420	42,3231	60747 0		CADR	FEADLO	
1248	REF	3	LAST	420	42,3232	0 7257 0		TC	TPAGREE	MAKE DP DATA AGREE
1249	REF	1			42,3233	0 3417 0		TC	SEPSECM	LEAVE FRACT SEC/60 IN MPAC, MPAC+1. LEAVE WHOLE MIN IN BIT13 OF LOTENDUT AND ABOVE
A1250										
1251	REF	3	LAST	420	42,3234	0 7103 1		TC	ONP	USE ONLY FRACT SEC/60 MOD 60
1252	REF	1			42,3235	03271 0		ADRES	SECON2	MULT BY .06
1253	REF	4	LAST	411	42,3236	3 4321 0		CAF	R301	GIVES CENTI-SEC/10EXPS MOD 60
1254	REF	31	LAST	420	42,3237	54 777 1		TS	DSPCOUNT	
1255	REF	79	LAST	421	42,3240	0 4616 1		TC	BANKCALL	DISPLAY SEC MOD 60
1256	REF	2	LAST	417	42,3241	61226 0		CADR	DSPDECWD	
1257	REF	1			42,3242	0 3435 0		TC	SEPHIN	REMOVE REST OF SECONDS
1258	REF	1			42,3243	3 3273 1		CAF	MINCON2	LEAVE FRACT MIN/60 IN MPAC+1. LEAVE WHOLE HOURS IN MPAC.
1259	REF	114	LAST	420	42,3244	56 154 1		XCH	MPAC	SAVE WHOLE HOURS.
1260	REF	1			42,3245	55 007 0		TS	HITEMOUT	
1261	REF	2	LAST	421	42,3246	3 3274 0		CAF	MINCON2 +1	
1262	REF	115	LAST	421	42,3247	56 155 0		XCH	MPAC +1	USE ONLY FRACT MIN/60 MOD 60
1263	REF	3	LAST	419	42,3250	0 4415 0		TC	PRSHRTMP	IF C(A) = -0, SHORTMP FAILS TO GIVE -0. MULT BY .0006
A1264										
1265	REF	3	LAST	411	42,3251	3 4320 1		CAF	R201	GIVES MIN/10EXPS MOD 60
1266	REF	32	LAST	421	42,3252	54 777 1		TS	DSPCOUNT	
1267	REF	80	LAST	421	42,3253	0 4616 1		TC	BANKCALL	DISPLAY MIN MOD 60
1268	REF	3	LAST	421	42,3254	61226 0		CADR	DSPDECWD	
1269					42,3255	0 0006 1		EXTEND		MINUTES, SECONDS HAVE BEEN REMOVED
1270	REF	1			42,3256	3 3300 1		DCA	HRCOH1	
1271	REF	116	LAST	421	42,3257	52 155 1		DXCH	MPAC	
1272	REF	2	LAST	421	42,3260	3 1007 1		CA	HITEMOUT	USE WHOLE HOURS
1273	REF	4	LAST	421	42,3261	0 4415 0		TC	PRSHRTMP	IF C(A) = -0, SHORTMP FAILS TO GIVE -0. MULT BY .16384
A1274										
1275	REF	7	LAST	420	42,3262	3 4317 0		CAF	FID1	GIVES HOURS/10EXPS
1276	REF	33	LAST	421	42,3263	54 777 1		TS	DSPCOUNT	
1277	REF	81	LAST	421	42,3264	0 4616 1		TC	BANKCALL	USE REGULAR DSPDECWD, WITH ROUND OFF.
1278	REF	4	LAST	421	42,3265	61226 0		CADR	DSPDECWD	
1279	REF	5	LAST	417	42,3266	0 0136 0		TC	ENTEXIT	
1280					42,3267	25660 0	SECON1	2DEC*	1.666666666 E-4	612* 2EXPL2/6000
1280					42,3270	31742 1				
1281					42,3271	01727 1	SECON2	DCT	01727	.06 FOR SECONDS DISPLAY
1282					42,3272	01217 1		DCT	01217	
1283					42,3273	00011 1	MINCON2	DCT	00011	.0006 FOR MINUTES DISPLAY
1284					42,3274	32445 0		DCT	32445	

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1285				42,3275	02104 0	MINCON1	OCT	02104	.066..66 UPPED BY 2EXP-28
1286				42,3276	10422 1		OCT	10422	
1287				42,3277	05174 0	HRCON1	2DEC	.16384	
1287				42,3300	13261 0				
1288				42,3301	00000 1		OCT	00000	
1289				42,3302	00062 0	RNDCON	OCT	00062	.5 SEC

1290	REF	82	LAST	421	42,3303	0 4616 1	M/SDUT	TC	BANKCALL	READ FRESH DATA FOR HI AND LO INTO MPAC,
1291	REF	4	LAST	421	42,3304	60747 0		CADR	LEADLO	MPAC+1.
1292	REF	4	LAST	421	42,3305	0 7257 0		TC	TPAGREE	MAKE DP DATA AGREE
1293	REF	117	LAST	421	42,3306	10 154 0		CCS	MPAC	IF MAG OF (MPAC, MPAC+1) G/ 59 M 59 S,
1294					42,3307	0 3311 1		TC	+2	DISPLAY 59M59. WITH PROPER SIGN.
1295	REF	1			42,3310	0 3342 1		TC	M/SDORM	MPAC = +0. L/ 59M58.5S
1296	REF	1			42,3311	6 3377 1		AD	M/SDON1	- HI PART OF (59M58.5S) +1 FOR CCS
1297	REF	127	LAST	420	42,3312	10 000 0		LCS	A	MAG OF MPAC - HI PART OF (59M58.5S)
1298	REF	1			42,3313	0 3326 0		TC	M/SLIMIT	G/ 59M58.5S
1299	REF	2	LAST	422	42,3314	0 3342 1		TC	M/SDORM	ORIGINAL MPAC = -0. L/ 59M58.5S
1300	REF	3	LAST	422	42,3315	0 3342 1		TC	M/SDORM	L/ 59M58.5S
1301	REF	118	LAST	422	42,3316	10 155 1		CCS	MPAC +1	MAG OF MPAC = HI PART OF 59M58.5S
1302					42,3317	0 3321 1		TC	+2	
1303	REF	4	LAST	422	42,3320	0 3342 1		TC	M/SDORM	MPAC+1 = +0. L/ 59M58.5S
1304	REF	1			42,3321	6 3400 0		AD	M/SDON2	- LO PART OF (59M58.5S) +1 FOR CCS
1305	REF	128	LAST	422	42,3322	10 000 0		CCS	A	MAG OF MPAC+1 - LO PART OF (59M58.5S)
1306	REF	2	LAST	422	42,3323	0 3326 0		TC	M/SLIMIT	G/ 59M58.5S
1307	REF	5	LAST	422	42,3324	0 3342 1		TC	M/SDORM	ORIGINAL MPAC+1 = -0. L/ 59M58.5S
1308	REF	6	LAST	422	42,3325	0 3342 1		TC	M/SDORM	L/ 59M58.5S
1309	REF	119	LAST	422	42,3326	10 154 0	M/SLIMIT	CCS	MPAC	= 59M58.5S LIMIT
1310	REF	1			42,3327	3 3402 1		CAD	M/SDON3	MPAC CANNOT BE +/- 0 AT THIS POINT.
1311	REF	1			42,3330	0 3337 0		TC	+LIMIT	FORCE MPAC, MPAC+1 TO +/- 59M59.5S
1312	REF	2	LAST	422	42,3331	4 3402 0		CS	M/SDON3	
1313	REF	120	LAST	422	42,3332	54 154 0		TS	MPAC	WILL DISPLAY 59M59S IN DSPDCNR
1314	REF	3	LAST	422	42,3333	4 3403 1		CS	M/SDON3 +1	
1315	REF	121	LAST	422	42,3334	54 155 1	LIMITCOM	TS	MPAC +1	
1316	REF	1			42,3335	3 3401 1		CAD	NORADR	SET RETURN TO M/SDORM+1.
1317	REF	2	LAST	421	42,3336	0 3420 1		TC	SEPSECR +1	
1318	REF	122	LAST	422	42,3337	54 154 0	+LIMIT	TS	MPAC	
1319	REF	4	LAST	422	42,3340	3 3403 0		CAD	M/SDON3 +1	
1320	REF	1			42,3341	0 3334 0		TC	LIMITCOM	
1321	REF	1			42,3342	0 3404 1	M/SDORM	TC	SEPSEC	LEAVE FRACT SEC/60 IN MPAC, MPAC+1. LEAVE
A1322										WHOLE MIN IN BIT13 OF LOTFOUT AND ABOVE
1323	REF	1			42,3343	3 3375 0		CAD	HISFCON	USE ONLY FRACT SEC/60 MOD 60
1324	REF	3	LAST	419	42,3344	0 7307 1		TC	SHORTMP	MULT BY .6 + 2EXP-14
1325	REF	14	LAST	420	42,3345	4 6245 0		CS	THREE	GIVES SEC/100 MOD 60
1326	REF	34	LAST	421	42,3346	26 777 1		ADS	DSPDCUNT	DSPDCOUNT ALREADY SET TO RX01
1327	REF	83	LAST	422	42,3347	0 4616 1		TC	BANKCALL	DISPLAY SEC MOD 60 IN D405.
1328	REF	1			42,3350	61266 1		CADR	DSPDC2NR	
1329	REF	69	LAST	420	42,3351	3 4755 1		CAD	ZERO	
1330	REF	5	LAST	405	42,3352	54 124 1		TS	CHOL	
1331	REF	23	LAST	414	42,3353	4 4752 1		CS	TWO	

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1332	REF	11	LAST	420	42,3354	50 117 0	INDEX	DECCUNT	
1333	REF	8	LAST	421	42,3355	6 4317 0	AD	FID1	RXD3
1334	REF	3	LAST	405	42,3356	54 143 0	TS	CCUNT	
1335	REF	84	LAST	422	42,3357	0 4616 1	TC	BANKCALL	BLANK MIDDLE CHAR
1336	REF	3	LAST	405	42,3360	61322 0	CADR	DSPIN	
1337	REF	2	LAST	421	42,3361	0 3435 0	TC	SEPHIN	REMOVE REST OF SECONDS
1338	REF	123	LAST	422	42,3362	56 155 0	XCH	MPAC +1	LEAVE FRACT MIN/60 IN MPAC+1
1339					42,3363	0 0006 1	EXTEND		USE ONLY FRACT MIN/60 MOD 60
1340	REF	1			42,3364	7 3376 1	MP	HIMINCON	MULT BY .6 + 2EXP-7
1341	REF	124	LAST	423	42,3365	52 155 1	DXCH	MPAC	GIVES MIN/100 MOD 60
1342	REF	12	LAST	423	42,3366	50 117 0	INDEX	DECCUNT	
1343	REF	9	LAST	423	42,3367	3 4317 0	CAF	FID1	RXD1
1344	REF	35	LAST	422	42,3370	54 777 1	TS	DSPCOUNT	
1345	REF	85	LAST	423	42,3371	0 4616 1	TC	BANKCALL	DISPLAY MIN MOD 60 IN D102.
1346	REF	2	LAST	422	42,3372	61266 1	CADR	DSPDC2HR	
1347	REF	23	LAST	420	42,3373	0 4635 0	TC	POSTJUMP	
1348	REF	4	LAST	420	42,3374	62570 1	CADR	DSPDCEND +2	
1349					42,3375	23147 1	HISECON	OCT	23147 .6 + 2EXP-14
1350					42,3376	23346 1	HIMINCON	OCT	23346 .6 + 2EXP-7
1351					42,3377	77753 0	M/SCON1	OCT	77753 - HI PART OF (59M58.5S) +1
1352					42,3400	41126 1	M/SCON2	OCT	41126 - LO PART OF (59M58.5S) +1
1353	REF	7	LAST	422	42,3401	03343 0	NORMADR	ADRES	M/SHDRH +1
1354					42,3402	00025 0	M/SCON3	OCT	00025 59H 59.5S
1355					42,3403	37016 1		OCT	37016
1356	REF	125	LAST	423	42,3404	10 155 1	SEPSEC	CCS	MPAC +1
1357	REF	1			42,3405	1 3414 1	TCF	PDSEC	IF +. ROUND BY ADDING .5 SEC
1358	REF	2	LAST	423	42,3406	1 3414 1	TCF	PDSEC	IF -. ROUND BY SUBTRACTING .5 SEC
1359					42,3407	1 3410 0	TCF	+1	FINDS TIME IN MPAC, MPAC+1
1360					42,3410	0 0006 1	EXTEND		ROUNDS OFF BY +/- .5 SEC
1361	REF	1			42,3411	4 3302 1	DCS	RNDCON -1	LEAVES WHOLE MIN IN BIT13 OF
1362	REF	126	LAST	423	42,3412	20 155 1	SEPSEC1	DAS	LUTEMOUT AND ABOVE.
1363	REF	3	LAST	422	42,3413	1 3417 1	TCF	SEPSECNR	LEAVES FRACT SEC/60 IN MPAC, MPAC+1.
1364					42,3414	0 0006 1	PDSEC	EXTEND	
1365	REF	2	LAST	423	42,3415	3 3302 0	DCA	RNDCON -1	
1366	REF	1			42,3416	1 3412 1	TCF	SEPSEC1	
1367	REF	80	LAST	420	42,3417	56 002 0	SEPSECNR	XCH	0
1368	REF	1			42,3420	54 144 1	TS	SEPSCRT	THIS ENTRY AVOIDS ROUNDING BY .5 SEC
1369	REF	4	LAST	421	42,3421	0 7103 1	TC	DMP	MULT BY 2EXP12/6000
1370	REF	1			42,3422	03267 1	ADRES	SEC0N1	GIVES FRACT SEC/60 IN BIT12 OF MPAC+1
1371					42,3423	0 0006 1	EXTEND		AND BELOW.
1372	REF	127	LAST	423	42,3424	3 0155 0	DCA	MPAC	SAVE MINUTES AND HOURS
1373	REF	3	LAST	421	42,3425	53 010 0	DXCH	HITEMOUT	
1374	REF	1			42,3426	0 4404 0	TC	TPSL1	
1375	REF	2	LAST	423	42,3427	0 4404 0	TC	TPSL2	GIVES FRACT SEC/60 IN MPAC+1, MPAC+2.
1376	REF	70	LAST	422	42,3430	3 4755 1	CAF	VERC	
1377	REF	128	LAST	423	42,3431	56 156 0	XCH	MPAC +2	LEAVE FRACT SEC/60 IN MPAC, MPAC+1.

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1378	REF 129	LAST 423	42,3432	56 155 0	XCH	MPAC	+1	
1379	REF 130	LAST 424	42,3433	56 154 1	XCH	MPAC		
1380	REF 2	LAST 423	42,3434	0 0144 0	TC	SEPSCRET		
1381	REF 81	LAST 423	42,3435	56 002 0	SEPMIN	XCH	Q	FINDS WHOLE MINUTES IN BIT13
1382	REF 1		42,3436	54 144 1	TS	SEPINRET		OF LOTEMOUT AND ABOVE.
1383	REF 1		42,3437	3 1010 1	CA	LOTENOUT		REMOVES REST OF SECONDS.
1384			42,3440	0 0006 1	EXTEND			LEAVES FRAGT MIN/60 IN MPAC+1.
1385	REF 20	LAST 299	42,3441	7 4751 1	MP	BIT3		LEAVES WHOLE HOURS IN MPAC.
1386			42,3442	0 0006 1	EXTEND			SR 12, THROW AWAY LP.
1387	REF 22	LAST 292	42,3443	7 4737 1	MP	BIT13		SR 2, TAKE FROM LP. = SL 12.
1388	REF 131	LAST 424	42,3444	22 155 0	LXCH	MPAC	+1	THIS FORCES BITS 12-1 TO 0 IF +.
A1389								FORCES BITS 12-1 TO 1 IF -.
1390	REF 4	LAST 423	42,3445	3 1007 1	CA	HITEMOUT		
1391	REF 132	LAST 424	42,3446	54 154 0	TS	MPAC		
1392	REF 5	LAST 423	42,3447	0 7103 1	TC	DMP		MULT BY 1/15
1393	REF 1		42,3450	03275 1	ADRES	MINCON1		GIVES FRAGT MIN/60 IN MPAC+1.
1394	REF 2	LAST 424	42,3451	0 0144 0	ENDSPMIN	TC	SEPINRET	GIVES WHOLE HOURS IN MPAC.

R1395 THIS IS A SPECIAL PURPOSE VERB FOR DISPLAYING A DOUBLE PRECISION AGC
 R1396 WORD AS 10 DECIMAL DIGITS ON THE AGC DISPLAY PANEL. IT CAN BE USED WITH
 R1397 ANY NOUN, EXCEPT MIXED NOUNS. IT DISPLAYS THE CONTENTS
 R1398 OF THE REGISTER NOUNADD IS POINTING TO. IF USED WITH NOUNS WHICH ARE
 R1399 INHERENTLY NOT DP SUCH AS THE CDU COUNTERS THE DISPLAY WILL BE GARBAGE.
 R1400 DISPLAY IS IN R1 AND R2 ONLY WITH THE SIGN IN R1.

1401	REF 1		40,2771		SETLOC	ENDROLD	+1	
14015	REF 3	LAST 418 TO	4211	108 442*	COUNT*	33/PIN		
1402	REF 8	LAST 420	40,2771	50 140 1	DSPDPDEC	INDEX	R1XB	
1403			40,2772	0 2772 1	TC	+0		
1404			40,2773	0 2775 0	TC	+2		NORMAL NOUN
1405	REF 3	LAST 412	40,2774	0 3420 1	TC	DSPALARM		
1406			40,2775	0 0006 1	EXTEND			
1407	REF 11	LAST 421	40,2776	5 0145 1	INDEX	NOUNADD		
1408			40,2777	3 0001 0	DCA	0		
1409	REF 133	LAST 424	40,3000	52 155 1	DXCH	MPAC		
1410	REF 10	LAST 423	40,3001	3 4317 0	CAF	R1D1		
1411	REF 36	LAST 423	40,3002	54 777 1	TS	DSPCOUNT		
1412	REF 71	LAST 423	40,3003	3 4755 1	CAF	ZERO		
1413	REF 134	LAST 424	40,3004	54 156 1	TS	MPAC	+2	
1414	REF 5	LAST 422	40,3005	0 7257 0	TC	TRAGREF		
1415	REF 1		40,3006	0 3273 1	TC	DSP2DEC		
1416	REF 6	LAST 421	40,3007	0 0136 0	ENDDPDEC	TC	EXIT	

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P1417 LOAD VERSS IF ALARM CONDITION IS DETECTED DURING EXECUTE.
 R1418 CHECK FAIL LIGHT IS TURNED ON AND ENDOFJOB. IF ALARM CONDITION IS
 R1419 DETECTED DURING ENTER OF DATA, CHECK FAIL IS TURNED ON AND IT RECYCLES
 R1420 TO EXECUTE OF ORIGINAL LOAD VERB. RECYCLE CAUSED BY 1) DECIMAL MACHINE
 R1421 CADR 2) MIXTURE OF OCTAL/DECIMAL DATA 3) OCTAL DATA INTO DECIMAL
 R1422 ONLY NOUN 4) DEC DATA INTO OCT ONLY NOUN 5) DATA TOO LARGE FOR SCALE
 R1423 6) FEWER THAN 3 DATA WORDS LOADED FOR HRS. MIN. SEC NOUN.8(2)-(6) ALARM
 R1424 AND RECYCLE OCCUR AT FINAL ENTER OF SET. (1) ALARM AND RECYCLE OCCUR AT
 R1425 ENTER OF CADR.

1426 REF 1 41,2616

SETLOC ENORTOUT

14265 REF 2 LAST 406 TO 41,2616 398 398*
 1427 REF 24 LAST 422 41,2616 4 4752 1 ABCLoad
 1428 REF 3 LAST 414 41,2617 0 2424 1
 1429 REF 1 41,2620 0 2460 1
 1430 REF 1 41,2621 3 3006 1
 1431 REF 2 LAST 404 41,2622 0 2337 1
 1432 REF 1 41,2623 0 2303 0
 1433 REF 1 41,2624 3 3007 0
 1434 REF 3 LAST 425 41,2625 0 2337 1
 1435 REF 1 41,2626 0 2305 0
 1436 REF 1 41,2627 3 3010 0
 1437 REF 4 LAST 425 41,2630 0 2337 1
 1438 REF 2 LAST 407 41,2631 0 2307 1

COUNT* 31/PIN

CS TWO--

TC COMPTST

TC NOUNTEST

TEST IF NOUN CAN BE LOADED.

CAF VBSP1LD

TC UPDATVB -1

TC REQDATX

CAF VBSP2LD

TC UPDATVB -1

TC REQDATY

CAF VBSP3LD

TC UPDATVB -1

TC REQDATZ

1439 REF 12 LAST 419 41,2632 4 6242 1 PUTXYZ
 1440 REF 1 41,2633 0 3011 1
 1441 41,2634 0 0006 1
 1442 REF 4 LAST 411 41,2635 3 2114 1
 1443 REF 7 LAST 417 41,2636 52 006 0
 1444 REF 72 LAST 424 41,2637 3 4755 1
 1445 REF 1 41,2640 0 3075 0
 1446 REF 12 LAST 424 41,2641 50 145 1
 1447 41,2642 54 006 0
 1448 REF 38 LAST 418 41,2643 3 4753 1
 1449 REF 2 LAST 425 41,2644 0 3075 0
 1450 REF 13 LAST 425 41,2645 50 145 1
 1451 41,2646 54 001 1
 1452 REF 25 LAST 425 41,2647 3 4752 0
 1453 REF 3 LAST 425 41,2650 0 3075 0
 1454 REF 14 LAST 425 41,2651 50 145 1
 1455 41,2652 54 002 1
 145501 REF 2 LAST 155 41,2653 4 4757 1
 145502 REF 10 LAST 411 41,2654 6 1002 1
 145503 41,2655 0 0006 1
 145504 41,2656 1 2660 1
 145505 REF 2 LAST 406 41,2657 0 2775 0

CS SIX

TC ALLDC/OE

EXTEND

DCA LCONNLOC

DXCH Z

CAF ZERG

TC PUTCOM

INDEX NOUNADD

TS 0

CAF ONE

TC PUTCOM

INDEX NOUNADD

TS 1

CAF TWO

TC PUTCOM

INDEX NOUNADD

TS 2

CS SEVEN

AD NOUNREG

EXTEND

BZF +2

TC LOADLV

TEST THAT THE 3 DATA WORDS LOADED ARE
 ALL DEC OR ALL OCT.

SWITCH BANKS TO NOUN TABLE READING
 ROUTINE.

X COMP

Y COMP

Z COMP

IF NOUN 7 HAS JUST BEEN LOADED, SET
 FLAG BITS AS SPECIFIED.

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145506	REF	4	LAST	416	41,2660	3 1003 0	CA	XREG	ECAOR OF FLAG WORD.
145507	REF	5	LAST	411	41,2661	0 4304 1	TC	SETNCADR +1	SET EBANK. NOUNADD.
145508	REF	2	LAST	407	41,2662	3 1005 0	CA	ZREG	ZERO TO RESET BITS, NON-ZERO TO SET BITS
145509					41,2663	0 0004 0	INHINT		
14551					41,2664	0 0006 1	EXTEND		
145511	REF	1			41,2665	1 2674 1	BZF	BITSOFF	
145512	REF	15	LAST	425	41,2666	50 145 1	INDEX	NOUNADD	
145513					41,2667	4 0000 0	CS	0	
145514	REF	1			41,2670	7 1004 0	MASK	YREG	BITS TO BE PROCESSED.
145515	REF	16	LAST	426	41,2671	50 145 1	INDEX	NOUNADD	
145516					41,2672	26 000 0	ADS	0	SET BITS.
145517	REF	1			41,2673	0 2701 0	TC	BITSOFF1	
145518	REF	2	LAST	426	41,2674	4 1004 0	CS	YREG	BITS TO BE PROCESSED.
145519	REF	17	LAST	426	41,2675	50 145 1	INDEX	NOUNADD	
14552					41,2676	7 0000 0	MASK	0	
145521	REF	18	LAST	426	41,2677	50 145 1	INDEX	NOUNADD	
145522					41,2700	54 000 0	TS	0	RESET BITS.
145523					41,2701	0 0003 1	BITSOFF1	RELINT	
1456	REF	-3	LAST	425	41,2702	0 2775 0	TC	LOADLV	
1457	REF	39	LAST	425	41,2703	4 4753 0	ABLOAD	CS	ONE
1458	REF	-4	LAST	425	41,2704	0 2424 1	TC	COMPTST	
1459	REF	-2	LAST	425	41,2705	0 2460 1	TC	NOINTST	TEST IF NOUN CAN BE LOADED.
1460	REF	-2	LAST	425	41,2706	3 3006 1	CAF	VRSP1LD	
1461	REF	-5	LAST	425	41,2707	0 2337 1	TC	UPDATVB -1	
1462	REF	-2	LAST	425	41,2710	0 2303 0	TC	REQDATX	
1463	REF	-2	LAST	425	41,2711	3 3007 0	CAF	VRSP2LD	
1464	REF	-6	LAST	426	41,2712	0 2337 1	TC	UPDATVB -1	
1465	REF	-2	LAST	425	41,2713	0 2305 0	TC	REQDATY	
1466	REF	-9	LAST	408	41,2714	4 4756 0	PUTXY	CS	FIVE
1467	REF	-2	LAST	425	41,2715	0 3011 1	TC	ALLDC/DC	TEST THAT THE 2 DATA WORDS LOADED ARE ALL DEC OR ALL OCT.
1468					41,2716	0 0006 1	EXTEND		
1469	REF	5	LAST	425	41,2717	3 2114 1	DCA	LOADNLDG	SWITCH BANKS TO NOUN TABLE READING
1470	REF	8	LAST	425	41,2720	52 006 0	DXCH	Z	ROUTINE.
1471	REF	73	LAST	425	41,2721	3 4755 1	CAF	ZERO	X-COMP
1472	REF	4	LAST	425	41,2722	0 3075 0	TC	PUTCOM	
1473	REF	19	LAST	426	41,2723	50 145 1	INDEX	NOUNADD	
1474					41,2724	54 000 0	TS	0	
1475	REF	40	LAST	426	41,2725	3 4753 1	CAF	ONE	Y-COMP
1476	REF	5	LAST	426	41,2726	0 3075 0	TC	PUTCOM	
1477	REF	20	LAST	426	41,2727	50 145 1	INDEX	NOUNADD	
1478					41,2730	54 001 1	TS	1	
1479	REF	4	LAST	426	41,2731	0 2775 0	TC	LOADLV	
1481	REF	3	LAST	426	41,2732	0 2303 0	ALOAD	TC	REQDATX
1482					41,2733	0 0006 1	EXTEND		
1483	REF	6	LAST	426	41,2734	3 2114 1	DCA	LOADNLDG	SWITCH BANKS TO NOUN TABLE READING
1484	REF	9	LAST	426	41,2735	52 006 0	DXCH	Z	ROUTINE.
1485	REF	74	LAST	426	41,2736	3 4755 1	CAF	ZERO	X-COMP
1486	REF	6	LAST	426	41,2737	0 3075 0	TC	PUTCOM	

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1487	REF	21	LAST	426	41,2740	50 145 1		INDEX	NOUNADD	
1488					41,2741	54 000 0		TS	0	
1489	REF	5	LAST	426	41,2742	0 2775 0		TC	LOADLV	
1490	REF	41	LAST	426	41,2743	4 4753 0	BLOAD	CS	ONE	
1491	REF	5	LAST	426	41,2744	0 2424 1		TC	COMPTST	
1493	REF	22	LAST	419	41,2745	3 4735 1		CAF	BIT15	SET CLPASS FOR PASSO ONLY
1494	REF	10	LAST	407	41,2746	55 015 0		TS	CLPASS	
1495	REF	3	LAST	426	41,2747	0 2305 0		TC	REQDATY	
1496					41,2750	0 0006 1		EXTEND		
1497	REF	7	LAST	426	41,2751	3 2114 1		DCA	LODNNLOC	SWITCH BANKS TO NOUN TABLE READING ROUTINE.
1498	REF	10	LAST	426	41,2752	52 006 0		DXCH	Z	
1499	REF	42	LAST	427	41,2753	3 4753 1		CAF	ONE	
1500	REF	7	LAST	426	41,2754	0 3075 0		TC	PUTCOM	
1501	REF	22	LAST	427	41,2755	50 145 1		INDEX	NOUNADD	
1502					41,2756	54 001 1		TS	1	
1503	REF	6	LAST	427	41,2757	0 2775 0		TC	LOADLV	
1504	REF	26	LAST	425	41,2760	4 4752 1	CLDAD	CS	TWO	
1505	REF	6	LAST	427	41,2761	0 2424 1		TC	COMPTST	
1507	REF	23	LAST	427	41,2762	3 4735 1		CAF	BIT15	SET CLPASS FOR PASSO ONLY
1508	REF	11	LAST	427	41,2763	55 015 0		TS	CLPASS	
1509	REF	3	LAST	425	41,2764	0 2307 1		TC	REQDATZ	
1510					41,2765	0 0006 1		EXTEND		
1511	REF	8	LAST	427	41,2766	3 2114 1		DCA	LODNNLOC	SWITCH BANKS TO NOUN TABLE READING ROUTINE.
1512	REF	11	LAST	427	41,2767	52 006 0		DXCH	Z	
1513	REF	27	LAST	427	41,2770	3 4752 0		CAF	TWO	
1514	REF	8	LAST	427	41,2771	0 3075 0		TC	PUTCOM	
1515	REF	23	LAST	427	41,2772	50 145 1		INDEX	NOUNADD	
1516					41,2773	54 002 1		TS	Z	
1517	REF	7	LAST	427	41,2774	0 2775 0		TC	LOADLV	
1518	REF	75	LAST	426	41,2775	3 4755 1	LOADLV	CAF	ZERO	
1519	REF	13	LAST	407	41,2776	55 000 1		TS	DECBENCH	
1520	REF	76	LAST	427	41,2777	4 4755 0		CS	ZERO	
1521	REF	1			41,3000	55 014 1		TS	LOADSTAT	
15215	REF	5	LAST	408	41,3001	0 4457 0		TC	RELOSP	RELEASE FOR PRIORITY DISPLAY PROBLEM.
1522	REF	6	LAST	411	41,3002	4 4360 1		CS	V01	TO BLOCK NUMERICAL CHARACTERS AND
1523	REF	37	LAST	424	41,3003	54 777 1		TS	OSPEDUNT	CLEAR AFTER A COMPLETED LOAD
1524	REF	24	LAST	423	41,3004	0 4635 0		TC	POSTJUMP	AFTER COMPLETED LOAD, GO TO RECALTST
1525	REF	1			41,3005	61547 0		CADR	RECALTST	TO SEE IF THERE IS RECALL FROM ENDIDLE.
1526					41,3006	00025 0	VBSP1LD	DEC	21	VB21 = ALUAD
1527					41,3007	00026 0	VBSP2LD	DEC	22	VB22 = BLOAD
1528					41,3010	00027 1	VBSP3LD	DEC	23	VB23 = CLDAD
1529	REF	13	LAST	423	41,3011	54 117 1	ALLDC/DC	TS	DECDUNT	TESTS THAT DATA WORDS LOADED ARE EITHER
1530	REF	14	LAST	427	41,3012	4 1000 1		CS	DECBENCH	ALL DEC OR ALL OCT. ALARMS IF NOT.
1531	REF	3	LAST	405	41,3013	54 021 0		TS	SR	

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1532	REF 4	LAST 427	41,3014	4 0021 0	CS	SR	
1533	REF 5	LAST 428	41,3015	4 0021 0	CS	SR	SHIFTED RIGHT 2
1534	REF 129	LAST 422	41,3016	10 000 0	CCS	A	DEC COMP BITS IN LOW 3.
1535			41,3017	1 3021 0	TCF	+2	SOME ONES IN LOW 3
1536	REF 82	LAST 424	41,3020	0 0002 0	TC	Q	ALL ZEROS. ALL OCTAL. OK
1537	REF 14	LAST 427	41,3021	6 0117 0	AD	DECOUNT	DEC COMP = 7 FOR 3COMP. = 6 FOR 2COMP
1538			41,3022	0 0006 1	EXTEND		(BUT IT HAS BEEN DECREMENTED BY CCS)
1539			41,3023	1 3025 1	BZF	+2	MUST MATCH 6 FOR 3COMP, 5 FOR 2COMP.
1540	REF 4	LAST 415	41,3024	0 4145 0	TC	ALMCYCLE	ALARM AND RECYCLE.
1541	REF 83	LAST 428	41,3025	0 0002 0	TC	Q	ALL REQUIRED ARE DEC. OK
1542	REF 84	LAST 428	41,3026	56 002 0	SFRUTNOR	XCH	Q
1543	REF 1		41,3027	54 114 1	TS	EXITEM	GETS SF ROUTINE NUMBER FOR NORMAL CASE
1544	REF 1		41,3030	3 4347 0	CAF	MIDS	CANT USE L FOR RETURN. TSTFDROP USES L.
1545	REF 3	LAST 416	41,3031	7 0147 1	MASK	NNTYPTM	
1546	REF 1		41,3032	0 4322 0	TC	RIGHTS	
1547	REF 2	LAST 428	41,3033	0 0114 0	TC	EXITEM	SF ROUTINE NUMBER IN A
1548	REF 85	LAST 428	41,3034	56 002 0	SFRUTMIX	XCH	Q
1549	REF 3	LAST 428	41,3035	54 114 1	TS	EXITEM	GETS SF ROUTINE NUMBER FOR MIXED CASE
1550	REF 15	LAST 428	41,3036	50 117 0	INDEX	DECOUNT	
1551	REF 1		41,3037	3 3066 1	CAF	DISPLACE	PUT TC GOQ, TC RIGHTS, OR TC LEFTS IN L
1552	REF 54	LAST 416	41,3040	54 001 1	TS	L	
1553	REF 16	LAST 428	41,3041	50 117 0	INDEX	DECOUNT	
1554	REF 2	LAST 399	41,3042	3 4346 1	CAF	LOW5	LOW5, MID5, OR HIS IN A
1555	REF 2	LAST 304	41,3043	7 0153 1	MASK	ROUTATEM	GET HIS, MID5, OR LOW5 OF ROUTMTAB ENTRY
1556	REF 55	LAST 428	41,3044	50 001 0	INDEX	L	
1557			41,3045	0 0000 1	TC	D	
R1558	DO TC GOQ(DECOUNT=0), DO TC RIGHTS(DECOUNT=1), DO TC LEFTS(DECOUNT=2).						
1559	REF 4	LAST 428	41,3046	0 0114 0	SFRET1	TC	EXITEM
1560	REF 86	LAST 428	41,3047	56 002 0	SFCONUM	XCH	Q
1561	REF 5	LAST 428	41,3050	54 114 1	TS	EXITEM	GETS 2X(SF CONSTANT NUMBER)
1562	REF 9	LAST 424	41,3051	50 140 1	INDEX	MIXBR	
1563			41,3052	0 3052 0	TC	+C	
1564	REF 1		41,3053	0 3071 1	TC	CONUNOR	NORMAL NOON
1565	REF 17	LAST 428	41,3054	50 117 0	INDEX	DECOUNT	MIXED NOON
1566	REF 2	LAST 428	41,3055	3 3066 1	CAF	DISPLACE	
1567	REF 56	LAST 428	41,3056	54 001 1	TS	L	PUT TC GOQ, TC RIGHTS, OR TC LEFTS IN L
1568	REF 18	LAST 428	41,3057	50 117 0	INDEX	DECOUNT	
1569	REF 3	LAST 428	41,3060	3 4346 1	CAF	LOW5	
1570	REF 4	LAST 428	41,3061	7 0147 1	MASK	NNTYPTM	
1571	REF 57	LAST 428	41,3062	50 001 0	INDEX	L	
1572			41,3063	0 0000 1	TC	D	
R1573	DO TC GOQ(DECOUNT=0), DO TC RIGHTS(DECOUNT=1), DO TC LEFTS(DECOUNT=2).						
1574			41,3064	6 0000 1	SFRET	DOUBLE	2X(SF CONSTANT NUMBER) IN A
1575	REF 6	LAST 428	41,3065	0 0114 0	TC	EXITEM	
1576	REF 1		41,3066	0 3025 0	DISPLACE	TC	GOQ

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1577	REF	2	LAST	428	41,3067	0 4322 0	TC	RIGHT5	
1578	REF	3	LAST	416	41,3070	0 4331 1	TC	LEFT5	
1579	REF	4	LAST	428	41,3071	3 4346 1	CONUMNOR	CAF	LOW5
1580	REF	5	LAST	428	41,3072	7 0147 1		MASK	NNTYPTEN
1581					41,3073	6 0000 1		DOUBLE	
1582	REF	7	LAST	428	41,3074	0 0114 0	TC	EXITEN	NORMAL NOUN ALWAYS GETS LOW 5 OF NNTYPTAB FOR SF CONUM.
									2X(SF CONSTANT NUMBER) IN A
1583	REF	19	LAST	428	41,3075	54 117 1	PUTCOM	TS	DECCOUNT
1584	REF	87	LAST	428	41,3076	56 002 0		XCH	0
1585	REF	1			41,3077	54 115 0		TS	DECRET
1586	REF	77	LAST	427	41,3100	3 4755 1		CAF	ZERO
1587	REF	3	LAST	420	41,3101	54 162 0		TS	MPAC+6
1588	REF	20	LAST	429	41,3102	50 117 0		INDEX	DECCOUNT
1589	REF	3	LAST	405	41,3103	57 006 0		XCH	XREGLP
1590	REF	135	LAST	424	41,3104	54 155 1		TS	MPAC +1
1591	REF	21	LAST	429	41,3105	50 117 0		INDEX	DECCOUNT
1592	REF	5	LAST	426	41,3106	57 003 0		XCH	XPEG
1593	REF	136	LAST	429	41,3107	54 154 0		TS	MPAC
1594	REF	10	LAST	428	41,3110	50 140 1		INDEX	MIXBR
1595					41,3111	0 3111 0		TC	+0
1596	REF	1			41,3112	0 3137 1		TC	PUTNORM
R1597									NORMAL NOUN
1598	REF	22	LAST	429	41,3113	50 117 0		INDEX	DECCOUNT
1599	REF	4	LAST	420	41,3114	3 0150 0		CA	IDADITEM
1600	REF	5	LAST	420	41,3115	7 4356 1		MASK	10+11
1601	REF	6	LAST	426	41,3116	0 4303 0		TC	SETNCADR
1602					41,3117	0 0006 1		EXTEND	
1603	REF	23	LAST	429	41,3120	60 117 0		SU	DECCOUNT
1604	REF	24	LAST	427	41,3121	54 145 0		TS	NOUNADD
1605	REF	15	LAST	427	41,3122	11 000 1		CCS	DECBRNCH
1606	REF	1			41,3123	0 3174 0		TC	PUTDECSF
1607	REF	1			41,3124	0 2452 0		TC	OCTSTCYC
1608	REF	3	LAST	417	41,3125	0 3034 0		TC	SFRUTMIX
1609	REF	3	LAST	416	41,3126	0 2261 0		TC	OPTST
1610	REF	1			41,3127	0 3155 0		TC	PUTCOM2
A1611									TEST FOR DP SCALE FOR OCT LOAD. IF SU.
A1612									+0 INTO MAJOR PART. SET NOUNADD FOR
A1613									LOADING OCTAL WORD INTO MINOR PART.
1614	REF	25	LAST	429	41,3130	24 145 1	PUTDPCOM	INCP	NOUNADD
1615	REF	26	LAST	429	41,3131	3 0145 1		CA	NOUNADD
1616	REF	24	LAST	429	41,3132	26 117 1		ADS	DECCOUNT
1617	REF	78	LAST	429	41,3133	3 4755 1		CAF	ZERO
1618	REF	25	LAST	429	41,3134	50 117 0		INDEX	DECCOUNT
1619					41,3135	53 777 0		TS	0
1620	REF	2	LAST	429	41,3136	0 3155 0		TC	PUTCOM2
									-1
1621	REF	2	LAST	407	41,3137	0 4311 0	PUTNORM	TC	SETNADD
1622	REF	16	LAST	429	41,3140	11 000 1		CCS	DECBRNCH
									ECADR FROM NOUNCADR. SETS EB, NOUNADD.

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1623	REF	2	LAST	429	41,3141	0 3174 0	TC	PUTDECSF	+ DEC
1624	REF	2	LAST	429	41,3142	0 2452 0	TC	OCTSTCYC	+D OCTAL
1625	REF	3	LAST	417	41,3143	0 3026 0	TC	SFRUTNOR	TEST IF DEC ONLY BIT = 1. IF SO,
1626	REF	4	LAST	429	41,3144	0 2261 0	TC	DPTEST	ALARM AND RECYCLE. IF NOT, CONTINUE.
1627	REF	3	LAST	429	41,3145	0 3151 1	TC	PUTCOM2 -4	NO DP
1628	REF	79	LAST	429	41,3146	3 4755 1	CAF	ZERO	DP
1629	REF	26	LAST	429	41,3147	54 117 1	TS	DECCOUNT	
1630	REF	1			41,3150	0 3130 0	TC	PUTDPCOM	
1631	REF	8	LAST	416	41,3151	3 0146 1	CA	NNADTEM	
1632	REF	43	LAST	427	41,3152	6 4753 1	AD	ONE	IF NNADTEM = -1, CHANNEL TO BE SPECIFIED
1633					41,3153	0 0006 1	EXTEND		
1634	REF	1			41,3154	1 3161 0	BZF	CHANLOAD	
1635	REF	137	LAST	429	41,3155	56 154 1	PUTCOM2	XCH MPAC	
1636	REF	2	LAST	429	41,3156	0 0115 1	TC	DECRET	
1637	REF	38	LAST	427	0777		EBANK=	DSPCOUNT	
1638	REF	1			41,3157	02147 1	GTSFINLC	2CADR GTSFIN	
1638	REF	1			41,3160	64101 0			
1639	REF	3	LAST	425	41,3161	4 4757 1	CHANLOAD	CS SEVEN	DONT LOAD CHAN 7. (IT = SUPERBANK).
16391	REF	4	LAST	416	41,3162	6 1017 0	AD	NOUACADR	
16392					41,3163	0 0006 1	EXTEND		
16393	REF	8	LAST	427	41,3164	1 2775 1	BZF	LOADLV	
16394	REF	5	LAST	430	41,3165	3 1017 0	CA	NOUACADR	
1640	REF	7	LAST	416	41,3166	7 5004 1	MASK	LOW9	
1641	REF	138	LAST	430	41,3167	56 154 1	XCH	MPAC	
16411					41,3170	0 0006 1	EXTEND		
16412	REF	139	LAST	430	41,3171	5 0154 1	INDEX	MPAC	
1642					41,3172	01 000 0	WRITE	0	
1643	REF	9	LAST	430	41,3173	0 2775 0	TC	LOADLV	
R1644	PUTDECSF FINDS MIXBR AND DECCOUNT STILL SET FROM PUTCOM								
1645	REF	2	LAST	416	41,3174	0 3047 1	PUTDECSF	TC SFCO NUM	2X(SF CON NUMB) IN A
1646	REF	13	LAST	420	41,3175	54 123 0	TS	SFTEMP1	
1647					41,3176	0 0006 1	EXTEND		SWITCH BANKS TO SF CONSTANT TABLE
1648	REF	1			41,3177	3 3160 0	DCA	GTSFINLC	READING ROUTINE.
1649	REF	12	LAST	427	41,3200	52 006 0	DXCH	Z	LOADS SFTEMP1, SFTEMP2.
1650	REF	11	LAST	429	41,3201	50 140 1	INDEX	MIXBR	
1651					41,3202	0 3202 1	TC	+0	
1652	REF	1			41,3203	0 3206 0	TC	PUTSFNOR	
1653	REF	4	LAST	429	41,3204	0 3034 0	TC	SFUTMIX	
1654	REF	1			41,3205	0 3207 1	TC	PUTDCSF2	
1655	REF	4	LAST	430	41,3206	0 3026 0	PUTSFNOR	TC SFRUTNOR	
1656	REF	130	LAST	428	41,3207	50 000 1	PUTDCSF2	INDEX A	
1657	REF	1			41,3210	3 3212 0	CAF	SFINTABR	

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1658	REF	4	LAST	417	41,3211	0 4640 1	TC	BANKJUMP	SWITCH BANKS FOR EXPANSION ROOM
1659	REF	1			41,3212	62350 0	SFINTABR	GOALMCYC	ALARM AND RECYCLE IF DEC LOAD
A1660									WITH OCTAL ONLY NOUN.
1661	REF	1			41,3213	61106 1	CADR	BINROUND	
1662	REF	1			41,3214	61010 1	CADR	DEGINSF	
1663	REF	1			41,3215	61076 1	CADR	ARTHINSF	
1664	REF	1			41,3216	61114 1	CADR	DPINSF	
1665	REF	1			41,3217	61141 1	CADR	DPINSF2	
1666	REF	4	LAST	424	41,3220	61420 0	CADR	DSPALARM	LRPOSOUT CANT BE LOADED.
1667	REF	2	LAST	431	41,3221	61114 1	CADR	DPINSF	SAME AS ARITHOP1
1668	REF	1			41,3222	65452 1	CADR	HMSIN	
1669	REF	5	LAST	431	41,3223	61420 0	CADR	DSPALARM	MIN/SEC CANT BE LOADED.
1671	REF	1			41,3224	61146 0	CADR	DPINSF4	
16711	REF	1			41,3225	61111 1	CADR	ARTINSF	
16712	REF	6	LAST	431	41,3226	61420 0	CADR	DSPALARM	2INTOUT CANT BE LOADED.
16714	REF	2	LAST	431	41,3227	61010 1	CADR	DEGINSF	TESTS AT END FOR 360-CDU
1672					41,3230			ENDROUTIN	EQUALS

R1673 SCALE FACTORS FOR THOSE ROUTINES NEEDING THEM ARE AVAILABLE IN SFTEMP1.
 R1674 ALL SFIN ROUTINES USE MPAC-MPAC+1. LEAVE RESULT IN A. END WITH-TC-DECRET

1675	REF	1			40,3010		SETLOC	ENDOPDEC +1	
16755	REF	4	LAST	424	TO 425:	15 457*	COUNT*	15/PIN	
R1676					DEGINSF	APPLIES 1000/180 = 5.55555(10) = 5.43434(8)			
1677	REF	6	LAST	424	40,3010	0 7103 1	DEGINSF	TC	DMP
1678	REF	1			40,3011	03074 1	ADRES	DEGCON1	SF ROUTINE FOR DEC DEGREES
1679	REF	140	LAST	430	40,3012	10 155 1	CCS	MPAC +1	MULT BY 5.5 5(10)X2EXP-3
1680	REF	19	LAST	403	40,3013	3 4741 1	CAF	BIT11	THIS ROUNDS OFF MPAC+1 BEFORE SHIFT
1681					40,3014	0 3016 0	TC	+	LEFT 3, AND CAUSES 360.00 TO OF/UF
1682	REF	20	LAST	431	40,3015	4 4741 0	CS	BIT11	WHEN SHIFTED LEFT AND ALARM.
1683	REF	141	LAST	431	40,3016	6 0155 0	AD	MPAC +1	
1684	REF	1			40,3017	0 3165 0	TC	2ROUND +2	
1685	REF	3	LAST	423	40,3020	0 4404 0	TC	TPSL1	LEFT 1
1686	REF	4	LAST	431	40,3021	0 4404 0	DEGINSF2	TPSL1	LEFT 2
1687	REF	1			40,3022	0 3174 0	TC	TESTFHF	
1688	REF	5	LAST	431	40,3023	0 4404 0	TC	TPSL1	RETURNS IF NO OF/UF (LEFT3)
1689	REF	142	LAST	431	40,3024	10 154 0	CCS	MPAC	
1690	REF	1			40,3025	0 3031 0	TC	SIGNFIX	IF+, GO TO SIGNFIX
1691	REF	2	LAST	431	40,3026	0 3031 0	TC	SIGNFIX	IF +0, GO TO SIGNFIX
1692					40,3027	4 0000 0	COM		IF -, USE -MAGNITUDE +1
1693	REF	143	LAST	431	40,3030	54 154 0	TS	MPAC	IF -0, USE +0
1694	REF	4	LAST	429	40,3031	10 162 0	SIGNFIX	CCS	MPAC+0
1695	REF	1			40,3032	0 3070 0	TC	SGNT01	IF OVERFLOW
1696	REF	1			40,3033	0 3043 0	TC	ENDSCALE	NO OVERFLOW/UNDERFLOW
1697	REF	144	LAST	431	40,3034	10 154 0	CCS	MPAC	IF UF FORCE SIGN TO 0 EXCEPT -180
1698	REF	5	LAST	415	40,3035	0 5705 0	TC	CCSHGLE	

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1699	REF	1		40.3036	0 3066 1	TC	NEG180	
1700				40.3037	0 3040 0	TC	+1	
1701	REF	145	LAST 431	40.3040	56 154 1	XCH	MPAC	
1702	REF	7	LAST 418	40.3041	7 4733 0	MASK	PDSMAX	
1703	REF	146	LAST 432	40.3042	54 154 0	TS	MPAC	
1704	REF	12	LAST 430	40.3043	50 140 1	ENDSCALE INDEX	MIXB2	IF ROUTINE NO. IS NOT CDU DEGREES,
170405				40.3044	0 3044 1	TC	+0	THEN THIS IS 360 - CDU DEGREES
17041				40.3045	0 3050 1	TC	+3	AND ANGLE IN MPAC MUST BE REPLACED
17042	REF	1		40.3046	0 3060 1	TC	SFMIXCAL	BY 360 DEGREES MINUS ITSELF.
17043				40.3047	0 3051 0	MIXBACK TC	+2	
17044	REF	1		40.3050	0 3063 1	TC	SFNDRCAL	
1705	REF	131	LAST 430	40.3051	4 0000 0	NDRBACK CS	A	
17051	REF	24	LAST 283	40.3052	6 4752 0	AD	BIT?	
17052				40.3053	0 0006 1	EXTEND		
17053				40.3054	1 3056 0	BZF	+2	
17054	REF	2	LAST 418	40.3055	0 2625 1	TC	360-CDU	
17055	REF	25	LAST 427	40.3056	0 4635 0	ENDSCALE1 TC	POSTJUMP	
17056	REF	4	LAST 430	40.3057	63155 0	CADR	PUTCMP2	
17057	REF	86	LAST 423	40.3060	0 4616 1	SFMIXCAL TC	BANKCALL	
17058	REF	5	LAST 430	40.3061	63034 0	CADR	SFRUTMIX	
17059	REF	1		40.3062	0 3047 1	TC	MIXBACK	
170591	REF	87	LAST 432	40.3063	0 4616 1	SFNDRCAL TC	BANKCALL	
170592	REF	5	LAST 430	40.3064	63026 0	CADR	SFRUTNDR	
170593	REF	1		40.3065	0 3051 0	TC	NDRBACK	
1706	REF	8	LAST 432	40.3066	4 4733 0	NEG180 CS	PDSMAX	
1707	REF	2	LAST 431	40.3067	0 3042 1	TC	ENDSCALE -1	
1708	REF	147	LAST 432	40.3070	4 0154 0	SNT01 CS	MPAC	IF OF FORCE SIGN TO 1
1709	REF	9	LAST 432	40.3071	7 4733 0	MASK	PDSMAX	
1710	REF	132	LAST 432	40.3072	4 0000 0	CS	A	
1711	REF	3	LAST 432	40.3073	0 3042 1	TC	ENDSCALE -1	
1712				40.3074	26161 0	DEGCON1 2DEC	5.55555555 8-3	
1712				40.3075	30707 1			
1715	REF	7	LAST 431	40.3076	0 7103 1	ARTHINSE TC	UMP	SCALES MPAC. +1 BY SFTMP1. SFTMP2.
1716	REF	14	LAST 430	40.3077	00123 1	ADRES	SFTMP1	ASSUMES POINT BETWEEN HI AND LO PARTS
1717	REF	148	LAST 432	40.3100	56 156 0	XCH	MPAC +2	OF SFCUN. SHIFTS RESULTS LEFT BY 14.
1718	REF	149	LAST 432	40.3101	56 155 0	XCH	MPAC +1	(BY TAKING RESULTS FROM MPAC+1, MPAC+2)
1719	REF	150	LAST 432	40.3102	56 154 1	XCH	MPAC	
1720				40.3103	0 0006 1	EXTEND		
1721	REF	2	LAST 431	40.3104	1 3106 1	BZF	BINROUND	
1722	REF	5	LAST 428	40.3105	0 4145 0	TC	ALMOCYCLE	TOO LARGE A LOAD. ALARM AND RECYCLE.
1723	REF	2	LAST 431	40.3106	0 3163 0	BINROUND TC	2ROUND	
1724	REF	2	LAST 431	40.3107	0 3174 0	TC	TESTORUF	
1725	REF	1		40.3110	0 3056 1	TC	ENDSCALE	RETURNS IF NO OF/UF

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17251	REF	8	LAST	432	40,3111	0 7103 1	ARTINISF	TC	DMP	SCALES MPAC, +1 BY SFTEMP1, SFTEMP2.
17252	REF	15	LAST	432	40,3112	00123 1		ADRES	SFTEMP1	ROUNDS MPAC+1 INTO MPAC.
17253	REF	3	LAST	432	40,3113	0 3106 0		TC	BINROUND	

1739	REF	9	LAST	433	40,3114	0 7103 1	DPINSF	TC	DMP	SCALES MPAC, MPAC +1 BY SFTEMP1, SFTEMP2. STORES LOW PART OF RESULT IN (E SUBK) +1 OR E+1
1740	REF	16	LAST	433	40,3115	00123 1		ADRES	SFTEMP1	
1741	REF	151	LAST	432	40,3116	56 156 0		XCH	MPAC +2	
1742					40,3117	6 0000 1		DOUBLE		
1743	REF	152	LAST	433	40,3120	54 156 1		TS	MPAC +2	
1744	REF	80	LAST	430	40,3121	3 4755 1		CAF	ZERO	
1745	REF	153	LAST	433	40,3122	6 0155 0		AD	MPAC +1	
1746	REF	3	LAST	432	40,3123	0 3165 0		TC	ZEROUND +2	
1747	REF	3	LAST	432	40,3124	0 3174 0		TC	TESTRUP	
1748	REF	13	LAST	432	40,3125	50 140 1		INDEX	MIXER	RETURNS IF NO OF/OF
1749					40,3126	0 3126 1		TC	+0	
1750	REF	1			40,3127	0 3137 1		TC	DPINORM	
1751	REF	27	LAST	430	40,3130	3 0117 0		CA	DECOUNT	MIXEDNOUN
1752	REF	27	LAST	429	40,3131	6 0145 1	DPINCOM	AD	NOUNADD	MIXED
1753	REF	88	LAST	429	40,3132	54 002 1		TS	Q	E SUBK
1754	REF	154	LAST	433	40,3133	56 155 0		XCH	MPAC +1	
1755	REF	89	LAST	433	40,3134	50 002 0		INDEX	Q	
1756					40,3135	54 001 1		TS	1	PLACE LOW PART IN
1757	REF	2	LAST	432	40,3136	0 3056 1		TC	ENDSCALE	(E SUBK) +1 MIXED
1758	REF	81	LAST	433	40,3137	3 4755 1	DPINORM	CAF	ZERO	E +1
1759	REF	1			40,3140	0 3131 1		TC	DPINCOM	NORMAL

1760	REF	10	LAST	433	40,3141	0 7103 1	DPINSF2	TC	DMP	ASSUMES POINT BETWEEN BITS 7-8 OF HIGH PART OF SF CONST. DPINSF2 SHIFTS RESULTS LEFT BY 7, ROUNDS MPAC+2 INTO MPAC+1
1761	REF	17	LAST	433	40,3142	00123 1		ADRES	SFTEMP1	
1762	REF	13	LAST	425	40,3143	3 6242 0		CAF	SIX	
1763	REF	2	LAST	419	40,3144	0 3153 0		TC	TPLEFTN	SHIFT LEFT 7.
1764	REF	3	LAST	431	40,3145	0 3116 1		TC	DPINSF +2	

1765	REF	11	LAST	433	40,3146	0 7103 1	DPINSF4	TC	DMP	ASSUMES POINT BETWEEN BITS 11-12 OF HIGH PART OF SF CONST. DPINSF2 SHIFTS RESULTS LEFT BY 3, ROUNDS MPAC+2 INTO MPAC+1.
1766	REF	18	LAST	433	40,3147	00123 1		ADRES	SFTEMP1	
1767	REF	28	LAST	427	40,3150	3 4752 0		CAF	TWO	
1768	REF	3	LAST	433	40,3151	0 3153 0		TC	TPLEFTN	SHIFT LEFT 3.
1769	REF	4	LAST	433	40,3152	0 3116 1		TC	DPINSF +2	

1770	REF	90	LAST	433	40,3153	56 002 0	TPLEFTN	XCH	Q	SHIFTS MPAC, +1, +2 LEFT N. SETS DVFIND TO +1 FOR OF, -1 FOR UP.
1771	REF	1			40,3154	54 124 1		TS	SFTEMP2	
1772	REF	91	LAST	433	40,3155	56 002 0		XCH	Q	CALL WITH N-1 IN A.
1773	REF	19	LAST	433	40,3156	54 123 0	LEFTNCOM	TS	SFTEMP1	LOOP TIME .37 MSEC.
1774	REF	6	LAST	431	40,3157	0 4404 0		TC	TPSL1	
1775	REF	20	LAST	433	40,3160	10 123 0		CCS	SFTEMP1	
1776	REF	1			40,3161	0 3156 0		TC	LEFTNCOM	

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1777	REF	2	LAST	433	40,3162	0 0124 0	TC	SFTEMP2	
1778	REF	155	LAST	433	40,3163	56 155 0	2ROUND	XCH	MPAC +1
1779					40,3164	6 0000 1	DDOUBLE		
1780	REF	156	LAST	434	40,3165	54 155 1	TS	MPAC	+1
1781	REF	92	LAST	433	40,3166	0 0002 0	TC	Q	IF MPAC+1 DOES NOT OF/UF
1782	REF	157	LAST	434	40,3167	6 0154 1	AD	MPAC	
1783	REF	158	LAST	434	40,3170	54 154 0	TS	MPAC	
1784	REF	93	LAST	434	40,3171	0 0002 0	TC	Q	IF MPAC DOES NOT OF/UF
1785	REF	5	LAST	431	40,3172	54 162 0	TS	MPAC+6	
1786	REF	94	LAST	434	40,3173	0 0002 0	2RNDEND	TC	Q
1787	REF	6	LAST	434	40,3174	10 162 0	TESTGFUF	CCS	MPAC+6
1788	REF	6	LAST	432	40,3175	0 4145 0	TC	ALMCYCLE	UF ALARM AND RECYCLE.
1789	REF	95	LAST	434	40,3176	0 0002 0	TC	Q	
1790	REF	7	LAST	434	40,3177	0 4145 0	TC	ALMCYCLE	UF ALARM AND RECYCLE.
1791	REF	1			42,3452		SETLOC	ENDSPHIN	+1
17915	REF	2	LAST	421	TO 424:	146 146*	COUNT*	\$6/PIN	
1792	REF	1			42,3452	0 3573 0	HMSIN	TC	ALL3DEC
1793	REF	12	LAST	433	42,3453	0 7103 1	TC	DMP	IF ALL 3 WORDS WERE NOT LOADED, ALARM.
1794	REF	1			42,3454	03534 0	ADRES	WHOLECON	XREG, XREGLP (=HOURS) WERE ALREADY PUT
1795	REF	1			42,3455	0 3543 0	TC	AND/TST	INTO MPAC. MPAC+1.
1796	REF	82	LAST	433	42,3456	3 4755 1	CAF	ZERO	ROUND OFF TO WHOLE HRS IN MPAC+1.
1797	REF	159	LAST	434	42,3457	54 156 1	TS	MPAC	ALARM IF MPAC NON ZERO (G/ 16383).
1798	REF	1			42,3460	3 3536 1	CAF	HRCON	
1799	REF	160	LAST	434	42,3461	54 154 0	TS	MPAC	
1800	REF	2	LAST	434	42,3462	3 3537 0	CAF	HRCON	+1
1801	REF	161	LAST	434	42,3463	56 155 0	XCH	MPAC	+1
1802	REF	4	LAST	422	42,3464	0 7307 1	TC	SHKTMF	
1803	REF	1			42,3465	0 3554 0	TC	MPACTST	ALARM IF MPAC NON ZERO (G/ 745)
1804	REF	162	LAST	434	42,3466	52 156 1	DXCH	MPAC	+1
1805	REF	1			42,3467	52 124 1	DXCH	HITEMIN	STORE HOURS CONTRIBUTION
1806	REF	3	LAST	426	42,3470	3 1004 1	CA	YREG	PUT YREG, YREGLP INTO MPAC. +1.
1807	REF	2	LAST	101	42,3471	23 007 1	LXCH	YREGLP	
1808	REF	163	LAST	434	42,3472	52 155 1	DXCH	MPAC	
1809	REF	13	LAST	434	42,3473	0 7103 1	TC	DMP	
1810	REF	2	LAST	434	42,3474	03534 0	ADRES	WHOLECON	
1811	REF	2	LAST	434	42,3475	0 3543 0	TC	AND/TST	ROUND OFF TO WHOLE MIN IN MPAC+1
1812	REF	1			42,3476	4 3541 0	CS	59MIN	ALARM IF MPAC NON ZERO (G/16383)
1813	REF	1			42,3477	0 3561 0	TC	SIZETST	ALARM IF MPAC+1 G/ 59MIN
1814	REF	164	LAST	434	42,3500	56 155 0	XCH	MPAC	+1
1815					42,3501	0 0006 1	EXTEND		
1816	REF	1			42,3502	7 3540 1	MP	MINCON	LEAVES MINUTES CONTRIBUTION IN A.L
1817	REF	2	LAST	434	42,3503	20 124 1	DAS	HITEMIN	ADD IN MINUTES CONTRIBUTION
1818					42,3504	0 0006 1	EXTEND		IF THIS DAS OVERFLOWS, G/ 745HR, 39MIN

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1819				42,3505	1 3507 1	BZF	+2	
1820	REF	8	LAST	434	42,3506	0 4145 0	TC	ALMCYCLE
1821	REF	3	LAST	426	42,3507	3 1005 0	CA	ZREG
1822	REF	2	LAST	101	42,3510	23 010 1	LXCH	ZREGLP
1823	REF	165	LAST	434	42,3511	52 155 1	DXCH	MPAC
1824	REF	14	LAST	434	42,3512	0 7103 1	TC	DMP
1825	REF	3	LAST	434	42,3513	03534 0	ADRES	WHOLECON
1826	REF	3	LAST	434	42,3514	0 3543 0	TC	RND/TST
1827	REF	1			42,3515	4 3542 0	CS	59.99SEC
1828	REF	2	LAST	434	42,3516	0 3561 0	TC	SIZETST
1829	REF	3	LAST	434	42,3517	52 124 1	DXCH	HITEMIN
1830	REF	166	LAST	435	42,3520	20 155 1	DAS	MPAC
1831					42,3521	0 0006 1	EXTEND	
1832					42,3522	1 3524 0	BZF	+2
1833	REF	9	LAST	435	42,3523	0 4145 0	TC	ALMCYCLE
1834	REF	83	LAST	434	42,3524	3 4755 1	CAF	ZERO
1835	REF	167	LAST	435	42,3525	54 156 1	TS	MPAC +2
1836	REF	6	LAST	424	42,3526	0 7257 0	TC	TPAGREE
1837	REF	168	LAST	435	42,3527	52 155 1	DXCH	MPAC
1838	REF	28	LAST	433	42,3530	50 145 1	INDEX	NOUNADD
1839					42,3531	52 001 1	DXCH	0
1840	REF	26	LAST	432	42,3532	0 4635 0	TC	POSTJUMP
1841	REF	10	LAST	430	42,3533	62775 0	CADR	LOADLV
1842					42,3534	00006 1	WHOLECON	OCT 00006
1843					42,3535	03240 1		OCT 03240
1844					42,3536	00025 0	HRCON	OCT 00025
1845					42,3537	37100 1		OCT 37100
1846					42,3540	13560 0	MINCON	OCT 13560
1847					42,3541	00073 0	59MIN	OCT 00073
1848					42,3542	13557 1	59.99SEC	OCT 13557
1849	REF	169	LAST	435	42,3543	56 156 0	RND/TST	XCH MPAC +2
1850					42,3544	6 0000 1		DOUBLE
1851	REF	170	LAST	435	42,3545	54 156 1	TS	MPAC +2
1852	REF	84	LAST	435	42,3546	3 4755 1	CAF	ZERO
1853	REF	171	LAST	435	42,3547	6 0155 0	AD	MPAC +1
1854	REF	172	LAST	435	42,3550	54 155 1	TS	MPAC +1
1855	REF	85	LAST	435	42,3551	3 4755 1	CAF	ZERO
1856	REF	173	LAST	435	42,3552	6 0154 1	AD	MPAC
1857	REF	174	LAST	435	42,3553	56 154 1	XCH	MPAC
1858	REF	175	LAST	435	42,3554	10 154 0	MPACTST	CCS MPAC
1859	REF	10	LAST	435	42,3555	0 4145 0	TC	ALMCYCLE
1860	REF	96	LAST	434	42,3556	0 0002 0	TC	0
1861	REF	11	LAST	435	42,3557	0 4145 0	TC	ALMCYCLE
1862	REF	97	LAST	435	42,3560	0 0002 0	TC	0
1863	REF	176	LAST	435	42,3561	54 156 1	SIZETST	TS MPAC +2
1864	REF	177	LAST	435	42,3562	10 155 1	CCS	MPAC +1

PUT ZREG, ZREGLP INTO MPAC, +1.

ROUND OFF TO WHOLE CENTI-SEC IN MPAC+1

ALARM IF MPAC NON ZERO (G/163.83 SEC)

ALARM IF MPAC+1 G/59.99 SEC

ADD IN SECONDS CONTRIBUTION

IF THIS DAS OVERFLOWS,

G/ 745 HR, 39 MIN, 14.55 SEC.

ALARM AND RECYCLE

(10EXP5/2EXP14)2EXP14

1 HOUR IN CENTI-SEC

1 MINUTE IN CENTI-SEC

59 AS WHOLE

5999 CENTI-SEC

ROUNDS MPAC+2 INTO MPAC+1.

ALARMS IF MPAC NOT 0

CANT OVFLOW

ALARM IF MPAC NON ZERO

ALARM AND RECYCLE.

ALARM AND RECYCLE.

CALLED WITH - CON IN A

GET MAG OF MPAC+1

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1865	REF 44	LAST 430	42,3563	6 4753 1	AD	ONE	
1866			42,3564	1 3566 0	TCF	+2	
1867	REF 45	LAST 436	42,3565	6 4753 1	AD	ONE	
1868	REF 178	LAST 435	42,3566	6 0156 0	AD	MPAC	+2
1869			42,3567	0 0006 1	EXTEND		MAG OF MPAC+1 - CON
1870			42,3570	6 3572 1	BZMF	+2	
1871	REF 12	LAST 435	42,3571	0 4145 0	TC	ALMCYCLE	MAG OF MPAC+1 G/ CON. ALARM AND RECYCLE.
1872	REF 98	LAST 435	42,3572	0 0002 0	TC	Q	MAG OF MPAC+1 L/= CON

R1873 ALL3DEC TESTS THAT ALL 3 WORDS ARE LOADED IN DEC (FOR HMSIN).

R1874 ALARM IF NOT. (TEST THAT BITS 3,4,5 OF DECBRNCH ARE ALL = 1)

1875	REF 1		42,3573	4 3600 0	ALL3DEC	CS	OCT34BAR	GET BITS 3,4,5 IN A
1876	REF 17	LAST 429	42,3574	7 1000 1	MASK	DECBRNCH		GET BITS 3,4,5 OF DECBRNCH IN A
1877	REF 2	LAST 436	42,3575	6 3600 1	AD	OCT34BAR		BITS 3,4,5 OF DECBRNCH MUST ALL = 1
1878	REF 133	LAST 432	42,3576	10 000 0	CCS	A		
1879	REF 1		42,3577	0 3603 1	TC	FORCEV25		
1880			42,3600	77743 1	OCT34BAR	OCT	77743	
1881	REF 2	LAST 436	42,3601	0 3603 1	TC	FORCEV25		
1882	REF 99	LAST 436	42,3602	0 0002 0	TC	Q		

18825	REF 2	LAST 209	42,3603	4 6010 1	FORCEV25	CS	OCT31	FORCE VERB 25 TO BE EXECUTED BY RECYCLE
18826	REF 2	LAST 407	42,3604	55 041 1	TS	VERBSAVE		IN CASE OPERATOR EXECUTED A LOWER LOAD
18827	REF 13	LAST 436	42,3605	0 4145 0	TC	ALMCYCLE		VERB. ALARM AND RECYCLE.
1883			42,3606		ENDHMSS	EQUALS		

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P1884 MONITOR ALLOWS OTHER KEYBOARD ACTIVITY. IT IS ENDED BY VERB TERMINATE.
 R1885 VERB PROCEED WITHOUT DATA, VERB RESEQUENCE,
 R1886 ANOTHER MONITOR, OR ANY NVSUB CALL THAT PASSES THE DSPLOCK (PROVIDED
 R18361 THAT THE OPERATOR HAS SOMEHOW ALLOWED THE ENDING OF A MONITOR WHICH
 R18862 HE HAS INITIATED THROUGH THE KEYBOARD).

R1887 MONITOR ACTION IS SUSPENDED, BUT NOT ENDED, BY ANY KEYBOARD ACTION,
 R1888 EXCEPT ERROR LIGHT RESET. IT BEGINS AGAIN WHEN KEY RELEASE IS PERFORMED.
 R1889 MONITOR SAVES THE NOUN AND APPROPRIATE DISPLAY VERB IN MONSAVE. IT SAVES
 R1890 NOUNCADR IN MONSAVE1, IF NOUN = MACHINE CADR TO BE SPECIFIED. BIT 15 OF
 R1891 MONSAVE1 IS THE KILL MONITOR SIGNAL (KILLER BIT). BIT 14 OF MONSAVE1
 R18911 INDICATES THE CURRENT MONITOR WAS EXTERNALLY INITIATED (EXTERNAL
 R18912 MONITOR BIT). IT IS TURNED OFF BY RELOSP AND KILMONON.

R1892 MONSAVE INDICATES IF MONITOR IS ON(+ON, +O=OFF)
 R1893 IF MONSAVE IS +, MONITOR ENTERS NO REQUEST, BUT TURNS KILLER BIT OFF.
 R1894 IF MONSAVE IS +O, MONITOR ENTERS REQUEST AND TURNS KILLER BIT OFF.

R1895 NVSUB (IF EXTERNAL MONITOR BIT IS OFF). VB=PROCEED WITHOUT DATA,
 R1896 VB=RESEQUENCE, AND VB=TERMINATE TURN KILL MONITOR BIT ON.

R1897 IF KILLER BIT IS ON, MONREQ ENTERS NO FURTHER REQUESTS, ZEROS MONSAVE
 R1898 AND MONSAVE1 (TURNING OFF KILLER BIT AND EXTERNAL MONITOR BIT).

R1899 MONITOR DOESN'T TEST FOR MATBS SINCE NVSUB CAN HANDLE INTERNAL MATBS NOW
 1900 REF 1 41,3230 SETLOC ENDRUTIN

19005	REF	3	LAST	425	TO	431:	266	664*	COUNT*	\$\$/PIN	
1901	REF	1				41,3230	4	3237 0	MONITOR	CS	BIT15/14
1902	REF	6	LAST	430		41,3231	7	1017 1		MASK	NOUNCADR
1903	REF	179	LAST	436		41,3232	54	155 1	MONIT1	TS	MPAC +1 TEMP STORAGE
19031	REF	7	LAST	424		41,3233	4	0136 1		CS	ENTEXIT
19032	REF	4	LAST	407		41,3234	6	4217 1		AD	ENDINST
19033	REF	134	LAST	436		41,3235	10	000 0		CCS	A
19034	REF	1				41,3236	0	3245 1		TC	MONIT2
19035						41,3237	60000	1	BIT15/14	OCT	60000
19036	REF	2	LAST	437		41,3240	0	3245 1		TC	MONIT2
19037	REF	38	LAST	415		41,3241	3	4736 1		CAF	BIT14
19038	REF	180	LAST	437		41,3242	25	155 1		ADS	MPAC +1
190381	REF	86	LAST	435		41,3243	3	4755 1		CAF	ZERO
190382	REF	1				41,3244	55	022 1		TS	MONSAVE2
1904	REF	3	LAST	232		41,3245	3	6074 1	MONIT2	CAF	LOW7
1905	REF	17	LAST	414		41,3246	7	1001 0		MASK	VERBREG
1906	REF	4	LAST	429		41,3247	0	4331 1		TC	LEFT5
1907	REF	5	LAST	400		41,3250	54	022 0		TS	CYL
1908	REF	6	LAST	437		41,3251	4	0022 0		CS	CYL
1909	REF	7	LAST	437		41,3252	56	022 1		XCH	CYL
1910	REF	11	LAST	425		41,3253	6	1002 1		AD	NOUNREG
1911	REF	181	LAST	437		41,3254	54	154 0		TS	MPAC
1912	REF	87	LAST	437		41,3255	3	4755 1		CAF	ZERO

 EXTERNALLY INITIATED MONITOR,
 SET BIT 14 FOR MONSAVE1.

ZERO NVMONOPT OPTIONS

TEMP STORAGE

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1913	REF	3	LAST	398	41,3256	55'012 1	TS	DSBLOCK	+0 INTO DSPLOCK SO MONITOR CAN RUN.
1914	REF	4	LAST	407	41,3257	11'042 1	CCS	CADRSTOR	TURN OFF KR LITE IF CADRSTOR AND DSPLIST
1915					41,3260	0 3262 1	TC	+2	ARE BOTH EMPTY. (LITE COMES ON IF NEW
1916	REF	1			41,3261	0 4502 1	TC	RELDSP1	MONITOR IS KEYED IN OVER OLD MONITOR.)
1917					41,3262	0 0004 0	INHINT		
1918	REF	2	LAST	222	41,3263	11'020 0	CCS	MONSAVE	
1919					41,3264	0 3271 0	TC	+5	IF MONSAVE WAS +, NO REQUEST
1920	REF	46	LAST	436	41,3265	3 4753 1	CAF	ONE	IF MONSAVE WAS 0, REQUEST MONREQ
1921	REF	15	LAST	367	41,3266	0 5203 0	TC	WAITLIST	
1922	REF	39	LAST	430	0777		EBANK=	DSPCOUNT	
1923	REF	1			41,3267	03275 1	2CADR	MONREQ	
1923	REF	1			41,3270	62101 0			
1924	REF	182	LAST	437	41,3271	52 155 1	DXCH	HPAC	PLACE MONITOR VERB AND NOUN INTO MONSAVE
1925	REF	3	LAST	438	41,3272	53'021 1	DXCH	MONSAVE	ZERO THE KILL MONITOR BIT
1926					41,3273	0 0003 1	RELINT		SET UP EXTERNAL MONITOR BIT
1927	REF	4	LAST	406	41,3274	0 0136 0	TC	ENTRET	
1928	REF	1			41,3275	0 4400 1	TC	LODSAMPT	CALLED BY WAITLIST
1929	REF	2	LAST	222	41,3276	11'021 1	CCS	MONSAVE1	TIME IS SNATCHED IN RUPT FOR NOUN 65
1930					41,3277	0 3303 1	TC	+4	IF KILLER BIT = 0, ENTER REQUESTS
1931					41,3300	0 3303 1	TC	+3	IF KILLER BIT = 0, ENTER REQUESTS
1932	REF	1			41,3301	0 3314 1	TC	KILLMON	IF KILLER BIT = 1, NO REQUESTS
1933	REF	2	LAST	438	41,3302	0 3314 1	TC	KILLMON	IF KILLER BIT = 1, NO REQUESTS
1934	REF	1			41,3303	3 3320 0	CAF	MONDEL	
1935	REF	16	LAST	438	41,3304	0 5203 0	TC	WAITLIST	ENTER WAITLIST REQUEST FOR MONREQ
1936	REF	40	LAST	438	0777		EBANK=	DSPCOUNT	
1937	REF	2	LAST	438	41,3305	03275 1	2CADR	MONREQ	
1937					41,3306	62101 0			
1938	REF	2	LAST	158	41,3307	3 4355 0	CAF	CHRPRI0	
1939	REF	5	LAST	328	41,3310	0 5072 1	TC	NOVAC	ENTER EXEC REQUEST FOR MONDO
1940	REF	41	LAST	438	0777		EBANK=	DSPCOUNT	
1941	REF	1			41,3311	03321 1	2CADR	MONDO	
1941	REF	1			41,3312	62101 0			
1942	REF	11	LAST	384	41,3313	0 5261 1	TC	TASKOVER	
1943	REF	88	LAST	437	41,3314	3 4755 1	CAF	ZERO	ZERO MONSAVE AND TURN KILLER BIT OFF
1944	REF	4	LAST	438	41,3315	55'020 0	TS	MONSAVE	
1945	REF	3	LAST	438	41,3316	55'021 1	TS	MONSAVE1	TURN OFF KILL MONITOR BIT.
1946	REF	12	LAST	438	41,3317	0 5261 1	TC	TASKOVER	TURN OFF EXTERNAL MONITOR BIT.
1947					41,3320	00144 0	DGT	144	FOR 1 SEC MONITOR INTERVALS
1948	REF	4	LAST	438	41,3321	11'021 1	CCS	MONSAVE1	CALLED BY EXEC
1949					41,3322	0 3326 0	TC	+4	IF KILLER BIT = 0, CONTINUE
1950					41,3323	0 3326 0	TC	+3	IF KILLER BIT = 0, CONTINUE
1951	REF	47	LAST	404	41,3324	0 5155 0	TC	ENDOFJOB	IN CASE TERMINATE CAME SINCE LAST MONREQ
1952	REF	48	LAST	438	41,3325	0 5155 0	TC	ENDOFJOB	IN CASE TERMINATE CAME SINCE LAST MONREQ
1953	REF	4	LAST	438	41,3326	11'012 1	CCS	DSBLOCK	
1954	REF	1			41,3327	0 3351 0	TC	MONBUSY	NVSUB IS BUSY

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1955	REF	4	LAST	437	41,3330	3 6074 1	CAF	LOW7	
1956	REF	5	LAST	438	41,3331	7 1020 0	MASK	MONSAVE	
1958	REF	1			41,3332	0 2317 0	TC	UPDATNN -1	PLACE NOUN INTO NOUNREG AND DISPLAY IT
1960	REF	1			41,3333	3 4144 1	CAF	MID7	
1961	REF	6	LAST	439	41,3334	7 1020 0	MASK	MONSAVE	CHANGE MONITOR VERB TO DISPLAY VERB
1962	REF	1			41,3335	6 3347 1	AD	MONREF	-DEC10, STARTING IN BIT8
1963	REF	1			41,3336	54 023 1	TS	EDOP	RIGHT 7
1964	REF	2	LAST	439	41,3337	3 0023 0	CA	EDOP	
1965	REF	18	LAST	437	41,3340	55 001 0	TS	VERBREG	
1966	REF	1			41,3341	3 3350 1	CAF	MONBACK	SET RETURN TO PASTEVB AFTER DATA DISPLAY
1967	REF	5	LAST	438	41,3342	54 136 1	TS	ENTRET	
1968	REF	2	LAST	437	41,3343	4 3237 0	CS	BIT15/14	
1969	REF	5	LAST	438	41,3344	7 1021 1	MASK	MONSAVE1	PUT ECADR INTO MPAC +2. INTMCTBS WILL
1970	REF	183	LAST	438	41,3345	54 156 1	TS	MPAC +2	DISPLAY IT AND SET NOUNCADR, NOUNADD,
1971	REF	1			41,3346	0 2046 1	ENDMONDO TC	TESTNN	EBANK.

1972					4124		BLOCK 2	
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197201	REF	1			4000		SETLOC FFTAG8	
197202					4124		BANK	

19725	REF	1					COUNT* \$\$/PIN	
1973	REF	2	LAST	439	4124	3 4144 1	PASTEVB CAF	MID7
1974	REF	2	LAST	437	4125	7 1022 1	MASK	MONSAVE2 NVMONOPT PASTE OPTION
1975					4126	0 0006 1	EXTEND	
1976					4127	1 4131 1	BZF	+2
1977	REF	1			4130	0 4132 0	TC	PASTEOPT
1978	REF	7	LAST	439	4131	3 1020 1	CA	MONSAVE
19782	REF	3	LAST	439	4132	54 023 1	PASTEOPT TS	EDOP
19783	REF	4	LAST	439	4133	3 0023 0	CA	EDOP
197832	REF	88	LAST	432	4134	0 4616 1	TC	BANKCALL
197833	REF	7	LAST	426	4135	62337 1	CADR	UPDATVB -1
197835	REF	89	LAST	438	4136	3 4755 1	CAF	ZERO
197838	REF	10	LAST	411	4137	55 013 0	TS	REQRET
19784	REF	3	LAST	439	4140	3 1022 0	CA	MONSAVE2
19785	REF	1			4141	0 4255 1	TC	BLANKSUB
19786					4142	0 4143 0	TC	+1
19787	REF	49	LAST	438	4143	0 5155 0	ENDPASTE TC	ENDOFJOB

1979					4144	37600 0	MID7	OCT	37600
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1980	REF	1			41,3347		SETLOC ENDMONDO +1	
19805	REF	4	LAST	437 TO 439:	79	743*	COUNT* \$\$/PIN	
1981					41,3347	75377 0	OCT	75377
1982	REF	1			41,3350	04124 1	MONREF	-DEC10, STARTING IN BIT8
							MONBACK	ADRES PASTEVB
1983	REF	2	LAST	398	41,3351	0 4374 0	MONBUSY	TC
1984	REF	50	LAST	439	41,3352	0 5155 0	TC	RELDSPON
								ENDOFJOB

TURN KEY RELEASE LIGHT

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R1985 DSPFMEM IS USED TO DISPLAY (IN OCTAL) ANY FIXED REGISTER.

R1986 IT IS USED WITH NOUN = MACHINE CADR TO BE SPECIFIED. THE FCADR OF THE

R1987 DESIRED LOCATION IS THEN PUNCHED IN. IT HANDLES F/F (FCADR 4000-7777)

R19871 FOR BANKS L/E 27, THIS IS ENOUGH.

R19872 FOR BANKS G/E 30, THE THIRD COMPONENT OF NOUN 26 (PRIO, ADRES, BBCON)

R19873 MUST BE PRELOADED WITH THE DESIRED SUPERBANK BITS (BITS 5,6,7).

R19874 V23N26 SHOULD BE USED.

R19875 SUMMARY

R19876 FOR BANKS L/E 27, V27N01E(FCADR)E

R19877 FOR BANKS G/E 30, V23N26E(SUPERBITS)E V27N01E(FCADR)E

1988	REF 11	LAST 424	41,3353	3 4317 0	DSPFMEM	CAF	R101	IF F/F, DATACALL USES BANK 02 OR 03.
1989	REF 42	LAST 438	41,3354	54 777 1		TS	DSPCOUNT	
19891	REF 17	LAST 374	41,3355	3 1047 0		CA	DSPTEM1 +2	SUPERBANK BITS WERE PRELOADED INTO
19892	REF 58	LAST 428	41,3356	54 001 1		TS	L	3RD COMPONENT OF NOUN 26.
1990	REF 7	LAST 437	41,3357	3 1017 0		CA	NOUNCADR	ORIGINAL FCADR LOADED STILL IN NOUNCADR.
1991	REF 1		41,3360	0 4651 1		TC	SUPDACAL	CALL WITH FCADR IN A, SUPERBITS IN L.
1992	REF 3	LAST 414	41,3361	0 3363 1		TC	DSPDCTWD	
1993	REF 51	LAST 439	41,3362	0 5155 0	ENDSPF	TC	ENDOFJOB	

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P1994 WORD DISPLAY ROUTINES

1995	REF 4	LAST 433	40,3200		SETLOC TESTOFUF +4
19955	REF 5	LAST 431 TO 434:	120 577*		COUNT* \$\$/PIN
1996	REF 100	LAST 436	40,3200	56 002 0	DSPSIGN XCH Q
1997	REF 1		40,3201	54 144 1	TS DSPWDRET
1998	REF 184	LAST 439	40,3202	10 154 0	CCS MPAC
1999			40,3203	0 3213 1	TC +80
2000			40,3204	0 3213 1	TC +7
2001	REF 47	LAST 438	40,3205	6 4753 1	AD ONE
2002	REF 185	LAST 441	40,3206	54 154 0	TS MPAC
2003	REF 2	LAST 402	40,3207	0 2433 1	TC -ON
2004	REF 186	LAST 441	40,3210	4 0155 1	CS MPAC +1
2005	REF 187	LAST 441	40,3211	54 155 1	TS MPAC +1
2006	REF 2	LAST 441	40,3212	0 0144 0	TC DSPWDRET
2007	REF 3	LAST 420	40,3213	0 2413 0	TC +ON
2008	REF 3	LAST 441	40,3214	0 0144 0	TC DSPWDRET

2009			40,3215	0 0006 1	DSPRND EXTEND	ROUND BY 5 EXP-6
2010	REF 1		40,3216	3 3261 1	DCA DECROUND -1	
2011	REF 188	LAST 441	40,3217	20 155 1	DAS MPAC	
2012			40,3220	0 0006 1	EXTEND	
2013			40,3221	1 3225 0	BZF +4	
2014			40,3222	0 0006 1	EXTEND	
2015	REF 1		40,3223	3 4733 1	DCA DPOS MAX	
2016	REF 189	LAST 441	40,3224	52 155 1	DXCH MPAC	
2017	REF 101	LAST 441	40,3225	0 0002 0	TC Q	

R2018 DSPDECWD CONVERTS C(MPAC, MPAC+1) INTO A SIGN AND 5 CHAR DECIMAL
 R2019 STARTING IN LOC SPECIFIED IN DSPCOUNT. IT ROUNDS BY 5 EXP-6.

2020	REF 102	LAST 441	40,3226	56 002 0	DSPDECWD XCH Q	
2021	REF 1		40,3227	54 115 0	TS WDRET	
2022	REF 1		40,3230	0 3200 0	TC DSPSIGN	
2023	REF 1		40,3231	0 3215 1	TC DSPRND	
2024	REF 7	LAST 333	40,3232	3 4751 0	CAF FOUR	
2025	REF 1		40,3233	54 137 0	DSPDCWD1 TS WDCNT	
2026	REF 1		40,3234	3 4363 0	CAF BINCON	
2027	REF 5	LAST 434	40,3235	0 7307 1	TC SHORTMP	
2028	REF 190	LAST 441	40,3236	50 154 1	TRACE1 INDEX MPAC	
2029	REF 3	LAST 399	40,3237	3 4066 0	CAF RELTAB	
2030	REF 5	LAST 429	40,3240	7 4346 0	MASK LOW5	
2031	REF 6	LAST 422	40,3241	54 124 1	TS CODE	
2032	REF 90	LAST 439	40,3242	3 4755 1	CAF ZERO	
2033	REF 191	LAST 441	40,3243	56 156 0	XCH MPAC +2	
2034	REF 192	LAST 441	40,3244	56 155 0	XCH MPAC +1	
2035	REF 193	LAST 441	40,3245	54 154 0	TS MPAC	
2036	REF 43	LAST 440	40,3246	56 777 0	XCH DSPCOUNT	
2037	REF 4	LAST 423	40,3247	54 143 0	TRACE1S TS COUNT	
2038	REF 135	LAST 437	40,3250	10 000 0	CCS A	DECREMENT DSPCOUNT EXCEPT AT +0

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2039	REF	44	LAST	441	40,3251	54 777 1	TS	DSPCOUNT
2040	REF	4	LAST	423	40,3252	0 3322 1	TC	DSPIN
2041	REF	2	LAST	441	40,3253	10 137 0	CCS	WDCNT
2042	REF	1			40,3254	0 3233 0	TC	DSPDCWD1
2043	REF	7	LAST	427	40,3255	4 4360 1	CS	VD1
2044	REF	45	LAST	442	40,3256	54 777 1	TS	DSPCOUNT
2045	REF	2	LAST	441	40,3257	0 0115 1	TC	WDRET

2046					40,3260	00000 1	OCT	00000
2047					40,3261	02476 0	DECROUND OCT	02476

R2048 DSPDECNR CONVERTS C(MPAC,MPAC+1) INTO A SIGN AND 5 CHAR DECIMAL
 R2049 STARTING IN LOC SPECIFIED IN DSPCOUNT. IT DOES NOT ROUND

2050	REF	103	LAST	441	40,3262	56 002 0	DSPDECNR XCH	Q
2051	REF	3	LAST	442	40,3263	54 115 0	TS	WDRET
2052	REF	2	LAST	441	40,3264	0 3200 0	TC	DSPSIGN
2053	REF	2	LAST	442	40,3265	0 3232 1	TC	DSPDCWD1 -1

R2054 DSPDC2NR CONVERTS C(MPAC,MPAC+1) INTO A SIGN AND 2 CHAR DECIMAL
 R2055 STARTING IN LOC SPECIFIED IN DSPCOUNT. IT DOES NOT ROUND

2056	REF	104	LAST	442	40,3266	56 002 0	DSPDC2NR XCH	Q
2057	REF	4	LAST	442	40,3267	54 115 0	TS	WDRET
2058	REF	3	LAST	442	40,3270	0 3200 0	TC	DSPSIGN
2059	REF	48	LAST	441	40,3271	3 4753 1	CAF	ONE
2060	REF	3	LAST	442	40,3272	0 3233 0	TC	DSPDCWD1

R2061 DSP2DEC CONVERTS C(MPAC) AND C(MPAC+1) INTO A SIGN AND 10 CHAR DECIMAL
 R2062 STARTING IN THE LOC SPECIFIED IN DSPCOUNT.

2063	REF	105	LAST	442	40,3273	56 002 0	DSP2DEC XCH	Q
2064	REF	5	LAST	442	40,3274	54 115 0	TS	WDRET
2065	REF	91	LAST	441	40,3275	3 4755 1	CAF	ZERO
2066	REF	7	LAST	441	40,3276	54 124 1	TS	CODE
2067	REF	15	LAST	422	40,3277	3 6245 1	CAF	THREE
2068	REF	3	LAST	403	40,3300	0 3404 1	TC	11DSPIN -R2 OFF
2069	REF	8	LAST	441	40,3301	3 4751 0	CAF	FOUR
2070	REF	4	LAST	442	40,3302	0 3404 1	TC	11DSPIN +R2 OFF
2071	REF	4	LAST	442	40,3303	0 3200 0	TC	DSPSIGN
2072	REF	4	LAST	421	40,3304	3 4320 1	CAF	R2D1
2073	REF	4	LAST	442	40,3305	0 3233 0	END2DEC TC	DSPDCWD1

R2074 DSPDECVN DISPLAYS C(A) UPON ENTRY AS A 2 CHAR DECIMAL BEGINNING IN THE
 R2075 DSP LOC SPECIFIED IN DSPCOUNT.
 R2076 C(A) SHOULD BE IN FORM N X 2EXP-14. THIS IS SCALED TO FORM N/100 BEFORE
 R2077 DISPLAY CONVERSION.

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2078					40,3306	0 0006 1	DSPDECVN	EXTEND		
2079	REF	1			40,3307	7 3316 1	MP	VNDSPCON	MULT BY .01	
2080	REF	194	LAST	441	40,3310	22 154 1	LXCH	MPAC	TAKE RESULTS FROM L. (MULT BY 2EXP14).	
2081	REF	92	LAST	442	40,3311	3 4755 1	CAF	ZERO		
2082	REF	195	LAST	443	40,3312	54 155 1	TS	MPAC	+1	
2083	REF	106	LAST	442	40,3313	56 002 0	XCH	Q		
2084	REF	6	LAST	442	40,3314	54 115 0	TS	WDRET		
2085	REF	3	LAST	423	40,3315	0 3271 0	TC	DSPDC2NR	+3	NO SIGN. NO ROUND. 2 CHAR
2086					40,3316	00244 0	VNDSPCON	OCT	00244	.01 ROUNDED UP
2087	REF	3	LAST	420	40,3317	0 3306 1	GOVNUPDT	TC	DSPDECVN	THIS IS NOT FOR GENERAL USE. REALLY PART
2088	REF	27	LAST	435	40,3320	0 4635 0	TC	POSTJUMP		OF UPDATVB.
2089	REF	2	LAST	411	40,3321	62347 0	CADR	UPDAT1	+2	
2090					40,3322		ENDECVN	EQUALS		
2091	REF	1			41,3363		SETLOC	ENDSPF	+1	
20915	REF	5	LAST	439 TO 441:	12	755*	COUNT*	\$/PIN		
2092	DSPOCTWD DISPLAYS C(A) UPON ENTRY AS A 5 CHAR OCT STARTING IN THE DSP									
2093	CHAR SPECIFIED IN DSPCOUNT. IT STOPS AFTER 5 CHAR HAVE BEEN DISPLAYED.									
2094	REF	8	LAST	437	41,3363	54 022 0	DSPOCTWD	TS	CYL	
2095	REF	107	LAST	443	41,3364	56 002 0	XCH	Q		
2096	REF	7	LAST	443	41,3365	54 115 0	TS	WDRET		MUST USE SAME RETURN AS DSP28IT.
2097	REF	39	LAST	437	41,3366	3 4736 1	CAF	BIT14		TO BLANK SIGNS
2098	REF	46	LAST	442	41,3367	26 777 1	ADS	DSPCOUNT		
2099	REF	9	LAST	442	41,3370	3 4751 0	CAF	FOUR		
2100	REF	3	LAST	442	41,3371	54 137 0	WDAGAIN	TS	WDCNT	
2101	REF	9	LAST	443	41,3372	4 0022 0	CS	CYL		
2102	REF	10	LAST	443	41,3373	4 0022 0	CS	CYL		
2103	REF	11	LAST	443	41,3374	4 0022 0	CS	CYL		
2104	REF	136	LAST	441	41,3375	4 0000 0	CS	A		
2105	REF	1			41,3376	7 4757 1	MASK	DSPMSK		
2106	REF	137	LAST	443	41,3377	50 000 1	INDEX	A		
2107	REF	4	LAST	441	41,3400	3 4066 0	CAF	RELTAB		
2108	REF	6	LAST	441	41,3401	7 4346 0	MASK	LOW5		
2109	REF	8	LAST	442	41,3402	54 124 1	TS	CODE		
2110	REF	47	LAST	443	41,3403	56 777 0	XCH	DSPCOUNT		
2111	REF	5	LAST	441	41,3404	54 143 0	TS	COUNT		
2112	REF	138	LAST	443	41,3405	10 000 0	CCS	A		DECREMENT DSPCOUNT EXCEPT AT +0
2113	REF	48	LAST	443	41,3406	54 777 1	TS	DSPCOUNT		
2114	REF	28	LAST	443	41,3407	0 4635 0	TC	POSTJUMP		
2115	REF	1			41,3410	61412 1	CADR	DSPOCTIN		
2116	REF	4	LAST	443	41,3411	10 137 0	OCTBACK	CCS	WDCNT	
2117	REF	1			41,3412	0 3371 1	TC	WDAGAIN		
2118	REF	8	LAST	442	41,3413	4 4360 1	DSPLV	CS	VD1	TO BLOCK NUMERICAL CHARACTERS. CLEARS,
2119	REF	49	LAST	443	41,3414	54 777 1	TS	DSPCOUNT		AND SIGNS AFTER A COMPLETED DISPLAY.

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2120 REF 8 LAST 443 41,3415 0 0115 1 TC WDRET

2121 REF 4 LAST 430 4757 DSPMSK = SEVEN

R2122 DSP2BIT DISPLAYS C(A) UPON ENTRY AS A 2 CHAR OCT BEGINNING IN THE DSP
R2123 LOC SPECIFIED IN DSPCOUNT BY PRE CYCLING RIGHT C(A) AND USING THE LOGIC
R2124 OF THE 5 CHAR OCTAL DISPLAY

2125	REF	3	LAST	232	41,3416	54 020 1	DSP2BIT	TS	CYR
2126	REF	108	LAST	443	41,3417	56 002 0		XCH	Q
2127	REF	9	LAST	444	41,3420	54 115 0		TS	WDRET
2128	REF	49	LAST	442	41,3421	3 4753 1		CAF	ONE
2129	REF	5	LAST	443	41,3422	54 137 0		TS	WDCNT
2130	REF	4	LAST	444	41,3423	4 0020 1		CS	CYR
2131	REF	5	LAST	444	41,3424	4 0020 1		CS	CYR
2132	REF	6	LAST	444	41,3425	56 020 0		XCH	CYR
2133	REF	12	LAST	443	41,3426	54 022 0		TS	CYL
2134	REF	2	LAST	443	41,3427	0 3376 0		TC	WDAGAIN +5

R2135 FOR DSPIN PLACE 0/25 OCT INTO COUNT, 5 BIT RELAY CODE INTO CODE. BOTH
R2136 ARE DESTROYED. IF BIT14 OF COUNT IS 1, SIGN IS BLANKED WITH LEFT CHAR.
R2137 FOR DSPIN1 PLACE 0.1 INTO BIT11 OF CODE, 2 INTO COUNT, REL ADDRESS OF
R2138 DSPTAB ENTRY INTO DSREL.

2139 REF 1 40,3322 SETLOC ENDECVN

21395	REF	6	LAST	441 TO	443:	82 659*	COUNT*	\$/PIN
2140	REF	109	LAST	444	40,3322	56 002 0	DSPIN	XCH Q
2141	REF	1			40,3323	54 114 1		TS DSEXIT
2142	REF	7	LAST	443	40,3324	3 4346 1		CAF LOW5
2143	REF	6	LAST	443	40,3325	7 0143 0		MASK COUNT
2144	REF	6	LAST	428	40,3326	54 021 0		TS SR
2145	REF	7	LAST	444	40,3327	56 021 1		XCH SR
2146	REF	1			40,3330	54 141 1		TS DSREL
2147	REF	19	LAST	295	40,3331	3 4753 1		CAF BIT1
2148	REF	7	LAST	444	40,3332	7 0143 0		MASK COUNT
2149	REF	139	LAST	443	40,3333	10 000 0		CCS A
2150					40,3334	0 3336 1		TC +2
2151	REF	1			40,3335	0 3346 0		TC DSPIN1 -1
2152	REF	9	LAST	443	40,3336	56 124 0		XCH CODE
2153	REF	1			40,3337	0 4340 1		TC SLEFT5
2154	REF	10	LAST	444	40,3340	54 124 1		TS CODE
2155	REF	40	LAST	443	40,3341	3 4736 1		CAF BIT14
2156	REF	8	LAST	444	40,3342	7 0143 0		MASK COUNT
2157	REF	140	LAST	444	40,3343	10 000 0		CCS A
2158	REF	29	LAST	433	40,3344	3 4752 0		CAF TWO
2159	REF	50	LAST	444	40,3345	6 4753 1		AD ONE
2160	REF	9	LAST	444	40,3346	54 143 0		TS COUNT

CANT USE L FOR RETURN, SINCE MANY OF THE
ROUTINES CALLING DSPIN USE L AS RETURN.

LEFT IF COUNT IS ODD
RIGHT IF COUNT IS EVEN

DOES NOT USE CYL

BIT14 = 1, BLANK SIGN
BIT14 = 0, LEAVE SIGN ALONE
+0 INTO COUNT FOR RIGHT

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A2161
 A2162 +1 INTO COUNT FOR LEFT(SIGN LEFT ALONE)
 +3 INTO COUNT FOR LEFT(TO-BLANK SIGN)

2163					40,3347	0 0004 0	DSPIN1	INHINT	
2164	REF	2	LAST	444	40,3350	50 141 0		INDEX	DSREL
2165	REF	24	LAST	405	40,3351	11 023 0		CCS	DSPTAB
2166					40,3352	0 3354 0		TC	+2
2167	REF	6	LAST	431	40,3353	0 5705 0		TC	CCSHOLE
2168	REF	51	LAST	444	40,3354	6 4753 1		AD	ONE
2169	REF	1			40,3355	54 142 1		TS	DSMAG
2170	REF	10	LAST	444	40,3356	50 143 1		INDEX	COUNT
2171	REF	1			40,3357	7 3400 1		MASK	DSMSK
2172					40,3360	0 0006 1		EXTEND	
2173	REF	11	LAST	444	40,3361	60 124 0		SU	CODE
2174					40,3362	0 0006 1		EXTEND	
2175	REF	1			40,3363	1 3376 1		BZF	DSLX
2176	REF	11	LAST	445	40,3364	50 143 1	DFRNT	INDEX	COUNT
2177	REF	2	LAST	445	40,3365	4 3400 1		CS	DSMSK
2178	REF	2	LAST	445	40,3366	7 0142 1		MASK	DSMAG
2179	REF	12	LAST	445	40,3367	6 0124 0		AD	CODE
2180	REF	141	LAST	444	40,3370	4 0000 0		CS	A
2181	REF	3	LAST	445	40,3371	50 141 0		INDEX	DSREL
2182	REF	25	LAST	445	40,3372	57 023 1		XCH	DSPTAB
2183					40,3373	0 0006 1		EXTEND	
2184	REF	2	LAST	445	40,3374	6 3376 0		BZMF	DSLX
2185	REF	7	LAST	405	40,3375	25 016 1		INCR	NOUT
2186					40,3376	0 0003 1	DSLX	RELINT	
2187	REF	2	LAST	444	40,3377	0 0114 0		TC	DSEXIT
2188					40,3400	00037 0	DSMSK	OCT	37
2189					40,3401	01740 0		OCT	1740
2190					40,3402	02000 0		OCT	2000
2191					40,3403	03740 1		OCT	3740

R2192 FOR 11DSPIN, PUT REL ADDRESS OF DSPTAB ENTRY INTO A, 1 IN BIT11 OR 0 IN
 R2193 BIT11 OF CODE.

2194	REF	4	LAST	445	40,3404	54 141 1	11DSPIN	TS	DSREL
2195	REF	30	LAST	444	40,3405	3 4752 0		CAF	TWO
2196	REF	12	LAST	445	40,3406	54 143 0		TS	COUNT
2197	REF	110	LAST	444	40,3407	56 002 0		XCH	Q
2198	REF	3	LAST	445	40,3410	54 114 1		TS	DSEXIT
2199	REF	2	LAST	444	40,3411	0 3347 1		TC	DSPIN1
2200	REF	5	LAST	442	40,3412	0 3322 1	DSPOCTIN	TC	DSPIN
2201					40,3413	3 3415 1		CAF	+2
2202	REF	5	LAST	431	40,3414	0 4640 1		TC	BANKJUMP
2203	REF	1			40,3415	63411 0	ENDSPOCT	CADR	OCTBACK

MUST USE SAME RETURN AS DSPIN

SO DSPOCTWD DOESNT USE SWCALL

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R2204 DSPALARM FINDS TC NVSUBEND IN ENTRET FOR NVSUB INITIATED ROUTINES.

R2205 ABORT WITH 01501.

R2206 DSPALARM FINDS TC ENDOFJOB IN ENTRET FOR KEYBOARD INITIATED ROUTINES.

R2207 DO TC ENTRET.

22075	REF	9	LAST	443	40,3416	4 4360 1	PREDSPAL	CS	VD1	
22076	REF	50	LAST	443	40,3417	54 777 1		TS	DSPCOUNT	
2208	REF	1			40,3420	4 3441 1	DSPALARM	CS	NVSBENDL	
2209	REF	8	LAST	437	40,3421	6 0136 0		AD	ENTEXIT	
2210					40,3422	0 0006 1		EXTEND		
2211	REF	16	LAST	399	40,3423	1 3436 1		BZF	CHARALRM +2	
22111	REF	1			40,3424	4 3440 0		CS	MONADR	IF THIS IS A MONITOR. KILL IT
22112	REF	9	LAST	446	40,3425	6 0136 0		AD	ENTEXIT	
22113					40,3426	0 0006 1		EXTEND		
22114					40,3427	1 3431 0		BZF	+2	
22115	REF	17	LAST	446	40,3430	0 3434 1		TC	CHARALRM	
22116	REF	1			40,3431	0 4204 0		TC	KILMONON	
22117	REF	4	LAST	264	40,3432	0 4364 1		TC	FALTON	
22118	REF	2	LAST	439	40,3433	0 4124 1		TC	PASTEVB	PUT MONITOR VERB BACK IN VERBREG
2212	REF	5	LAST	446	40,3434	0 4364 1	CHARALRM	TC	FALTON	NOT NVSUB INITIATED. TURN ON OPR ERROR
2213	REF	52	LAST	440	40,3435	0 5155 0		TC	ENDOFJOB	
2214	REF	2	LAST	244	40,3436	0 5652 0		TC	POODOO	
2217					40,3437	01501 1		DCT	01501	
22171	REF	3	LAST	446	40,3440	04124 1	MONADR	GENADR	PASTEVB	
2218	REF	1			40,3441	0 4202 0	NVSBENDL	TC	NVSBEND	

R2219 ALMCYCLE TURNS ON CHECK FAIL LIGHT, REDISPLAYS THE ORIGINAL VERB THAT

R2220 WAS EXECUTED. AND RECYCLES TO EXECUTE THE ORIGINAL VERB/NOON COMBINATION

R2221 THAT WAS LAST EXECUTED. USED FOR BAD DATA DURING LOAD VERBS AND BY

R2222 MCTBS. ALSO BY MMCHANG IF 2 NUMERICAL CHARACTERS WERE NOT PUNCHED IN

R2223 FOR MM CODE.

2224	REF	3	LAST	439	4145		SETLOC	MID7	+1	
22245	REF	2	LAST	439 TO	439:	17 17*	COUNT*	\$/PIN		
2225	REF	6	LAST	446	4145	0 4364 1	ALMCYCLE	TC	FALTON	TURN ON CHECK FAIL LIGHT.
2228	REF	3	LAST	436	4146	4 1041 1	CS	VERBSAVE		GET ORIGINAL VERB THAT WAS EXECUTED
2229	REF	11	LAST	439	4147	55 013 0	TS	REQRET		SET FOR ENTPASO
2230	REF	89	LAST	439	4150	0 4616 1	TC	BANKCALL		PUTS ORIGINAL VERB INTO VERBREG AND
2231	REF	8	LAST	439	4151	62337 1	CADR	UPDATVB -1		DISPLAYS IT IN VERB LIGHTS.
2232	REF	29	LAST	443	4152	0 4635 0	TC	POSTJUMP		
2233	REF	2	LAST	399	4153	62002 1	ENDALM	CADR	ENTER	

R2234 MMCHANG USES NOON DISPLAY UNTIL ENTER. THEN IT USES MODE DISP.

R2235 IT GOES TO MODROUT WITH THE NEW M M CODE IN A, BUT NOT DISPLAYED IN

R2236 MM LIGHTS.

R2237 IT DEMANDS 2 NUMERICAL CHARACTERS BE PUNCHED IN FOR NEW MM CODE.

R2238 IF NOT, IT RECYCLES.

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2239 REF 1 41,3430 SETLOC DSP2BIT +100

22395 REF 6 LAST 443 TO 444: 37 792* COUNT* \$\$/PIN

2240 REF 1 41,3430 0 3452 1 MMCHANG TC REQMM

ENTPASHI ASSUMES THE TC REQMM AT MMCHANG
IF THIS MOVES AT ALL, MUST CHANGE
MMADREF AT ENTPASHI.

OCT20 = ND2.

DSPCOUNT MUST = -ND2.

DEMAND THAT 2 NUM CHAR WERE PUNCHED IN.

A2241

A2242

2243 REF 21 LAST 376 41,3431 3 4747 1 CAF BIT5

2244 REF 51 LAST 446 41,3432 6 0777 0 AD DSPCOUNT

2245 41,3433 0 0006 1 EXTEND

2246 41,3434 1 3436 1 BZF +2

2247 REF 14 LAST 436 41,3435 0 4145 0 TC ALMCYCLE

2248 REF 93 LAST 443 41,3436 3 4755 1 CAF ZERO

2249 REF 12 LAST 437 41,3437 57'002 1 XCH NOUNREG

2250 REF 196 LAST 443 41,3440 54 154 0 TS MPAC

2251 REF 4 LAST 411 41,3441 3 4361 1 CAF ND1

2252 REF 52 LAST 447 41,3442 54 777 1 TS DSPCOUNT

2253 REF 90 LAST 446 41,3443 0 4616 1 TC BANKCALL

2254 REF 4 LAST 405 41,3444 60601 0 CADR 2BLANK

2255 REF 10 LAST 446 41,3445 4 4360 1 CS VDI

BLOCK NUM CHAR IN

2256 REF 53 LAST 447 41,3446 54 777 1 TS DSPCOUNT

2257 REF 197 LAST 447 41,3447 3 0154 1 CA MPAC

2258 REF 30 LAST 446 41,3450 0 4635 0 TC POSTJUMP

2259 REF 1 41,3451 10040 1 CADR MODROUTB

GO THRU STANDARD LOC.

2260 REF 2 LAST 298 04,2040 MODROUTB = V37

2261 REF 111 LAST 445 41,3452 4 0002 1 REQMM CS Q

2262 REF 12 LAST 446 41,3453 55'013 0 TS REQRET

2263 REF 5 LAST 447 41,3454 3 4361 1 CAF ND1

2264 REF 54 LAST 447 41,3455 54 777 1 TS DSPCOUNT

2265 REF 94 LAST 447 41,3456 3 4755 1 CAF ZERO

2266 REF 13 LAST 447 41,3457 55'002 0 TS NOUNREG

2267 REF 91 LAST 447 41,3460 0 4616 1 TC BANKCALL

2268 REF 5 LAST 447 41,3461 60601 0 CADR 2BLANK

2269 REF 3 LAST 411 41,3462 0 4427 1 TC FLASHON

2270 REF 52 LAST 445 41,3463 3 4753 1 CAF ONE

2271 REF 18 LAST 436 41,3464 55'000 1 TS DECBRNCH

SET FOR DEC

2272 REF 10 LAST 446 41,3465 0 0136 0 TC ENTEXT

R2273 VBRQEXEC ENTERS REQUEST TO EXEC FOR ANY ADDRESS WITH ANY PRIORITY.

R2274 IT DOES ENDOFJOB AFTER ENTERING REQUEST. DISPLAY SYST IS RELEASED.

R2275 IT ASSUMES NOUN 26 HAS BEEN PRELOADED WITH

R2276 COMPONENT 1 PRIORITY(BITS 10-14) BIT1=0 FOR NOVAC, BIT1=1 FOR FINDVAC.

R2277 COMPONENT 2 JOB ADRES (12 BIT)

R2278 COMPONENT 3 BBCON

2279 REF 20 LAST 444 41,3466 3 4753 1 VBRQEXEC CAF BIT1

2280 REF 18 LAST 440 41,3467 7 1045 0 MASK DSPTM1

2281 REF 142 LAST 445 41,3470 10 000 0 CCS A

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2282	REF	1		41,3471	0 3510 0	TC	SETVAC	IF BIT1 = 1, FINDVAC
2283	REF	1		41,3472	3 4351 1	CAF	TCNOVAC	IF BIT1 = 0, NOVAC
2284	REF	198	LAST 447	41,3473	54 154 0	IS	MPAC	TC NOVAC OR TC FINDVAC INTO MPAC
2285	REF	21	LAST 447	41,3474	4 4753 0	CS	BIT1	
2286	REF	19	LAST 447	41,3475	7 1045 0	MASK	DSPTM1	
2287	REF	199	LAST 448	41,3476	54 160 1	IS	MPAC +4	PRI0 INTO MPAC+4 AS A TEMP
2288	REF	6	LAST 427	41,3477	0 4457 0	REQUESTC	TC	
2289	REF	5	LAST 437	41,3500	3 4217 1	CA	ENDINST	
2290	REF	200	LAST 448	41,3501	54 157 0	IS	MPAC +3	TC ENDOFJOB INTO MPAC+3
2291				41,3502	0 0006 1	EXTEND		
2292	REF	20	LAST 448	41,3503	3 1047 0	DCA	DSPTM1 +1	JOB ADRES INTO MPAC+1
2293	REF	201	LAST 448	41,3504	52 156 1	DXCH	MPAC +1	BBCON INTO MPAC+2
2294	REF	202	LAST 448	41,3505	3 0160 0	CA	MPAC +4	PRI0 IN A
2295				41,3506	0 0004 0	INHINT		
2296	REF	203	LAST 448	41,3507	0 0154 1	TC	MPAC	
2297	REF	1		41,3510	3 4354 1	SETVAC	CAF	TCFINDVC
2298	REF	1		41,3511	0 3473 1	TC	REQEX1	

R2299 VBRQWAIT ENTERS REQUEST TO WAITLIST FOR ANY ADDRESS WITH ANY DELAY.
 R2300 IT DOES ENDOFJOB AFTER ENTERING REQUEST. DISPLAY SYST IS RELEASED.
 R2301 IT ASSUMES NOUN 26 HAS BEEN PRELOADED WITH
 R2302 COMPONENT 1 DELAY (LOW BITS)
 R2303 COMPONENT 2 TASK ADRES (12 BIT)
 R2304 COMPONENT 3 BBCON

2305	REF	1		41,3512	3 4352 1	VBRQWAIT	CAF	TCWAIT	
2306	REF	204	LAST 448	41,3513	54 154 0	TS	MPAC	TC WAITLIST INTO MPAC	
2307	REF	21	LAST 448	41,3514	3 1045 1	CA	DSPTM1	TIME DELAY	
2308	REF	1		41,3515	0 3476 1	ENDRQWT	TC	REQUESTC -1	

R2309 REQUESTC WILL PUT TASK ADRES INTO MPAC+1, BBCON INTO MPAC+2,
 R2310 TC ENDOFJOB INTO MPAC+3. IT WILL TAKE TIME DELAY OUT OF MPAC+4 AND
 R2311 LEAVE IT IN A, INHINT AND TC MPAC.

2312	REF	2	LAST 446	40,3442		SETLOC	NVSBENDL +1	
23125	REF	7	LAST 444 TO 446:	80	739*	COUNT*	\$\$/PIN	
2313	REF	53	LAST 447	40,3442	3 4753 1	VBPROC	CAF	ONE
2314	REF	2	LAST 427	40,3443	55 014 1	TS	LOADSTAT	PROCEED WITHOUT DATA
2315	REF	2	LAST 446	40,3444	0 4204 0	TC	KILMONON	TURN ON KILL MONITOR BIT
2316	REF	7	LAST 448	40,3445	0 4457 0	TC	RELDSP	
2317	REF	3	LAST 406	40,3446	0 4433 1	TC	FLASHOFF	
2318	REF	2	LAST 427	40,3447	0 3547 1	TC	RECALTST	SEE IF THERE IS ANY RECALL FROM ENDIDLE

2319	REF	54	LAST 448	40,3450	4 4753 0	VBTERM	CS	ONE
2320	REF	2	LAST 409	40,3451	0 3443 1	TC	VBPROC +1	TERM VERB SETS LOADSTAT NEG

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R23201 PROCKEY PERFORMS THE SAME FUNCTION AS VBPROC. IT MUST BE CALLED UNDER
R23202 EXECUTIVE CONTROL, WITH CHRPRIO.

23205	REF	95	LAST	447	40,3452	3 4755 1	PROCKEY	CAF	ZERO	SET REQRET FOR ENTER PASS 0.
23206	REF	13	LAST	447	40,3453	55 013 0		TS	REQRET	
23207	REF	11	LAST	447	40,3454	4 4360 1		CS	VD1	BLOCK NUMERICAL CHARACTERS, SIGNS, CLEAR
23208	REF	55	LAST	447	40,3455	54 777 1		TS	DSPCOUNT	
23209	REF	3	LAST	448	40,3456	0 3442 0		TC	VBPROC	

R2321 VBRESEQ WAKES ENDIDLE AT SAME LINE AS FINAL ENTER OF LOAD (L+3).
R2322 (MAIN USE IS INTENDED AS RESPONSE TO INTERNALLY INITIATED FLASHING
R2323 DISPLAYS IN ENDIDLE. SHOULD NOT BE USED WITH LOAD VERBS, PLEASE PERFORM,
R2324 OR PLEASE MARK VERBS BECAUSE THEY ALREADY USE L+3 IN ANOTHER CONTEXT.)

2325	REF	96	LAST	449	40,3457	4 4755 0	VBRESEQ	CS	ZERO	MAKE IT LOOK LIKE DATA IN.
2326	REF	4	LAST	449	40,3460	0 3443 1		TC	VBPROC +1	

R2327 FLASH IS TURNED OFF BY PROCEED WITHOUT DATA, TERMINATE, RESEQUENCE,
R2328 END OF LOAD.

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P2329 KEY RELEASE ROUTINE

R2330 THIS ROUTINE ALWAYS TURNS OFF THE UPACT LIGHT AND ALWAYS CLEARS DSPLOCK.

R2331 THE HIGHEST PRIORITY FUNCTION OF THE KEY RELEASE BUTTON IS THE
 R2332 UNSUSPENDING OF A SUSPENDED MONITOR WHICH WAS EXTERNALLY INITIATED.
 R2333 THIS FUNCTION IS ACCOMPLISHED BY CLEARING DSPLOCK AND TURNING OFF
 R2334 THE KEY RELEASE LIGHT IF BOTH DSPLIST AND CADRSTOR ARE EMPTY.

R2335 IF NO SUCH MONITOR EXISTS, THEN RELDSP IS EXECUTED TO CLEAR DSPLOCK
 R2336 AND THE EXTERNAL MONITOR BIT (FREEING THE DISPLAY SYSTEM FOR INTERNAL
 R2337 USE). TURN OFF THE KEY RELEASE LIGHT, AND WAKE UP ANY JOB IN DSPLIST.

R2338 IN ADDITION IF THERE IS A JOB IN ENDIDLE, THEN CONTROL IS TRANSFERRED
 R2339 TO PINBRNCH (IN DISPLAY INTERFACE ROUTINE) TO RE-EXECUTE THE SERIES OF
 R23391 NVSUB CALLS ETC. THAT PRECEDED THE ENDIDLE CALL STILL AWAITING RESPONSE.
 R2340 THIS FEATURE IS INTENDED FOR USE WHEN THE OPERATOR HAS BEEN REQUESTED TO
 R2341 RESPOND TO SOME INTERNAL ACTION THAT USED ENDIDLE, BUT HE HAS WRITTEN
 R2342 OVER THE INFORMATION ON THE DISPLAY PANEL BY SOME DISPLAYS OF HIS OWN
 R2343 INITIATION WHICH DO NOT SERVE AS RESPONSES. HITTING KEY RLSE WILL
 R2344 RE-ESTABLISH THE DISPLAYS TO THE STATE THEY WERE IN BEFORE HE OBSCURED
 R2345 THEM, SO THAT HE CAN SEE THE WAITING REQUEST. THIS WORKS ONLY FOR
 R2346 INTERNAL PROGRAMS THAT USED ENDIDLE THROUGH MARGARETS DISPLAY
 R2347 SUBROUTINES.

2348	REF	21	LAST	424	40,3461	4 4751 1	VBRELDSP	CS	BIT3	
2349					40,3462	0 0006 1		EXTEND		
2350	REF	11	LAST	219	40,3463	03 011 1		WAND	DSALMOUT	TURN OFF UPACT LITE
2351	REF	2	LAST	398	40,3464	10 115 0		CCS	21/22REG	OLD DSPLOCK
2352	REF	41	LAST	444	40,3465	3 4736 1		CAF	BIT14	
2353	REF	6	LAST	439	40,3466	7 1021 1		MASK	MONSAVE1	EXTERNAL MONITOR BIT (EMB)
2354	REF	143	LAST	447	40,3467	10 000 0		CCS	A	
2355	REF	1			40,3470	0 3477 0		TC	UNSPEN	OLD DSPLOCK AND EMB BOTH 1, UNSUSPEND.
2356	REF	8	LAST	448	40,3471	0 4457 0	TSTLTS4	TC	RELDSP	NOT UNSUSPENDING EXTERNAL MONITOR.
2357	REF	5	LAST	438	40,3472	11 042 1		CCS	CADRSTOR	RELEASE DISPLAY SYSTEM AND
2358					40,3473	0 3475 1		TC	+2	DO RE-ESTABLISH IF CADRSTOR IS FULL.
2359	REF	53	LAST	446	40,3474	0 5155 0		TC	ENDOFJOB	
2360	REF	31	LAST	447	40,3475	0 4635 0		TC	POSTJUMP	
2361	REF	4	LAST	298	40,3476	21050 1		CADR	PINBRNCH	
2362	REF	97	LAST	449	40,3477	3 4755 1	UNSPEN	CAF	ZERO	EXTERNAL MONITOR IS SUSPENDED,
2363	REF	5	LAST	438	40,3500	55 012 1		TS	DSPLOCK	JUST UNSUSPEND IT BY CLEARING DSPLOCK.
2364	REF	6	LAST	450	40,3501	11 042 1		CCS	CADRSTOR	TURN KEY RELEASE LIGHT OFF IF BOTH
2365	REF	54	LAST	450	40,3502	0 5155 0		TC	ENDOFJOB	CADRSTOR AND DSPLIST ARE EMPTY.
2366	REF	2	LAST	438	40,3503	0 4502 1		TC	RELDSP1	
23661	REF	55	LAST	450	40,3504	0 5155 0		TC	ENDOFJOB	
2367					40,3505			ENDRELDSP	EQUALS	

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R2368 NVSUB IS USED FOR SUB ROUTINE CALLS FROM WITHIN COMPUTER. IT CAN BE
R2369 USED TO CALL THE COMBINATION OF ANY DISPLAY, LOAD, OR MONITOR VERB
R2370 TOGETHER WITH ANY NOUN AVAILABLE TO THE KEYBOARD.
R23701 PLACE OVVVVVVVNNNNNNN INTO A.
R23702 V-S ARE THE 7 BIT VERB CODE. N-S ARE THE 7 BIT NOUN CODE.

R23703 IF NVSUB IS CALLED WITH THE FOLLOWING NEGATIVE NUMBERS (RATHER THAN THE
R23704 VERB-NOUN CODE) IN A, THEN THE DISPLAY IS BLANKED AS FOLLOWS-
R23705 -4 FULL BLANK, -3 LEAVE MODE, -2 LEAVE MODE AND VERB, -1 BLANK R-S ONLY

R2371 NVSUB CAN BE USED WITH MACH CADR TO BE SPEC BY PLACING THE CADR INTO
R2372 MPAC+2 BEFORE THE STANDARD NVSUB CALL.

R2373 NVSUB RETURNS TO 2+ CALLING LOC AFTER PERFORMING TASK. IF DISPLAY
R2374 SYSTEM IS AVAILABLE. THE NEW NOUN AND VERB CODES ARE DISPLAYED.
R2375 IF V:S = 0, THE NEW NOUN CODE IS DISPLAYED ONLY (RETURN WITH NO FURTHER
R2376 ACTION). IF N-S = 0, THE NEW VERB CODE IS DISPLAYED ONLY (RETURN WITH NO
R2377 FURTHER ACTION).

R2378 IT RETURNS TO 1+ CALLING LOC WITHOUT PERFORMING TASK. IF DISPLAY
R2379 SYSTEM IS BLOCKED (NOTHING IS DISPLAYED IN THIS CASE):
R2380 IT DOES TO ABORT (WITH OCT 01501) IF IT ENCOUNTERS A DISPLAY PROGRAM
R2381 ALARM CONDITION BEFORE RETURN TO CALLER.

R2382 THE DISPLAY SYSTEM IS BLOCKED BY THE DEPRESSION OF ANY
R2383 KEY, EXCEPT ERROR LIGHT RESET
R2384 IT IS RELEASED BY THE KEY RELEASE BUTTON. ALL EXTENDED VERBS,
R2385 PROCEED WITHOUT DATA, TERMINATE, RESEQUENCE, INITIALIZE EXECUTIVE,
R2386 RECALL PART OF RECALYST IF ENDIDLE WAS USED,
R2387 VB = REQUEST EXECUTIVE, VB = REQUEST WAITLIST,
R2388 MONITOR SET-UP.

R23881 THE DISPLAY SYSTEM IS ALSO BLOCKED BY THE EXTERNAL MONITOR BIT, WHICH
R23882 INDICATES AN EXTERNALLY INITIATED MONITOR IS RUNNING (SEE MONITOR)

R2389 A NVSUB CALL THAT PASSES DSPLOCK AND THE EXTERNAL MONITOR BIT ENDS OLD
R23891 MONITOR.

R2390 DSPLOCK IS THE INTERLOCK FOR USE OF KEYBOARD AND DISPLAY SYSTEM WHICH
R2391 LOCKS OUT INTERNAL USE WHENEVER THERE IS EXTERNAL KEYBOARD ACTION.

R23911 NVSUB SHOULD BE USED TWICE IN SUCCESSION FOR :PLEASE PERFORM: SITUATIONS
R23912 (SIMILARLY FOR PLEASE MARK). FIRST PLACE THE CODED NUMBER FOR WHAT
R23913 ACTION IS DESIRED OF OPERATOR INTO THE REGISTERS REFERRED TO BY THE
R23914 :CHECKLIST: NOUN. GO TO NVSUB WITH A DISPLAY VERB AND THE :CHECKLIST:
R23915 NOUN. GO TO NVSUB AGAIN WITH THE :PLEASE PERFORM: VERB AND ZEROS IN THE
R23916 LOW 7 BITS. THIS :PASTES UP: THE :PLEASE PERFORM: VERB INTO THE VERB
R23917 LIGHTS.

R23918 NVMONOPT IS AN ENTRY SIMILAR TO NVSUB, BUT REQUIRING AN ADDITIONAL

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R239181 PARAMETER IN L. IT SHOULD BE USED ONLY WITH A MONITOR VERB-NDUN CODE IN
 R239182 A. AFTER EACH MONITOR DISPLAY A *PLEASE* VERB WILL BE PASTED IN THE VERB
 R239183 LIGHTS OR DATA WILL BE BLANKED (OR BOTH) ACCORDING TO THE OPTIONS
 R239184 SPECIFIED IN L. IF BITS 8-14 OF L ARE OTHER THAN ZERO, THEN THEY WILL
 R239185 BE INTERPRETED AS A VERB CODE AND PASTED IN THE VERB LIGHTS. (THIS VERB
 R239186 CODE SHOULD DESIGNATE ONE OF THE *PLEASE* VERBS.) IF BITS 1-3 OF L ARE
 R239187 OTHER THAN ZERO, THEN THEY WILL BE USED TO BLANK DATA BY BEING FED TO
 R239188 BLANKSUB. IF NVMONOPT IS USED WITH A VERB OTHER THAN A MONITOR VERB,
 R239189 THE PARAMETER IN L HAS NO EFFECT.

R2392 NVSUB IN FIXED-FIXED PLACES 2+CALLING LOC INTO NVQTEM, TC NVSUBEND INTO
 R2393 ENTRET. (THIS WILL RESTORE OLD-CALLING BANK-BITS)

2394	REF	1		4154		SETLOC ENDALM +1	
23945	REF	3	LAST 446 TO 447:	7	24*	COUNT* \$\$/PIN	
2395				4154	22 007 0	NVSUB LXCH 7	ZERO NVMONOPT OPTIONS
2396	REF	1		4155	54 123 0	NVMONOPT TS NVTEMP	
2397	REF	42	LAST 450	4156	3 4736 1	CAF BIT14	
23971	REF	7	LAST 450	4157	7 1021 1	MASK MONSAVE1	EXTERNAL MONITOR BIT
23972	REF	6	LAST 450	4160	6 1012 0	AD DSPLOCK	
23973	REF	144	LAST 450	4161	10 000 0	CCS A	
23974	REF	112	LAST 447	4162	0 0002 0	TC 0	DSP SYST BLOCKED. RET TO 1+ CALLING LOC
2398	REF	55	LAST 448	4163	3 4753 1	CAF ONE	DSP-SYST-AVAILABLE
2399	REF	113	LAST 452	4164	6 0002 0	NVSBCOM AD Q	
2400	REF	1		4165	55 037 0	TS NVQTEM	2+ CALLING LOC INTO NVQTEM
24001	REF	4	LAST 439	4166	23 022 0	LXCH MONSAVE2	STORE NVMONOPT OPTIONS
2401	REF	3	LAST 448	4167	0 4204 0	TC KILMONON	TURN ON KILL MONITOR BIT
2402	REF	1		4170	3 4201 0	NVSUBCOM CAF NVSBBBNK	
2403	REF	11	LAST 370	4171	56 006 1	XCH BBANK	
24031				4172	0 0006 1	EXTEND	SAVE OLD-SUPERBITS
24032	REF	4	LAST 274	4173	04 007 1	ROR SUPERBNK	
2404	REF	1		4174	55 040 0	TS NVBNKTEM	
24041	REF	2	LAST 274	4175	3 4201 0	CAF PINSUPBT	
24042				4176	0 0006 1	EXTEND	
24043	REF	5	LAST 452	4177	01 007 1	WRITE SUPERBNK	
2405	REF	1		4200	0 2000 0	TC NVSUB2	GO TO NVSUB1 THRU STANDARD LOC
2406	REF	56	LAST 449	0777		EBANK DSPCOUNT	
2407	REF	2	LAST 406	4201	62101 0	NVSBBBNK BBON NVSUB1	
24071	REF	2	LAST 452	4201		PINSUPBT = NVSBBBNK	CONTAINS THE PINBALL SUPERBITS.
2412	REF	2	LAST 452	4202	53 040 0	NVSUBEND DXCH NVQTEM	NVBNKTEM MUST = NVQTEM+1
2413	REF	2	LAST 283	4203	0 5165 0	TC SUPDXCHZ	DTCE WITH-SUPERBIT SWITCHING
2414	REF	1		41.3516		SETLOC ENDRQWT +1	
241405	REF	7	LAST 447 TO 448:	54	846*	COUNT* \$\$/PIN	
241412							BLANKDSP BLANKS DISPLAY ACCORDING TO OPTION NUMBER IN NVTEMP AS FOLLOWS

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R241415 -4 FULL BLANK, -3 LEAVE MODE. -2 LEAVE MODE AND VERB. -1 BLANK R-S ONLY

241419	REF	5	LAST	444	41,3516	6 4757 0	BLANKDSP	AD	SEVEN	7,8,9,OR 10 (A HAD 0,1,2,OR 3)
241422					41,3517	0 0004 0		INHINT		
241425	REF	13	LAST	445	41,3520	54 124 1		TS	CODE	BLANK SPECIFIED DSPTABS
241429	REF	21	LAST	254	41,3521	4 4740 1		CS	BIT12	
241432	REF	14	LAST	453	41,3522	50 124 0		INDEX	CODE	
241435	REF	26	LAST	445	41,3523	57 023 1		XCH	DSPTAB	
241439	REF	145	LAST	452	41,3524	10 000 0		CCS	A	
241442	REF	8	LAST	445	41,3525	25 016 1		INCR	NOUT	
241445					41,3526	0 3527 1		TC	+1	
241449	REF	15	LAST	453	41,3527	10 124 1		CCS	CODE	
241452	REF	1			41,3530	0 3520 0		TC	BLANKDSP +2	
241455					41,3531	0 0003 1		RELINT		
241459	REF	2	LAST	452	41,3532	50 123 1		INDEX	NVTEMP	
241462					41,3533	0 3540 0		TC	+5	
241465					41,3534	0 3535 1		TC	+1	NVTEMP HAS -4 (NEVER TOUCH MODREG)
241469	REF	19	LAST	439	41,3535	55 001 0		TS	VERBREG	-3
241472	REF	14	LAST	447	41,3536	55 002 0		TS	NOUNREG	-2
241475	REF	12	LAST	427	41,3537	55 015 0		TS	CLPASS	-1
241479	REF	12	LAST	449	41,3540	4 4360 1		CS	VDI	
241482	REF	57	LAST	452	41,3541	54 777 1		TS	DSPCOUNT	
241485	REF	4	LAST	448	41,3542	0 4433 1		TC	FLASHOFF	PROTECT AGAINST INVISIBLE FLASH
241489	REF	1			41,3543	0 3566 1		TC	ENTSET -2	ZEROS REQRET
2415	REF	2	LAST	453	41,3544	3 3570 0	NVSUB1	CAF	ENTSET	IN BANK
2416	REF	6	LAST	439	41,3545	54 136 1		TS	ENTRET	SET RETURN TO NVSUBEND
24161	REF	3	LAST	453	41,3546	10 123 0		CCS	NVTEMP	WHAT NOW
24162					41,3547	0 3553 1		TC	+4	NORMAL NVSUB CALL (EXECUTE VN OR PASTE)
24163	REF	19	LAST	415	41,3550	0 2351 1		TC	GODSPALM	
24164	REF	2	LAST	453	41,3551	0 3516 0		TC	BLANKDSP	BLANK DISPLAY AS SPECIFIED
24165	REF	20	LAST	453	41,3552	0 2351 1		TC	GODSPALM	
2417	REF	5	LAST	439	41,3553	3 6074 1		CAF	LOW7	
2418	REF	4	LAST	453	41,3554	7 0123 0		MASK	NVTEMP	
2419	REF	205	LAST	448	41,3555	54 157 0		TS	MPAC +3	TEMP FOR NOUN (CANT USE MPAC. DSPDECVN USES MPAC, +1, +2)
2420	REF	5	LAST	453	41,3556	3 0123 1		CA	NVTEMP	
2422	REF	5	LAST	439	41,3557	54 023 1		TS	EDUP	RIGHT 7
2423	REF	6	LAST	453	41,3560	3 0023 0		CA	EDUP	
2424	REF	206	LAST	453	41,3561	54 160 1		TS	MPAC +4	TEMP FOR VERB (CANT USE MPAC+1. DSPDECVN USES MPAC, +1, +2).
A2425										
2426	REF	207	LAST	453	41,3562	10 157 0		CCS	MPAC +3	TEST NOUN
2427	REF	1			41,3563	0 3571 1		TC	NVSUB2	IF NOUN NOT +0, GO ON
2428	REF	208	LAST	453	41,3564	3 0160 0		CA	MPAC +4	
2429	REF	9	LAST	446	41,3565	0 2337 1		TC	UPDATVB -1	IF NOUN = +0, DISPLAY VERB. THEN RETURN
24291	REF	98	LAST	450	41,3566	3 4755 1		CAF	ZERO	ZERO REQRET SO THAT PASTED VERBS CAN
24292	REF	14	LAST	449	41,3567	55 013 0		TS	REQRET	BE EXECUTED BY OPERATOR.
2430	REF	2	LAST	446	41,3570	0 4202 0	ENTSET	TC	NVSUBEND	
2431	REF	209	LAST	453	41,3571	10 160 1	NVSUB2	CCS	MPAC +4	TEST VERB
2432					41,3572	0 3576 0		TC	+4	IF VERB NOT +0, GO ON
2433	REF	210	LAST	453	41,3573	3 0157 1		CA	MPAC +3	

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2434	REF	2	LAST	439	41,3574	0 2317 0	TC	UPDATNN -1	IF VERB = +0, DISPLAY NOUN. THEN RETURN
2435	REF	3	LAST	453	41,3575	0 4202 0	TC	NVSUBEND	
2436	REF	211	LAST	453	41,3576	3 0156 0	CA	MPAC +2	TEMP FOR MACH CADR TO BE SPEC. (DSPDECVN
2437	REF	212	LAST	454	41,3577	54 161 0	TS	MPAC +5	USES MPAC, +1, +2)
2438	REF	213	LAST	454	41,3600	3 0160 0	CA	MPAC +4	
2439	REF	10	LAST	453	41,3601	0 2337 1	TC	UPDATVB -1	IF BOTH NOUN AND VERB NOT +0, DISPLAY
2440	REF	214	LAST	454	41,3602	3 0157 1	CA	MPAC +3	BOTH AND GO TO ENTPASO.
2441	REF	3	LAST	454	41,3603	0 2317 0	TC	UPDATNN -1	
2442	REF	99	LAST	453	41,3604	3 4755 1	CAF	ZERO	
2443	REF	3	LAST	448	41,3605	55 014 1	TS	LOADSTAT	SET FOR WAITING FOR DATA CONDITION
2444	REF	13	LAST	453	41,3606	55 015 0	TS	CLPASS	
2445	REF	15	LAST	453	41,3607	55 013 0	TS	REQRET	SET REQRET FOR PASS 0.
2446	REF	215	LAST	454	41,3610	3 0161 1	CA	MPAC +5	RESTORES MACH CADR TO BE SPEC TO MPAC+2
2447	REF	216	LAST	454	41,3611	54 156 1	TS	MPAC +2	FOR USE IN INTMCTBS (IN ENTPASO).
2448	REF	3	LAST	406	41,3612	0 2035 0	ENDNVSB1 TC	ENTPASO	

2449 IF INTERNAL MACH CADR TO BE SPECIFIED, MPAC+2 WILL BE PLACED INTO
 2450 NOUNCADR IN ENTPASO (INTMCTBS).

2451	REF	4	LAST	454	4204		SETLOC NVSUBEND +2	
24515	REF	4	LAST	452 TO 452:	24	48*	COUNT* \$\$/PIN	
A2452								FORCE BIT 15 OF MONSAVE1 TO 1.
2453	REF	24	LAST	427	4204	3 4735 1	KILMONON CAF	BIT15
2454	REF	8	LAST	452	4205	55 021 1	TS	MONSAVE1
A2455								THIS IS THE KILL MONITOR BIT.
2458	REF	114	LAST	452	4206	0 0002 0	TC	Q
								TURN OFF BIT 14, THE EXTERNAL MONITOR BIT.

2459 LOADSTAT +0 INACTIVE(WAITING FOR DATA). SET BY NVSUB
 2460 +1 PROCEED NO DATA. SET BY SPECIAL VERB
 2461 -1 TERMINATE SET BY SPECIAL VERB
 2462 -0 DATA IN SET BY END OF LOAD ROUTINE
 2463 OR RESEQUENCE SET BY VERB 32

2464 L TO ENDIDLE (FIXED FIXED)
 2465 ROUTINES THAT REQUEST LOADS THROUGH NVSUB SHOULD USE ENDIDLE WHILE
 2466 WAITING FOR THE DATA TO BE LOADED. ENDIDLE PUTS CURRENT JOB TO SLEEP.
 2467 ENDIDLE CANNOT BE CALLED FROM ERASABLE OR F/F MEMORY,
 2468 SINCE JOBSLEEP AND JOBWAKE CAN HANDLE ONLY FIXED BANKS.
 2469 RECALTST TESTS LOADSTAT AND WAKES JOB UP TO,
 2470 L+1 FOR TERMINATE
 2471 L+2 FOR PROCEED WITHOUT DATA
 2472 L+3 FOR DATA IN, OR RESEQUENCE
 2473 IT DOES NOTHING IF LOADSTAT INDICATES WAITING FOR DATA.

2474 ENDIDLE ABORTS (WITH CODE 01206) IF A SECOND JOB ATTEMPTS TO GO TO SLEEP

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R2475 IN PINBALL. IN PARTICULAR, IF AN ATTEMPT IS MADE TO GO TO ENDIDLE WHEN
 R2476 1) CADRSTOR NOT= +0. THIS IS THE CASE WHERE THE CAPACITY OF ENDIDLE IS
 R2477 EXCEEDED. (+=NZ INDICATE A JOB IS ALREADY ASLEEP DUE TO ENDIDLE.)
 R2478 2) DSPLIST NOT= +0. THIS INDICATES A JOB IS ALREADY ASLEEP DUE TO
 R2479 NVSUBUSY.

2480	REF 115	LAST 454	4207	22 002 0	ENDIDLE	LXCH	Q	RETURN ADDRESS INTO L.
2481	REF 1		4210	0 4220 0		TC	ISCADR+0	ABORT IF CADRSTOR NOT= +0
2482	REF 1		4211	0 4224 1		TC	ISLIST+0	ABORT IF DSPLIST NOT= +0
2483	REF 59	LAST 440	4212	3 0001 0		CA	L	DONT SET DSPLOCK TO 1 SO CAN USE
2484	REF 4	LAST 370	4213	7 5012 0		MASK	LOWIO	ENDIDLE WITH NVSUB INITIATED MONITOR.
2485	REF 1		4214	6 0004 0		AD	FBANK	SAME STRATEGY FOR CADR AS MAKECADR.
2486	REF 7	LAST 450	4215	55 042 1		TS	CADRSTOR	
2487	REF 2	LAST 374	4216	0 5133 0		TC	JOBSLEEP	

2488	REF 56	LAST 450	4217	0 5155 0	ENDINST	TC	ENDOFJOB	
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2489	REF 8	LAST 455	4220	11 042 1	ISCADR+0	CCS	CADRSTOR	ABORTS (CODE 01206) IF CADRSTOR NOT= +0.
2490	REF 1		4221	0 4227 1		TC	DSPABORT	RETURNS IF CADRSTOR = +0.
2491	REF 116	LAST 455	4222	0 0002 0		TC	Q	
2492	REF 2	LAST 455	4223	0 4227 1		TC	DSPABORT	
2493	REF 2	LAST 222	4224	11 043 0	ISLIST+0	CCS	DSPLIST	ABORTS (CODE 01206) IF DSPLIST NOT= +0.
2494	REF 3	LAST 455	4225	0 4227 1		TC	DSPABORT	RETURNS IF DSPLIST = +0.
2495	REF 117	LAST 455	4226	0 0002 0		TC	Q	
2496	REF 3	LAST 446	4227	0 5652 0	DSPABORT	TC	PC0000	
2497			4230	01206 1		OCT	01206	

R2498 JAMTERM ALLOWS PROGRAMS TO PERFORM THE TERMINATE FUNCTION.
 R2499 IT DOES ENDOFJOB.

2500	REF 3	LAST 452	4231	3 4201 0	JAMTERM	CAF	PINSUPBT	
2501			4232	0 0006 1		EXTEND		
25011	REF 6	LAST 452	4233	01 007 1		WRITE	SUPERBNK	
25012	REF 2	LAST 209	4234	3 4242 1		CAF	34DEC	
25013	REF 16	LAST 454	4235	55 013 0		TS	REQRET	LEAVE ENTER SET FOR ENTPASSO.
2502	REF 13	LAST 453	4236	4 4360 1		CS	VD1	
2503	REF 58	LAST 453	4237	54 777 1		TS	DSPCOUNT	
2504	REF 32	LAST 450	4240	0 4635 0		TC	POSTJUMP	
2505	REF 2	LAST 409	4241	61450 1		CADR	VBTERM	
2506			4242	00042 1	34DEC	DEC	34	

R2507 JAMPROC ALLOWS PROGRAMS TO PERFORM THE PROCEED/PROCEED WITHOUT DATA
 R2508 FUNCTION. IT DOES ENDOFJOB.

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2509	REF	4	LAST	455	4243	3 4201 0	JAMPROC	CAF	PINSUPBT
2510					4244	0 0006 1		EXTEND	
25101	REF	7	LAST	455	4245	01 007 1		WRITE	SUPERBNK
25102	REF	1			4246	3 4254 0		CAF	33DEC
25103	REF	17	LAST	455	4247	55 013 0		TS	REQRET
2511	REF	14	LAST	455	4250	4 4360 1		CS	VD1
2512	REF	59	LAST	455	4251	54 777 1		TS	DSPCOUNT
2513	REF	33	LAST	455	4252	0 4635 0		TC	POSTJUMP
2514	REF	5	LAST	449	4253	61442 1		CADR	VBPROC

LEAVE ENTER SET FOR ENTPASSO.

2515					4254	00041 1	33DEC	DEC	33
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R2532 BLANKSUB BLANKS ANY COMBINATION OF R1, R2, R3.

R2533 CALL WITH BLANKING CODE IN A.

R2534 BIT1=1 BLANKS R1. BIT2=1 BLANKS R2. BIT3=1 BLANKS R3.

R2535 ANY COMBINATION OF THESE BITS IS ACCEPTED.

R2536 DSPCOUNT IS RESTORED TO STATE IT WAS IN BEFORE BLANKSUB WAS EXECUTED.

2538	REF	6	LAST	453	4255	7 4757 1	BLANKSUB	MASK	SEVEN	
25381	REF	6	LAST	453	4256	54 123 0		TS	NVTEMP	STORE BLANKING CODE IN NVTEMP.
2539	REF	43	LAST	452	4257	3 4736 1		CAF	BIT14	
2540	REF	9	LAST	454	4260	7 1021 1		MASK	MONSAVE1	EXTERNAL MONITOR BIT
25401	REF	7	LAST	452	4261	6 1012 0		AD	DSPLOCK	
25402	REF	146	LAST	453	4262	10 000 0		CCS	A	
25403	REF	118	LAST	455	4263	0 0002 0		TC	0	DSP SYST BLOCKED. RET TO 1+ CALLING LOC
25404	REF	119	LAST	456	4264	24 002 0		INCR	0	DSP SYST AVAILABLE

SET RETURN FOR 2+ CALLING LOC

A2541										
25411	REF	7	LAST	456	4265	10 123 0		CCS	NVTEMP	
25412					4266	1 4270 1		TCF	+2	
25413	REF	120	LAST	456	4267	0 0002 0		TC	0	NOTHING TO BLANK. RET TO 2+ CALLING LOC
2542	REF	121	LAST	456	4270	22 002 0		LXCH	0	SET RETURN FOR 2 + CALLING LOC
2544	REF	1			4271	3 4302 1		CAF	BLNKBBNK	
2545	REF	12	LAST	452	4272	56 006 1		XCH	BBANK	
25451					4273	0 0006 1		EXTEND		
25452	REF	8	LAST	456	4274	04 007 1		ROR	SUPERBNK	SAVE OLD SUPERBITS.
2546	REF	45	LAST	414	4275	52 131 0		DXCH	BUF	
25461	REF	5	LAST	456	4276	3 4201 0		CAF	PINSUPBT	
25462					4277	0 0006 1		EXTEND		
25463	REF	9	LAST	456	4300	01 007 1		WRITE	SUPERBNK	
2547	REF	1			4301	0 3505 1		TC	BLNKSUB1	

2548	REF	60	LAST	456	0777			EBANK=	DSPCOUNT	
25481	REF	2	LAST	456	4302	60101 1	BLNKBBNK	BBCON	BLNKSUB1	
2549					4303		ENDBLFF	EQUALS		

2550	REF	1			40,3505			SETLOC	ENDRELDS	
25505	REF	8	LAST	448 TO	452:	35	774*	COUNT*	\$1/PIN	
2551	REF	61	LAST	456	40,3505	3 0777 0	BLNKSUB1	CA	DSPCOUNT	SAVE OLD DSPCOUNT FOR LATER RESTORATION

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25511	REF	46	LAST	456	40,3506	54 132 0	TS	BUF	+2	
25512	REF	22	LAST	448	40,3507	3 4753 1	CAF	BIT1		TEST BIT1. SEE IF R1 TO BE BLANKED.
2552	REF	1			40,3510	0 3527 1	TC	TESTBIT		
2553	REF	12	LAST	440	40,3511	3 4317 0	CAF	R1D1		
2554	REF	4	LAST	420	40,3512	0 2535 0	TC	5BLANK -1		
2555	REF	25	LAST	432	40,3513	3 4752 0	CAF	BIT2		TEST BIT 2. SEE IF R2 TO BE BLANKED.
2556	REF	2	LAST	457	40,3514	0 3527 1	TC	TESTBIT		
2557	REF	5	LAST	442	40,3515	3 4320 1	CAF	R2D1		
2558	REF	5	LAST	457	40,3516	0 2535 0	TC	5BLANK -1		
2559	REF	22	LAST	450	40,3517	3 4751 0	CAF	BIT3		TEST BIT3. SEE IF R3 TO BE BLANKED.
2560	REF	3	LAST	457	40,3520	0 3527 1	TC	TESTBIT		
2561	REF	5	LAST	421	40,3521	3 4321 0	CAF	R3D1		
2562	REF	6	LAST	457	40,3522	0 2535 0	TC	5BLANK -1		
2563	REF	47	LAST	457	40,3523	3 0132 1	CA	BUF	+2	RESTORE DSPCOUNT TO STATE IT HAD
2564	REF	62	LAST	456	40,3524	54 777 1	TS	DSPCOUNT		BEFORE BLANKSUB.
2565	REF	48	LAST	457	40,3525	52 131 0	DXCH	BUF		CALL L+2 DIRECTLY.
2566	REF	3	LAST	452	40,3526	0 5166 0	TC	SUPDXCHZ +1		DTCB WITH SUPERBIT SWITCHING
2567	REF	8	LAST	456	40,3527	7 0123 0	TESTBIT	MASK	NVTEMP	NVTEMP CONTAINS BLANKING CODE.
2568	REF	147	LAST	456	40,3530	10 000 0	CCS	A		
2569	REF	122	LAST	456	40,3531	0 0002 0	TC	Q		IF CURRENT BIT = 1, RETURN TO L+1.
2570	REF	123	LAST	457	40,3532	50 002 0	INDEX	Q		IF CURRENT BIT = 0, RETURN TO L+3.
2571					40,3533	0 0002 0	TC	2		

2572 40,3534 ENDBSUB1 EQUALS

R257205 DSPMM DOES NOT DISPLAY MODREG DIRECTLY. IT PUTS IN EXEC REQUEST WITH
 R257206 PRIO 30000 FOR DSPMMJB AND RETURNS TO CALLER.

R257207 IF MODREG CONTAINS -0, DSPMMJB BLANKS THE MODE LIGHTS.

R257209 DSPMM MUST BE IN BANK 27 OR LOWER, SO IT CAN BE CALLED VIA BANKCALL.

25721					07,2667		BANK	7
257215	REF	1			04,2000		SETLOC	PINBALL4
257217					04,2636		BANK	
257218	REF	1					COUNT*	\$\$/PIN
25722	REF	124	LAST	457	04,2636	56 002 0	DSPMM	XCH Q
25723	REF	217	LAST	454	04,2637	54 154 0	TS	MPAC
25724					04,2640	0 0004 0	INHINT	
25725	REF	3	LAST	438	04,2641	3 4355 0	CAF	CHRPRI0
25726	REF	6	LAST	438	04,2642	0 5072 1	TC	NOVAC
25727	REF	63	LAST	457	0777		EBANK=	DSPCOUNT
25728	REF	1			04,2643	03534 0	2CADR	DSPMMJB
25728	REF	1			04,2644	60101 1		
257285					04,2645	0 0003 1	RELINT	
25729	REF	218	LAST	457	04,2646	0 0154 1	ENDSPMM	TC MPAC

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R2573 DSPMM PLACE MAJOR MODE CODE INTO MODREG

25735	REF 1	40,3534	SETLOC ENDBSUB1	
25736	REF 9 LAST 456 TO 457:	23 797*	COUNT* \$\$/PIN	
2574	REF 1	40,3534 3 4362 1	CAF MD1	GETS HERE THRU DSPMM
2575	REF 64 LAST 457	40,3535 56 777 0	XCH DSPCOUNT	
2576	REF 1	40,3536 54 140 0	TS DSPMMTEM	SAVE DSPCOUNT
2579	REF 8 LAST 280	40,3537 11 011 1	CCS MODREG	
2580	REF 56 LAST 452	40,3540 6 4753 1	AD ONE	
25801	REF 4 LAST 443	40,3541 0 3306 1	TC DSPDECVN	IF MODREG IS + OR +0, DISPLAY MODREG
25802		40,3542 0 3544 1	TC +2	IF MODREG IS -NZ, DO NOTHING
25803	REF 6 LAST 447	40,3543 0 2601 1	TC 2BLANK	IF MODREG IS -0, BLANK MM
2581	REF 2 LAST 458	40,3544 56 140 1	XCH DSPMMTEM	RESTORE DSPCOUNT
2582	REF 65 LAST 458	40,3545 54 777 1	TS DSPCOUNT	
2583	REF 57 LAST 455	40,3546 0 5155 0	TC ENDOFJOB	

R2584 RECALST IS ENTERED DIRECTLY AFTER DATA IS LOADED (OR RESEQUENCE VERB IS
 R2585 EXECUTED), TERMINATE VERB IS EXECUTED, OR PROCEED WITHOUT DATA VERB IS
 R2586 EXECUTED. IT WAKES UP JOB THAT DID TC ENDIDLE.

R2587 IF CADRSTOR NOT= +0, IT PUTS +0 INTO DSPLOCK, AND TURNS OFF KEY RLSE
 R2588 LIGHT IF DSPLIST IS EMPTY (LEAVES KEY RLSE LIGHT ALONE IF NOT EMPTY).

2589	REF 9 LAST 455	40,3547 11 042 1	RECALST CCS	CADRSTOR	
2590	REF 1	40,3550 0 3552 0	TC	RECAL1	
2591	REF 58 LAST 458	40,3551 0 5155 0	TC	ENDOFJOB	NORMAL EXIT IF KEYBOARD INITIATED
2592	REF 100 LAST 454	40,3552 3 4755 1	RECAL1 CAF	ZERU	
2593	REF 10 LAST 458	40,3553 57 042 0	XCH	CADRSTOR	
2594		40,3554 0 0004 0	INHINT		
2595	REF 3 LAST 374	40,3555 0 5137 1	TC	JOBWAKE	
2596	REF 4 LAST 454	40,3556 11 014 1	CCS	LOADSTAT	
2597	REF 1	40,3557 0 3601 0	TC	DOPROC	+ PROCEED WITHOUT DATA
2598	REF 59 LAST 458	40,3560 0 5155 0	TC	ENDOFJOB	PATHOLOGICAL CASE EXIT
2599	REF 1	40,3561 0 3577 1	TC	DOTERM	TERMINATE
2600	REF 31 LAST 445	40,3562 3 4752 0	CAF	TWO	-0 DATA IN OR RESEQUENCE
2601	REF 2 LAST 372	40,3563 50 064 0	RECAL2 INDEX	LOGCTR	
2602	REF 3 LAST 372	40,3564 6 0164 1	AD	LOC	LOC IS + FOR BASIC JOBS
2603	REF 3 LAST 458	40,3565 50 064 0	INDEX	LOGCTR	
2604	REF 4 LAST 458	40,3566 54 164 0	TS	LOC	
26041	REF 15 LAST 453	40,3567 3 1002 1	CA	NOUNREG	SAVE VERB IN MPAC, NOUN IN MPAC+1 AT
26042	REF 60 LAST 455	40,3570 54 001 1	TS	L	TIME OF RESPONSE TO ENDIDLE FOR
26043	REF 20 LAST 453	40,3571 3 1001 1	CA	VERBREG	POSSIBLE LATER TESTING BY JOB THAT HAS
26044	REF 4 LAST 458	40,3572 50 064 0	INDEX	LOGCTR	BEEN WAKED UP.
26045	REF 219 LAST 457	40,3573 52 155 1	DXCH	MPAC	
2605		40,3574 0 0003 1	RELINT		
2606	REF 9 LAST 450	40,3575 0 4457 0	RECAL3 TC	RELDSP	
2607	REF 60 LAST 458	40,3576 0 5155 0	TC	ENDOFJOB	

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2608	REF	101	LAST	458	40,3577	3	4755	1	DOTERM	CAF	ZERO
2609	REF	1			40,3600	0	3563	1		TC	RECAL2
2610	REF	57	LAST	458	40,3601	3	4753	1	DOPROC	CAF	ONE
2611	REF	2	LAST	459	40,3602	0	3563	1		TC	RECAL2

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P2612 MISCELLANEOUS SERVICE ROUTINES IN FIXED/FIXED

2613 REF 1 4303 SETLOC ENDBLFF

26135 REF 5 LAST 454 TO 456: 63 111* COUNT* 33/PIN
 R2614 SETNCADR E CADR ARRIVES IN A. IT IS STORED IN NOUNCADR. EBANK BITS
 R2615 ARE SET. E ADRES IS DERIVED AND PUT INTO NOUNADD.

2616 REF 8 LAST 440 4303 55 017 1 SETNCADR TS NOUNCADR STORE ECADR
 2617 REF 13 LAST 388 4304 54 003 0 TS EBANK SET EBANK BITS
 2618 REF 2 LAST 191 4305 7 4357 0 MASK LOW8
 2619 REF 1 4306 6 5007 0 AD OCT1400
 2620 REF 29 LAST 435 4307 54 145 0 TS NOUNADD PUT E ADRES INTO NOUNADD
 2621 REF 125 LAST 457 4310 0 0002 0 TC Q

R2622 SETNADD GETS E CADR FROM NOUNCADR. SETS EBANK BITS, DERIVES
 R2623 E ADRES AND PUTS IT INTO NOUNADD.

2624 REF 9 LAST 460 4311 3 1017 0 SETNADD CA NOUNCADR
 2625 REF 7 LAST 429 4312 1 4304 0 TCF SETNCADR +1

R2626 SETEBANK E CADR ARRIVES IN A. EBANK BITS ARE SET. E ADRES IS
 R2627 DERIVED AND LEFT IN A.

2628 REF 14 LAST 460 4313 54 003 0 SETEBANK TS EBANK SET EBANK BITS
 2629 REF 3 LAST 460 4314 7 4357 0 MASK LOW8
 2630 REF 2 LAST 460 4315 6 5007 0 AD OCT1400 E ADRES LEFT IN A
 2631 REF 126 LAST 460 4316 0 0002 0 TC Q

2632 4317 00016 0 R1D1 OCT 16 THESE 3 CONSTANTS FORM A PACKED TABLE.
 2633 4320 00011 1 R2D1 OCT 11 DONT SEPARATE.
 2634 4321 00004 0 R3D1 OCT 4

2635 REF 7 LAST 444 4322 54 020 1 RIGHT5 TS CYR
 2636 REF 8 LAST 460 4323 4 0020 1 CS CYR
 2637 REF 9 LAST 460 4324 4 0020 1 CS CYR
 2638 REF 10 LAST 460 4325 4 0020 1 CS CYR
 2639 REF 11 LAST 460 4326 4 0020 1 CS CYR
 2640 REF 12 LAST 460 4327 56 020 0 XCH CYR
 2641 REF 127 LAST 460 4330 0 0002 0 TC Q

2642 REF 13 LAST 444 4331 54 022 0 LEFT5 TS CYL
 2643 REF 14 LAST 460 4332 4 0022 0 CS CYL
 2644 REF 15 LAST 460 4333 4 0022 0 CS CYL
 2645 REF 16 LAST 460 4334 4 0022 0 CS CYL
 2646 REF 17 LAST 460 4335 4 0022 0 CS CYL

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2647	REF 18	LAST 460	4336	56 022 1		XCH	CYL	
2648	REF 128	LAST 460	4337	0 0002 0		TC	Q	
2649			4340	6 0000 1	SLEFT5	DOUBLE		
2650			4341	6 0000 1		DOUBLE		
2651			4342	6 0000 1		DOUBLE		
2652			4343	6 0000 1		DOUBLE		
2653			4344	6 0000 1		DOUBLE		
2654	REF 129	LAST 461	4345	0 0002 0		TC	Q	
2655			4346	00037 0	LOW5	OCT	37	
2656			4347	01740 0	MID5	OCT	1740	
2657			4350	76000 0	HIS	OCT	76000	
2658	REF 7	LAST 457	4351	0 5072 1	TCNOVAC	TC	NOVAC	
2659	REF 17	LAST 438	4352	0 5203 0	TCWAIT	TC	WAITLIST	
2660	REF 13	LAST 438	4353	0 5261 1	TCTSKOVR	TC	TASKOVER	
2661	REF 16	LAST 384	4354	0 5105 0	TCFINDVC	TC	FINDVAC	
2662			4355	30000 1	CHRPRI0	OCT	30000	
2663			4356	03777 0	LOW11	OCT	3777	
2664	REF 6	LAST 429	4356		B12-1	EQUALS	LOW11	
2665			4357	00377 1	LOW8	OCT	377	
2667			4360	00023 0	VD1	OCT	23	
2668			4361	00021 1	ND1	OCT	21	
2669			4362	00025 0	MD1	OCT	25	
2670			4363	00012 1	BINCON	DEC	10	
2671	REF 20	LAST 405	4364	3 4745 0	FALTON	CA	BIT7	
2672			4365	0 0006 1		EXTEND		
2673	REF 12	LAST 450	4366	05 011 1		WOR	DSALMOUT	
2674	REF 130	LAST 461	4367	0 0002 0		TC	Q	
2675	REF 21	LAST 461	4370	4 4745 1	FALTOF	CS	BIT7	
2676			4371	0 0006 1		EXTEND		
2677	REF 13	LAST 461	4372	03 011 1		WAND	DSALMOUT	
2678	REF 131	LAST 461	4373	0 0002 0		TC	Q	
2679	REF 22	LAST 447	4374	3 4747 1	RELDSPON	CAF	BIT5	
2680			4375	0 0006 1		EXTEND		
2681	REF 14	LAST 461	4376	05 011 1		WOR	DSALMOUT	
2682	REF 132	LAST 461	4377	0 0002 0		TC	Q	

THESE 3 CONSTANTS FORM A PACKED TABLE.
DONT SEPARATE.
MUST STAY HERE

EXEC PRIORITY OF CHARIN

THESE 3 CONSTANTS FORM A PACKED TABLE.
DONT SEPARATE.

TURN ON OPERATOR ERROR LIGHT

BIT 7 OF CHANNEL 11

TURN OFF OPERATOR ERROR LIGHT

BIT 7 OF CHANNEL 11

TURN ON KEY RELEASE LIGHT

BIT 5 OF CHANNEL 11

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2683				4400	0 0006 1	LODSAMPT	EXTEND	
2684	REF 13	LAST	366	4401	3 0025 0	DCA	TIME2	
2685	REF 5	LAST	315	4402	52 014 0	DXCH	SAMPTIME	
2686	REF 133	LAST	461	4403	0 0002 0	TC	Q	

2687				4404	0 0006 1	TPSL1	EXTEND		SHIFTS MPAC, +1, +2 LEFT 1
2688	REF 220	LAST	458	4405	3 0156 0	DCA	MPAC	+1	LEAVES OVFINO SET TO +/- 1 FOR OF/UF
2689	REF 221	LAST	462	4406	20 156 1	DAS	MPAC	+1	
2690	REF 222	LAST	462	4407	6 0154 1	AD	MPAC		
2691	REF 223	LAST	462	4410	26 154 0	ADS	MPAC		
2692				4411	54 007 1	TS	7		TS A DOES NOT CHANGE A ON OF/UF.
2693	REF 134	LAST	462	4412	0 0002 0	TC	Q		NO NET OF/UF
2694	REF 7	LAST	434	4413	54 162 0	TS	MPAC+6		MPAC +6 SET TO +/-1 FOR OF/UF
2695	REF 135	LAST	462	4414	0 0002 0	TC	Q		

R2696 IF MPAC, +1 ARE EACH +NZ OR +0 AND C(A)=-0, SHORTMP WRONGLY GIVES +0.
 R2697 IF MPAC, +1 ARE EACH -NZ OR -0 AND C(A)=+0, SHORTMP WRONGLY GIVES +0.
 R2698 PRSHRTMP FIXES FIRST CASE ONLY, BY MERELY TESTING C(A) AND IF IT = -0,
 R2699 SETTING RESULT TO -0.
 R2700 (DO NOT USE PRSHRTMP UNLESS MPAC, +1 ARE EACH +NZ OR +0, AS THEY ARE
 R2701 WHEN THEY CONTAIN THE SF CONSTANTS.)

2702	REF 2	LAST	97	4415	54 135 1	PRSHRTMP	TS	MPTEMP	
2703	REF 148	LAST	457	4416	10 000 0	CCS	A		
2704	REF 3	LAST	462	4417	3 0135 0	CA	MPTEMP		C(A) +, DO REGULAR SHORTMP
2705	REF 6	LAST	441	4420	1 7310 0	TCF	SHORTMP +1		C(A) +0, DO REGULAR SHORTMP
2706				4421	1 4417 0	TCF	-2		C(A) -, DO REGULAR SHORTMP
2707	REF 102	LAST	459	4422	4 4755 0	CS	ZERO		C(A) -0, FORCE RESULT TO -0 AND RETURN.
2708	REF 224	LAST	462	4423	54 154 0	TS	MPAC		
2709	REF 225	LAST	462	4424	54 155 1	TS	MPAC	+1	
2710	REF 226	LAST	462	4425	54 156 1	TS	MPAC	+2	
2711	REF 136	LAST	462	4426	0 0002 0	TC	Q		

2712	REF 35	LAST	326	4427	3 4746 0	FLASHON	CAF	BIT6	TURN ON V/N FLASH
2713				4430	0 0006 1		EXTEND		BIT 6 OF CHANNEL 11
2714	REF 15	LAST	461	4431	05 011 1		WOR	DSALMOUT	
2715	REF 137	LAST	462	4432	0 0002 0		TC	Q	

2716	REF 36	LAST	462	4433	4 4746 1	FLASHOFF	CS	BIT6	TURN OFF V/N FLASH
2717				4434	0 0006 1		EXTEND		
2718	REF 16	LAST	462	4435	03 011 1		WAND	DSALMOUT	BIT 6 OF CHANNEL 11
2719	REF 138	LAST	462	4436	0 0002 0		TC	Q	

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P2720 INTERNAL USE OF KEYBOARD AND DISPLAY PROGRAM

R2721 USER MUST SCHEDULE CALLS TO NVSUB SO THAT THERE IS NO CONFLICT OF USE OR
R2722 CONFUSION TO OPERATOR. THE OLD GRABLOCK (INTERNAL/INTERNAL INTERLOCK)
R2723 HAS BEEN REMOVED AND THE INTERNAL USER NO LONGER HAS THE PROTECTION THIS
R2724 OFFERED.

R2725 THERE ARE TWO WAYS A JOB CAN BE PUT TO SLEEP BY THE KEYBOARD + DISPLAY
R2726 PROGRAM. 1) BY ENDIDLE

R2727 2) BY NVSUBUSY

R2728 THE BASIC CONVENTION IS THAT ONLY ONE JOB WILL BE PERMITTED ASLEEP VIA
R2729 THE KEYBOARD + DISPLAY PROGRAM AT A TIME. IF A JOB ATTEMPTS TO GO TO
R2730 SLEEP BY MEANS OF (1) OR (2) AND THERE IS ALREADY A JOB ASLEEP THAT WAS
R2731 PUT TO SLEEP BY (1) OR (2), THEN AN ABORT IS CAUSED.

R2732 THE CALLING SEQUENCE FOR NVSUB IS

R2733 CAF V/N

R2734 L TC NVSUB

R2735 L+1 RETURN HERE IF OPERATOR HAS INTERVENED

R2736 L+2 RETURN HERE AFTER EXECUTION

R2737 A ROUTINE CALLED NVSUBUSY IS PROVIDED (USE IS OPTIONAL) TO PUT
R2738 YOUR JOB TO SLEEP UNTIL THE OPERATOR RELEASES THE KEYBOARD + DISPLAY
R2739 SYSTEM. NVSUBUSY ALSO TURNS ON THE KEY RELEASE LIGHT.
R2740 NVSUBUSY CANNOT BE CALLED FROM ERASABLE OR F/F MEMORY.
R2741 SINCE JOBSLEEP AND JOBWAKE CAN HANDLE ONLY FIXED BANKS.

R2742 THE CALLING SEQUENCE IS

R2743 CAF WAKEFCADR

R2744 TC NVSUBUSY

R2745 .

R2746 NVSUBUSY IS INTENDED FOR USE WHEN AN INTERNAL PROGRAM FINDS THE OPERATOR
R2747 IS USING THE KEYBOARD + DISPLAY PROGRAM (BY HIS OWN INITIATION). IT IS
R2748 NOT INTENDED FOR USE WHEN ONE INTERNAL PROGRAM FINDS ANOTHER INTERNAL
R2749 PROGRAM USING THE KEYBOARD + DISPLAY PROGRAM.

R2750 NVSUBUSY ABORTS (WITH CODE 01206) IF A SECOND JOB ATTEMPTS TO GO TO
R2751 SLEEP IN PINBALL. IN PARTICULAR, IF AN ATTEMPT IS MADE TO GO TO NVSUBUSY
R2752 WHEN

R2753 1) DSPLIST NOT= +0. THIS IS THE CASE WHERE THE CAPACITY OF THE DSPLIST
R2754 IS EXCEEDED.

R2755 2) CADDRSTOR NOT= +0. THIS INDICATES THAT A JOB IS ALREADY USING

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22756 ENDIDLE. (+-NZ INDICATE A JOB IS ALREADY ASLEEP DUE TO ENDIDLE.)

2757	REF	1		4437	4	4444	0	PRENVBSY	CS	2K+3	SPECIAL ENTRANCE FOR ROUTINES IN FIXED
2758	REF	139	LAST	452	4440	6	0002	0	AD	Q	BANKS ONLY DESIRING THE FCADR OF(LOC
2759	REF	2	LAST	455	4441	6	0004	0	AD	FBANK	FROM WHICH THE TC PRENVBSY WAS DONE) -2
2760	REF	34	LAST	456	4442	0	4635	0	NVSUBUSY	TC	POSTJUMP
2761	REF	1			4443	1	0647	0	CADR	NVSUBSY1	TO BE ENTERED.
2762					4444	0	2003	0	2K+3	DCT	2003

327625 NVSUBSY1 MUST BE IN BANK 27 OR LOWER, SO IT WILL PUT CALLER TO SLEEP
327626 WITH HIS PROPER SUPERBITS.

2763	REF	1		04,2647			SETLOC	ENDSPMM	+1	
27635	REF	2	LAST	457 TO 458:	9	9*	COUNT*	\$/PIN		
2764	REF	61	LAST	458	04,2647	54 001 1	NVSUBSY1	TS	L	
2769	REF	2	LAST	455	04,2650	0 4220 0	TC	ISCADR+0		ABORT IF CADDRSTOR NOT= +0.
2770	REF	2	LAST	455	04,2651	0 4224 1	TC	ISLIST+0		ABORT IF DSPLIST NOT= +0.
2771	REF	3	LAST	439	04,2652	0 4374 0	TC	RELDSPON		
2772	REF	62	LAST	464	04,2653	3 0001 0	CA	L		
2773	REF	3	LAST	455	04,2654	55 043 0	TS	DSPLIST		
2774	REF	3	LAST	455	04,2655	0 5133 0	ENDNVBSY	TC	JOBSLEEP	

```
R2775 NVSBWAIT IS A SPECIAL ENTRANCE FOR ROUTINES IN FIXED BANKS ONLY. IF
R2776 SYSTEM IS NOT BUSY, IT EXECUTES V/N AND RETURNS TO L+1 (L= LOC FROM
R2777 WHICH THE TC NVSBWAIT WAS DONE). IF SYSTEM IS BUSY, IT PUTS CALLING JOB
R2778 TO SLEEP WITH L-1 GOING INTO LIST FOR EVENTUAL WAKING-UP WHEN SYSTEM
R2779 IS NOT BUSY.
```

2780	REF	1			4445		SETLOC	NVSUBUSY +3		
27805	REF	6	LAST	460	TO	464:	98	209*	COUNT*	\$\$/PIN
2781						4445	22	007 0	NVSBWAIT	LXCH 7 ZERO NVMONOPT OPTIONS
2782	REF	9	LAST	457		4446	54	123 0	TS	NVTEMP
2783	REF	44	LAST	456		4447	3	4736 1	CAF	BIT14
27831	REF	10	LAST	456		4450	7	1021 1	MASK	MONSAVE1 EXTERNAL MONITOR BIT
27832	REF	8	LAST	456		4451	6	1012 0	AD	DSPLUCK
27833	REF	149	LAST	462		4452	10	000 0	CCS	A
27834	REF	1				4453	1	4455 0	TCF	NVSBWT1 BUSY
2784	REF	1				4454	1	4164 1	TCF	NVSBGOM FREE. NVSUB WILL SAVE L+1 FOR RETURN
A2785										AFTER EXECUTION.
2786	REF	140	LAST	464		4455	24	002 0	NVSBWT1	INCR Q L+2. PRENVBSY WILL PUT L-1 INTO LIST AND
2787	REF	1				4456	1	4437 1	TCF	PRENVBSY GO TO SLEEP.

R2788 RELDSP IS USED BY VBPROC, VBTERM, VBRQEXEC, VBRQWAIT, VBRELDSP, EXTENDED
R2789 VERB DISPATCHER, VBRESEQ, RECALST.
R2790 RELDSP1 IS USED BY MONITOR SET-UP, VBRELDSP.

2791	REF 141	LAST 464	4457	56 002 0	RELDSP	XCH	Q	SET DSPLOCK TO +0, TURN RELDSP LIGHT
2792	REF 1		4460	54 144 1	TS	RELRET		OFF, SEARCH DSPLIST
27921	REF 45	LAST 464	4461	4 4736 0	CS	BIT14		

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27922				4462	0 0004 0	INHINT		
27923	REF	11	LAST	464	4463 7 1021 1	MASK	MONSAVE1	
27924	REF	12	LAST	465	4464 55 021 1	TS	MONSAVE1	TURN OFF EXTERNAL MONITOR BIT
2793	REF	4	LAST	464	4465 11 043 0	CCS	DSPLIST	
2794					4466 0 4470 0	TC	+2	
2795	REF	1			4467 0 4473 0	TC	RELDSP2	LIST EMPTY
2796	REF	103	LAST	462	4470 3 4755 1	CAF	ZERO	
2797	REF	5	LAST	465	4471 57 043 1	XCH	DSPLIST	
2799	REF	4	LAST	458	4472 0 5137 1	TC	JOBWAKE	
2800					4473 0 0003 1	RELDSP2	RELINT	
2801	REF	23	LAST	461	4474 4 4747 0	CS	BIT5	TURN OFF KEY RELEASE LIGHT
2802					4475 0 0006 1	EXTEND		(BIT 5 OF CHANNEL 11)
2803	REF	17	LAST	462	4476 03 011 1	WAND	DSALMOUT	
2804	REF	104	LAST	465	4477 3 4755 1	CAF	ZERO	
2805	REF	9	LAST	464	4500 55 012 1	TS	DSPLCK	
2807	REF	2	LAST	464	4501 0 0144 0	TC	RELRET	
2808	REF	142	LAST	464	4502 56 002 0	RELDSP1	XCH	Q
2809	REF	3	LAST	465	4503 54 144 1	TS	RELRET	SET DSPLOCK TO +0. NO DSPLIST SEARCH.
A2810								TURN KEY RLSE LIGHT OFF IF DSPLIST IS
A2811								EMPTY. LEAVE KEY RLSE LIGHT ALONE IF
2812	REF	6	LAST	465	4504 11 043 0	CCS	DSPLIST	DSPLIST IS NOT EMPTY.
2813					4505 0 4507 1	TC	+2	+ NOT EMPTY. LEAVE KEY RLSE LIGHT ALONE
2814	REF	2	LAST	465	4506 0 4473 0	TC	RELDSP2	+0 EMPTY. TURN OFF KEY RLSE LIGHT
2815	REF	105	LAST	465	4507 3 4755 1	CAF	ZERO	- NOT EMPTY. LEAVE KEY RLSE LIGHT ALONE
2816	REF	10	LAST	465	4510 55 012 1	TS	DSPLCK	
2817	REF	4	LAST	465	4511 0 0144 0	TC	RELRET	

2818

4512

ENDPINBF EQUALS

GAP: ASSEMBLE REVISION 001 OF AGC PROGRAM LMY99 BY NASA 2021112-061 16:27 JULY 14, 1969 LNYAIDE .001 PAGE 466

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P28181 PINTEST IS NEEDED FOR AUTO CHECK OF PINBALL.

28182 REF 2 LAST 262 43.2002 -PINTEST EQUALS LST2FAN

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P2819 VBTSTLTS TURNS ON ALL DISPLAY PANEL LIGHTS. AFTER 5 SEC, IT TURNS
 2820 OFF THE CAUTION AND STATUS LIGHTS.

2821	REF	1		41,3613			SETLOC	ENDNVSB1	+1	
28215	REF	8	LAST	452 TO 454:	61	907*	COUNT*	\$\$/PIN		
2822				41,3613	0	0004 0	INHINT			
2823	REF	23	LAST	457	41,3614	4 4753 0	CS	BIT1		SET BIT 1 OF IMODES33 SO IMUMON WONT
2824	REF	19	LAST	222	41,3615	7 1303 1	MASK	IMODES33		TURN OUT ANY LAMPS.
2825	REF	24	LAST	467	41,3616	6 4753 1	AD	BIT1		
2826	REF	20	LAST	467	41,3617	55 303 1	TS	IMODES33		
2827	REF	1			41,3620	3 3656 1	CAF	TSTCON1		TURN ON UPLINK ACTIVITY, TEMP, KEY RLSE,
2828					41,3621	0 0006 1	EXTEND			V/N FLASH, OPERATOR ERROR.
2829	REF	18	LAST	465	41,3622	05 011 1	WOR	DSALMOUT		
2830	REF	1			41,3623	3 3657 0	CAF	TSTCON2		TURN ON NO ATT, GIMBAL LOCK, TRACKER,
2831	REF	27	LAST	453	41,3624	55 036 1	TS	DSPTAB	+110	PROG ALM.
2832	REF	21	LAST	418	41,3625	3 4742 1	CAF	BIT10		TURN ON TEST ALARM OUTBIT
2833					41,3626	0 0006 1	EXTEND			
2834	REF	5	LAST	220	41,3627	05 013 0	WOR	CHAN13		
2835	REF	5	LAST	400	41,3630	3 4363 0	CAF	TEN		
2836	REF	1			41,3631	54 117 1	TS	ERCNT		
2837	REF	1			41,3632	4 3654 1	CS	FULLDSP		
2838	REF	2	LAST	467	41,3633	50 117 0	INDEX	ERCNT		
2839	REF	28	LAST	467	41,3634	55 023 0	TS	DSPTAB		
2840	REF	3	LAST	467	41,3635	10 117 1	CCS	ERCNT		
2841	REF	1			41,3636	0 3631 0	TC	TSTLTS1		
2842	REF	1			41,3637	4 3655 0	CS	FULLDSP1		
2843	REF	29	LAST	467	41,3640	55 024 1	TS	DSPTAB	+1	TURN ON 3 PLUS SIGNS
2844	REF	30	LAST	467	41,3641	55 027 1	TS	DSPTAB	+4	
2845	REF	31	LAST	467	41,3642	55 031 0	TS	DSPTAB	+6	
2846	REF	1			41,3643	3 4760 1	CAF	ELEVEN		
2847	REF	9	LAST	453	41,3644	55 016 0	TS	NOUT		
2848					41,3645	0 0003 1	RELINT			
2849	REF	1			41,3646	3 3661 0	CAF	SHOLTS		
2850					41,3647	0 0004 0	INHINT			
2851	REF	18	LAST	461	41,3650	0 5203 0	TC	WAITLIST		
2852	REF	32	LAST	467	1023		EBANK=	DSPTAB		
2853	REF	1			41,3651	03662 0	2CADR	TSTLTS2		
2854	REF	1			41,3652	62102 0				
2854	REF	61	LAST	458	41,3653	0 5155 0	TC	ENDOFJOB		DSBLOCK IS LEFT BUSY (FROM KEYBOARD ACTION) UNTIL TSTLTS3 TO INSURE THAT LIGHTS TEST WILL BE SEEN.
A2855										
A2856										
2857					41,3654	05675 0	FULLDSP	OCT	05675	DISPLAY ALL 8:S
2858					41,3655	07675 1	FULLDSP1	OCT	07675	DISPLAY ALL 8:S AND +
2859					41,3656	00175 1	TSTCON1	OCT	00175	
A2860										UPLINK ACTIVITY, TEMP, KEY RLSE,
A2861										V/N FLASH, OPERATOR ERROR.

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2862					41,3657	40674 0	TSTCON2	OCT	40674	DSPTAB+11D BITS 3,4,5,6,8,9. LR LITES.
A2863										NO ATT, GIMBAL LOCK, TRACKER, PROG-ALM.
2864					41,3660	00115 1	TSTCON3	OCT	00115	CHAN 11 BITS 1, 3, 4, 7.
A2865										UPLINK ACTIVITY, TEMP, OPERATOR ERROR.
2866					41,3661	00764 1	SHOLTS	OCT	764	5 SEC
2867	REF	4	LAST	457	41,3662	3 4355 0	TSTLTS2	CAF	CHRPRI0	CALLED BY WAITLIST
2868	REF	8	LAST	461	41,3663	0 5072 1		TC	NOVAC	
2869	REF	33	LAST	467	1023			EBANK	DSPTAB	
2870	REF	1			41,3664	03667 0		2CADR	TSTLTS3	
2870	REF	1			41,3665	62102 0				
2871	REF	14	LAST	461	41,3666	0 5261 1		TC	TASKOVER	
2872	REF	1			41,3667	4 3660 0	TSTLTS3	CS	TSTCON3	CALLED BY EXECUTIVE
2873					41,3670	0 0004 0		INHINT		
2874					41,3671	0 0006 1		EXTEND		
2875	REF	19	LAST	467	41,3672	03 011 1		WAND	DSALMOUT	TURN OFF UPLINK ACTIVITY, TEMP,
2876	REF	22	LAST	467	41,3673	4 4742 0		CS	BIT10	OPERATOR ERROR.
2877					41,3674	0 0006 1		EXTEND		TURN OFF TEST ALARM OUTBIT
2878	REF	6	LAST	467	41,3675	03 013 0		WAND	CHAN13	
28781	REF	22	LAST	332	41,3676	3 4750 1		CAF	BIT4	MAKE NO ATT FOLLOW BIT 4 OF CHANNEL 12
28782					41,3677	0 0006 1		EXTEND		(NO ATT LIGHT ON IF IN COARSE ALIGN)
28783	REF	22	LAST	288	41,3700	02 012 0		RAND	CHAN12	
2879	REF	25	LAST	454	41,3701	6 4735 1		AD	BIT15	TURN OFF AUTO, HOLD, FREE, SPARE,
2880	REF	34	LAST	468	41,3702	55 036 1		TS	DSPTAB +11D	GIMBAL LOCK, SPARE, TRACKER, PROG-ALM
2881	REF	1			41,3703	4 3726 0		CS	13-11,1	SET BITS TO INDICATE ALL LAMPS OUT. TEST
2882	REF	21	LAST	467	41,3704	7 1303 1		MASK	IMODES33	LIGHTS COMPLETE.
2883	REF	3	LAST	223	41,3705	6 5026 0		AD	PRI016	
2884	REF	22	LAST	468	41,3706	55 303 1		TS	IMODES33	
2885	REF	1			41,3707	4 3730 1		CS	OCT55000	
2886	REF	42	LAST	227	41,3710	7 1302 0		MASK	IMODES30	
2887	REF	4	LAST	260	41,3711	6 5025 0		AD	PRI015	15000.
2888	REF	43	LAST	468	41,3712	55 302 0		TS	IMODES30	
2889	REF	1			41,3713	4 3727 1		CS	RFAILS2	
2890	REF	27	LAST	323	41,3714	7 0110 0		MASK	RADMODES	
2891	REF	4	LAST	185	41,3715	6 4745 0		AD	RCDUFBIT	
2892	REF	28	LAST	468	41,3716	54 110 0		TS	RADMODES	
2893					41,3717	0 0003 1		RELINT		
2894	REF	92	LAST	447	41,3720	0 4616 1		TC	BANKCALL	REDISPLAY C(MODREG)
2895	REF	1			41,3721	10636 0		CADR	DSPMM	
2896	REF	4	LAST	452	41,3722	0 4204 0		TC	KILMONON	TURN ON KILL MONITOR BIT.
2897	REF	5	LAST	453	41,3723	0 4433 1		TC	FLASHOFF	TURN OFF V/N FLASH.
2898	REF	35	LAST	464	41,3724	0 4635 0		TC	POSTJUMP	DOES RELDSP AND GOES TO PINBRNCH IF
2899	REF	1			41,3725	61471 1		CADR	TSTLTS4	ENDIDLE IS AWAITING OPERATOR RESPONSE.

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2901	41,3726	16001 1	13-11,1	OCT	16001
2902	41,3727	00330 1	RFAILS2	OCT	330
2903	41,3730	55000 1	OCT55000	OCT	55000
2904	41,3731		ENDPINS2	EQUALS	

RADAR CDU AND DATA FAIL FLAGS.

L PINBALL GAME BUTTONS AND LIGHTS

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P2905 ERROR LIGHT RESET (RSET) TURNS OFF,
 R2906 UPLINK ACTIVITY, AUTO, HOLD, FREE, OPERATOR ERROR,
 R2907 PROG ALM, TRACKER FAIL.
 R2908 LEAVES GIMBAL LOCK AND NO ATT ALONE.
 R2909 IT ALSO ZEROES THE :TEST ALARM: OUT BIT, WHICH TURNS OFF STBY, RESTART.
 R2910 IT ALSO SETS :CAUTION RESET: TO 1.
 R2911 IT ALSO FORCES BIT 12 OF ALL DSPTAB ENTRIES TO 1.

2912	REF 2	LAST 458	40,3603		SETLOC	DDPROC +2	
29125	REF 10	LAST 458 TO	460:	39 836*	COUNT*	\$/PIN	
2913	REF 3	LAST 450	40,3603	56 115 1	XCH	21/22REG	RESTORE ORIGINAL C(DSPLOCK). THUS ERROR
2914	REF 11	LAST 465	40,3604	55 012 1	TS	DSPLOCK	LIGHT RESET LEAVES DSPLOCK UNCHANGED.
2915			40,3605	0 0004 0	INHINT		
2916	REF 23	LAST 468	40,3606	3 4742 1	CAF	BIT10	TURN ON :CAUTION RESET: OUTBIT
2917			40,3607	0 0006 1	EXTEND		
2918	REF 20	LAST 468	40,3610	05 011 1	WGR	DSALMOUT	BIT10 CHAN 11
2919	REF 1		40,3611	3 3672 1	CAF	GL+NOATT	LEAVE GIMBAL LOCK AND NO ATT INTACT,
2920	REF 35	LAST 468	40,3612	7 1036 1	MASK	DSPTAB +11D	TURNING OFF AUTO, HOLD, FREE,
2921	REF 26	LAST 468	40,3613	6 4735 1	AD	BIT15	PROG ALARM, AND TRACKER.
2922	REF 36	LAST 470	40,3614	55 036 1	TS	DSPTAB +11D	
2923	REF 4	LAST 468	40,3615	4 5026 1	CS	PRI016	RESET FAIL BITS WHICH GENERATE PROG
2924	REF 23	LAST 468	40,3616	7 1303 1	MASK	IMODES33	ALARM SO THAT IF THE FAILURE STILL
2925	REF 5	LAST 470	40,3617	6 5026 0	AD	PRI016	EXISTS, THE ALARM WILL COME BACK.
2926	REF 24	LAST 470	40,3620	55 303 1	TS	IMODES33	
2927	REF 24	LAST 470	40,3621	4 4742 0	CS	BIT10	
2928	REF 44	LAST 468	40,3622	7 1302 0	MASK	IMODES30	
2929	REF 25	LAST 470	40,3623	6 4742 1	AD	BIT10	
2930	REF 45	LAST 470	40,3624	55 302 0	TS	IMODES30	
2931	REF 1		40,3625	4 3671 0	CS	RFAILS	
2932	REF 29	LAST 468	40,3626	7 0110 0	MASK	RADMODES	
2933	REF 5	LAST 468	40,3627	6 4745 0	AD	RCDUFBIT	
2934	REF 30	LAST 470	40,3630	54 110 0	TS	RADMODES	
2935	REF 26	LAST 470	40,3631	4 4742 0	CS	BIT10	TURN OFF :TEST ALARM: OUTBIT.
2936			40,3632	0 0006 1	EXTEND		
2937	REF 7	LAST 468	40,3633	03 013 0	WAND	CHAN13	
2938	REF 1		40,3634	4 3670 1	CS	ERCON	TURN OFF UPLINK ACTIVITY,
2939			40,3635	0 0006 1	EXTEND		OPERATOR ERROR.
2940	REF 21	LAST 470	40,3636	03 011 1	WAND	DSALMOUT	
2941	REF 2	LAST 441	40,3637	3 4363 0	CAF	BINGON	(DEC 10)
2942	REF 4	LAST 467	40,3640	54 117 1	TS	ERCNT	ERCNT = COUNT
2943			40,3641	0 0004 0	INHINT		
2944	REF 5	LAST 470	40,3642	50 117 0	INDEX	ERCNT	
2945	REF 37	LAST 470	40,3643	11 023 0	CCS	DSPTAB	
2946	REF 58	LAST 459	40,3644	6 4753 1	AD	ONE	
2947	REF 1		40,3645	0 3652 0	TC	ERPLUS	
2948	REF 59	LAST 470	40,3646	6 4753 1	AD	ONE	
2949	REF 150	LAST 464	40,3647	4 0000 0	CS	A	ERMINUS
2950	REF 1		40,3650	7 3673 1	MASK	NOTBIT12	

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2951	REF	1		40,3651	0 3655 1	TC	ERCOM	
2952	REF	151	LAST	470	40,3652	4 0000 0	CS	A
2953	REF	2	LAST	470	40,3653	7 3673 1	MASK	NOTBIT12
2954	REF	152	LAST	471	40,3654	4 0000 0	CS	A
2955	REF	6	LAST	470	40,3655	50 117 0	INDEX	ERCNT
2956	REF	38	LAST	470	40,3656	55 023 0	TS	DSPTAB
2957				40,3657	0 0003 1	RELINT		
2958	REF	7	LAST	471	40,3660	10 117 1	CCS	ERCNT
2959	REF	1			40,3661	0 3640 0	TC	TSTAB +1
2960	REF	106	LAST	465	40,3662	3 4755 1	CAF	ZERC
2961	REF	5	LAST	305	40,3663	54 375 1	TS	FAILREG
29611	REF	6	LAST	471	40,3664	54 376 1	TS	FAILREG +1
29612	REF	7	LAST	471	40,3665	54 377 0	TS	FAILREG +2
2962	REF	2	LAST	108	40,3666	55 357 0	TS	SFAIL
2963	REF	62	LAST	467	40,3667	0 5155 0	TC	ENDOFJOB
2964				40,3670	00104 1	ERCON	OCT	104
A2965								
2966				40,3671	00330 1	RFAILS	OCT	330
29665				40,3672	00050 1	GL+NOATT	OCT	00050
2967				40,3673	73777 1	NOTBIT12	OCT	73777

CHAN 11 BITS 3,7.
UPLINK ACTIVITY, AND OPERATOR ERROR.
RADAR CDU AND DATA FAIL FLAGS.
NO ATT AND GIMBAL LOCK LAMPS

2968 40,3674 ENDPINS1 EQUALS

2969 REF 5 LAST 320 30,2000 SBANK= LOWSUPER

L R60,R62 USER'S PAGE NO. 1 EO S7

R0100 MOD NO: 0 DATE: 1 MAY 1968

R0101 MOD BY: DIGITAL DEVEL GROUP LOG SECTION R60,R62

R0102 FUNCTIONAL DESCRIPTION:

R0103 CALLED AS A GENERAL SUBROUTINE TO MANEUVER THE LM TO A SPECIFIED
R0104 ATTITUDE.

R0105 1. IF THE 3-AXIS FLAG IS NOT SET THE FINAL CDU ANGLES ARE
R0106 CALCULATED (VECPPOINT).

R0107 2. THE FDAI BALL ANGLES (NOUN 18) ARE CALCULATED (BALLANGS).

R0108 3. REQUEST FLASHING DISPLAY V50 N18 PLEASE PERFORM AUTO MANEUVER.

R0109 4. IF PRIORITY DISPLAY FLAG IS SET DO A PHASECHANGE. THEN AWAIT
R0110 ASTRONAUT RESPONSE.

R0111 5. DISPLAY RESPONSE RETURNS:

R0112 A. ENTER - RESET 3-AXIS FLAG AND RETURN TO CLIENT.

R0113 B. TERMINATE - IF IN P00 GO TO STEP 5A. OTHERWISE CHECK IF R61 IS
R0114 THE CALLING PROGRAM. IF IN R61 AN EXIT IS MADE TO GOTOV56. IF
R0115 NOT IN R61 AN EXIT IS DONE VIA GOTOP00H.

R0116 C. PROCEED - CONTINUE WITH PROGRAM AT STEP 6.

R0117 6. IF THE 3-AXISFLAG IS NOT SET. THE FINAL CDU ANGLES ARE CALCULATED
R0118 (VECPPOINT).

R0119 7. THE FDAI BALL ANGLES (NOUN 18) ARE CALCULATED (BALLANGS).

R0120 8. IF THE G+N SWITCH IS NOT SET GO BACK TO STEP 3.

R0121 9. IF THE AUTO SWITCH IS NOT SET GO BACK TO STEP 3.

R0122 10. NONFLASHING DISPLAY V06N18 (FDAI ANGLES).

R0123 11. DO A PHASECHANGE.

R0124 12. DO A MANEUVER CALCULATION AND ICDU DRIVE ROUTINE TO ACHIEVE FINAL

R0125 GIMBAL ANGLES (GOMANUR).

R0126 13. AT END OF MANEUVER GO TO STEP 2.

R0127 IF SATISFACTORY MANEUVER STEP 5A EXITS R60.

R0128 FOR FURTHER ADJUSTMENT OF THE VEHICLE ATTITUDE ABOUT THE

R0129 DESIRED VECTOR, THE ROUTINE MAY BE PERFORMED AGAIN STARTING AT

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R0130 STEP 5C.

R0131 CALLING SEQUENCE: TC BANKCALL
R0132 CADR R60LEM

R0133 EPASABLE INITIALIZATION REQUIRED : SCAXIS, POINTVSM (FOR VECPOINT)
R0134 3AXISFLG.

R0135 SUBROUTINES CALLED: VECPOINT, BALLANGS, GOPERF2R, LINUS, GODSPER,
R0136 GOMANUR, DOWNFLAG, PHASCHNG, UPFLAG

R0137 NORMAL EXIT MODES: CAE TEMPR60 (CALLERS RETURN ADDRESS)
R0138 TC BANKJUMP

R0139 ALARMS: NONE

R0140 OUTPUT: NONE

R0141 DEBRIS: CPHI, CTHETA, CPSI, 3AXISFLG, TBASE2

0142					34,2000			BANK 34		
0143	REF	1			26,2000			SETLOC MANUEVER		
0144					26,2123			BANK		
0145	REF	1			1164			EBANK= TEMPR60		
0146	REF	1						COUNT* \$\$/R06		
0147	REF	2	LAST	271	26,2123	0 4645 1	R60LEM	TC	MAKECADR	
0148	REF	2	LAST	473	26,2124	55'164 1		TS	TEMPR60	
0149	REF	1			26,2125	3 4746 0	REDOMANN	CAF	3AXISBIT	
0150	REF	13	LAST	290	26,2126	7 0101 0		MASK	FLAGWRD5	IS 3-AXIS FLAG SET
0151	REF	153	LAST	471	26,2127	10 000 0		CCS	A	
0152	REF	1			26,2130	1 2136 0		TCF	TOBALL	YES
0153	REF	27	LAST	388	26,2131	0 6037 0		TC	INTPRET	
0154					26,2132	77624 1		CALL		
0155	REF	2	LAST	340	26,2133	56040 0			VECPOINT	TO COMPUTE FINAL ANGLES
0156	REF	5	LAST	369	26,2134	00322 1		STORE	CPHI	STORE FINAL ANGLES - CPHI,CTHETA,CPSI
0157					26,2135	77776 1		EXIT		
0158	REF	93	LAST	468	26,2136	0 4616 1	TOBALL	TC	BANKCALL	
01585	REF	2	LAST	340	26,2137	54266 1		CADR	BALLANGS	TO CONVERT ANGLES TO FDAI
0159	REF	1			26,2140	3 2254 0	TOBALLA	CAF	VO6N18	
0160	REF	94	LAST	473	26,2141	0 4616 1		TC	BANKCALL	
0161	REF	1			26,2142	20710 0		CADR	GOPERF2R	DISPLAY PLEASE PERFORM AUTO MANEUVER
0162	REF	1			26,2143	0 2242 1		TC	R61TEST	
0163	REF	1			26,2144	0 2150 1		TC	REDOMANC	PROCEED
0164	REF	1			26,2145	0 2175 0		TC	ENDMANUI	ENTER I.E. FINISHED WITH R60

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0165	REF	1		26,2146	0 2201 0	TC	CHKLINUS	TO CHECK FOR PRIORITY DISPLAYS
0166	REF	63	LAST 471	26,2147	0 5155 0	TC	ENDOFJOB	
0167	REF	2	LAST 473	26,2150	3 4746 0	REDO MANC	CAF	3AXISBIT
0168	REF	14	LAST 473	26,2151	7 0101 0	MASK	FLAGWRD5	IS 3-AXIS FLAG SET
0169	REF	154	LAST 473	26,2152	10 000 0	CCS	A	
0170	REF	1		26,2153	1 2161 1	TCF	TOBALLC	YES
0171	REF	28	LAST 473	26,2154	0 6037 0	TC	INTPRET	
0172				26,2155	77624 1	CALL		
0173	REF	3	LAST 473	26,2156	56040 0		VECPPOINT	TO COMPUTE FINAL ANGLES
0174	REF	6	LAST 473	26,2157	00322 1	STORE	CPHI	STORE ANGLES
0175				26,2160	77776 1	EXIT		
0176	REF	95	LAST 473	26,2161	0 4616 1	TOBALLC	TC	BANKCALL
01765	REF	3	LAST 473	26,2162	54266 1	CADR	BALLANGS	TO CONVERT ANGLES TO FOAI
0177	REF	1		26,2163	0 2255 1	TC	G+N,AUTO	CHECK AUTO MODE
0178	REF	155	LAST 474	26,2164	10 000 0	CCS	A	
0179	REF	1		26,2165	1 2140 1	TCF	TOBALLA	NOT AUTO, GO REREQUEST AUTO MANEUVER.
0180	REF	2	LAST 473	26,2166	3 2254 0	AUTOMANV	CAF	VO6N18
0181	REF	96	LAST 474	26,2167	0 4616 1	TC	BANKCALL	STATIC DISPLAY DURING AUTO MANEUVER
0182	REF	1		26,2170	20451 0	CADR	GODSPR	
0183	REF	2	LAST 474	26,2171	0 2201 0	TC	CHKLINUS	TO CHECK FOR PRIORITY DISPLAYS
0184	REF	97	LAST 474	26,2172	0 4616 1	STARTMNV	TC	BANKCALL
0185	REF	1		26,2173	17750 0	CADR	GOMANUR	PERFORM MANEUVER VIA KALCMANU
0186	REF	2	LAST 474	26,2174	1 2140 1	ENDMANUV	TCF	TOBALLA
0187	REF	29	LAST 388	26,2175	0 5516 0	ENDMANU1	TC	DOWNFLAG
0188	REF	3	LAST 340	26,2176	00124 0	ADRES	3AXISFLG	FINISHED MANEUVER.
0189	REF	3	LAST 473	26,2177	31 164 0	CAE	TEMPR60	RESET 3-AXIS FLAG
0190	REF	6	LAST 445	26,2200	0 4640 1	TC	BANKJUMP	
0191	REF	3	LAST 263	26,2201	4 0100 1	CHKLINUS	CS	FLAGWRD4
0192	REF	1		26,2202	7 4740 1	MASK	PDSPFBIT	IS PRIORITY DISPLAY FLAG SET?
0193	REF	156	LAST 474	26,2203	10 000 0	CCS	A	
0194	REF	143	LAST 465	26,2204	0 0002 0	TC	Q	NO -- EXIT
0195	REF	144	LAST 474	26,2205	3 0002 0	CA	Q	
0196	REF	227	LAST 462	26,2206	54 156 1	TS	MPAC +2	SAVE RETURN
0197	REF	16	LAST 442	26,2207	4 6245 0	CS	THREE	OBTAIN LOCATION FOR RESTART
0198	REF	4	LAST 370	26,2210	6 0133 0	AD	BUF2	HOLDS Q OF LAST DISPLAY
0199	REF	1		26,2211	55 055 1	TS	TBASE2	
0200	REF	3	LAST 288	26,2212	0 5353 1	TC	PHASCHNG	
0201				26,2213	00132 1	OCT	00132	
0202	REF	22	LAST 461	26,2214	3 4745 0	CAF	BIT7	
0203	REF	1		26,2215	0 5464 1	TC	LINUS	GO SET BITS FOR PRIORITY DISPLAY
0204	REF	228	LAST 474	26,2216	0 0156 0	TC	MPAC +2	

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0205	REF	2	LAST	368	26,2217	3 7714 1	RELINUS	CAF	PRI026	RESTORE ORIGINAL PRIORITY
0206	REF	6	LAST	299	26,2220	0 5146 1		TC	PRI0CHNG	
0207	REF	3	LAST	287	26,2221	3 4747 1		CAF	TRACKBIT	DON'T CONTINUE R60 UNLESS TRACKFLAG ON.
0208	REF	15	LAST	293	26,2222	7 0075 1		MASK	FLAGWRD1	
0209	REF	157	LAST	474	26,2223	10 000 0		CCS	A	
0210	REF	1			26,2224	1 2237 1		TCF	RER60	
0211	REF	5	LAST	280	26,2225	3 4745 0		CAF	RNDVZBIT	IS IT P20?
0212	REF	21	LAST	287	26,2226	7 0074 0		MASK	FLAGWRD0	
0213	REF	158	LAST	475	26,2227	10 000 0		CCS	A	
0214					26,2230	0 2234 0		TC	+4	YES
0215	REF	4	LAST	474	26,2231	0 5353 1		TC	PHASCHNG	NO, MUST BE P25, SET 2.11 SPOT
0216					26,2232	40112 1		OCT	40112	
0217	REF	64	LAST	474	26,2233	0 5155 0		TC	ENDOFJOB	
0218	REF	5	LAST	475	26,2234	0 5353 1		TC	PHASCHNG	SET 2.7 SPOT FOR P20
0219					26,2235	40072 0		OCT	40072	
0220	REF	65	LAST	475	26,2236	0 5155 0		TC	ENDOFJOB	
0221	REF	12	LAST	298	26,2237	0 5504 0	RER60	TC	UPFLAG	SET PRI0 DISPLAY FLAG AFTER RESTART
0222	REF	1			26,2240	00077 1		ADRES	PDSPFLAG	
0223	REF	2	LAST	474	26,2241	0 1055 0		TC	TBASE2	
0224	REF	9	LAST	458	26,2242	3 1011 0	R61TEST	CA	MODREG	IF WE ARE IN P00 IT MUST BE V49 OR V89
0225					26,2243	0 0006 1		EXTEND		
0226	REF	2	LAST	473	26,2244	1 2175 1		BZF	ENDMANU1	THUS WE GO TO ENDEXT VIA USER
0227	REF	4	LAST	474	26,2245	3 0100 0		CA	FLAGWRD4	ARE WE IN R61 (P20 OR P25)
0228	REF	2	LAST	474	26,2246	7 4740 1		MASK	PDSPFBIT	
0229					26,2247	0 0006 1		EXTEND		
0230	REF	3	LAST	246	26,2250	1 6001 1		BZF	GOTOPOOH	NO
0231	REF	1			26,2251	0 6022 1		TC	GOTOV56	YES
0232					26,2252	20100 1	BIT14+7	OCT	20100	
0233					26,2253	00203 0	OCT203	OCT	203	
0234					26,2254	01422 1	V06N18	VN	0618	
R0236	SUBROUTINE TO CHECK FOR G+N CONTROL, AUTO STABILIZATION									
R0237	RETURNS WITH C(A) = + IF NOT SET FOR G+N, AUTO									
R0238	RETURNS WITH C(A) = +0 IF SWITCHES ARE SET									
0239					26,2255	0 0006 1	G+N,AUTO	EXTEND		
0240	REF	3	LAST	184	26,2256	00 030 1		READ	CHAN30	
0241	REF	27	LAST	470	26,2257	7 4742 0		MASK	BIT10	
0242	REF	159	LAST	475	26,2260	10 000 0		CCS	A	
0243	REF	145	LAST	474	26,2261	0 0002 0		TC	0	NOT IN G+N C(A) = +

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J244					26,2262	0 0006 1	ISIT AUTO	EXTEND	
0245	REF	2	LAST	291	26,2263	00 031 0		READ	CHAN31
0246	REF	46	LAST	464	26,2264	7 4736 0		MASK	BIT14
0247	REF	146	LAST	475	26,2265	0 0002 0		TC	Q

CHECK FOR AUTO MODE

(+) = NOT IN AUTO, (+0) = AOK

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R0248 PROGRAM DESCRIPTION BALLANGS
R0249 MOD NO. LOG SECTION R60,R62

R0250 WRITTEN BY RAMA M. AIYAWAR
R0251 FUNCTIONAL DESCRIPTION

R0252 COMPUTES LM FDAI BALL DISPLAY ANGLES
R0253 CALLING SEQUENCE

R0254 TC BALLANGS
R0255 NORMAL EXIT MODE

R0256 TC BALLEEXIT (SAVED Q)

R0257 ALARM OR EXIT MODE NIL
R0258 SUBROUTINES CALLED
R0259 CD*TR*G
R0260 ARCTAN

R0261 INPUT

R0262 CPHI,CTHETA,CPSI ARE THE ANGLES CORRESPONDING TO ADG,AIG,AMG. THEY ARE
R0263 SP,2S COMPLIMENT SCALED TO HALF REVOLUTION.
R0264 OUTPUT

R0265 FDAIX,FDAIY,FDAIZ ARE THE REQUIRED BALL ANGLES SCALED TO HALF REVOLUTION
R0266 SP,2S COMPLIMENT.
R0267 THESE ANGLES WILL BE DISPLAYED AS DEGREES AND HUNDREDTHS. IN THE ORDER ROLL, PITCH, YAW, USING NOUNS 18 & 19.

R0269 ERASABLE INITIALIZATION REQUIRED

R0270 CPHI,CTHETA,CPSI EACH A SP REGISTER
R0271 DEBRIS

R0272 A,L,Q,MPAC,SINCDU,COSCDU,PUSHLIST,BALLEEXIT

R0273 NOMENCLATURE: CPHI, CTHETA, & CPSI REPRESENT THE OUTER, INNER, & MIDDLE GIMBAL ANGLES, RESPECTIVELY; OR
R0275 EQUIVALENTLY, CDUX, CDUY, & CDUZ.

R0276 NOTE: ARCTAN CHECKS FOR OVERFLOW AND SHOULD BE ABLE TO HANDLE ANY SINGULARITIES.

0278	REF	2	LAST	339	26,2000	SETLOC BAWLANGS
0279					26,2266	BANK
0280	REF	1				COUNT* \$\$/BALL
0281	REF	3	LAST	473	26,2266 0 4645 1	BALLANGS TC MAKECADR
0282	REF	1			26,2267 55 342 1	TS BALLEEXIT
0283	REF	7	LAST	474	26,2270 3 0321 1	CA CPHI

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0284	REF	7	LAST	253	26,2271	54 772 1	TS	CDUSPOT +4	
0285	REF	2	LAST	369	26,2272	3 0322 1	CA	CTHETA	
0286	REF	8	LAST	478	26,2273	54 766 1	TS	CDUSPOT	
0287	REF	3	LAST	369	26,2274	3 0323 0	CA	GPSI	
0288	REF	9	LAST	478	26,2275	54 770 0	TS	CDUSPOT +2	
0289	REF	29	LAST	474	26,2276	0 6037 0	TC	INTPRET	
0290					26,2277	45001 1	SETPD	CALL	
0291					26,2300	00001 0		OD	
0292	REF	1			26,2301	47543 0		GD*TR*G	
0293					26,2302	41345 0	DLOAD	DMP	
0294	REF	1			26,2303	00743 1		SINCDEX	SIN (OGA)
0295	REF	1			26,2304	00747 0		COSCDUZ	COS (MGA)
0296					26,2305	57552 1	SL1	DCOMP	SCALE
0297					26,2306	65336 1	ARCSIN	PDDL	YAW = ARCSIN(-SXCZ) INTO 0 PD
0298	REF	1			26,2307	00741 0		SINCDEX	
0299	REF	4	LAST	322	26,2310	14023 0	STODL	SINTH	(SINTH = 180 IN PD)
0300	REF	2	LAST	478	26,2311	00747 0		COSCDUZ	
0301					26,2312	72405 0	DMP	SL1	RESCALE
0302	REF	1			26,2313	00751 1		COSCDUX	
0303	REF	4	LAST	322	26,2314	34021 0	STCALL	COSTH	(COSTH = 160 IN PD)
0304	REF	1			26,2315	26510 1		ARCTAN	
0305					26,2316	41325 0	PDDL	DMP	ROLL = ARCTAN(SZ/CZCX) INTO 2 PD
0306	REF	2	LAST	478	26,2317	00741 0		SINCDEX	
0307	REF	2	LAST	478	26,2320	00743 1		SINCDEX	
0308					26,2321	41512 1	SL2	PUSH	SXSZ INTO 4 PD
0309					26,2322	65205 0	DMP	PDDL	SXSZCY INTO 4 PD
0310	REF	1			26,2323	00745 1		COSCDUY	
0311					26,2324	65205 0	DMP	PDDL	SXSZSY INTO 6 PD
0312	REF	1			26,2325	00737 1		SINCDEX	
0313	REF	2	LAST	478	26,2326	00751 1		COSCDUX	
0314					26,2327	72405 0	DMP	SL1	CXCY
0315	REF	2	LAST	478	26,2330	00745 1		COSCDUY	
0316					26,2331	45425 0	DSU	STADR	PULL UP FROM 6 PD
0317	REF	5	LAST	478	26,2332	63756 0	STODL	COSTH	COSTH = CXCY - SXSZSY
0318	REF	2	LAST	478	26,2333	00737 1		SINCDEX	
0319					26,2334	72405 0	DMP	SL1	
0320	REF	3	LAST	478	26,2335	00751 1		COSCDUX	CXSY
0321					26,2336	45415 0	DAD	STADR	PULL UP FROM 4 PD
0322	REF	5	LAST	478	26,2337	43754 0	STCALL	SINTH	SINTH = CXSY + SXSZCY
0323	REF	2	LAST	478	26,2340	26510 1		ARCTAN	RETURNS WITH D(MPAC) = PITCH
0324					26,2341	55525 0	PDDL	VDEF	PITCH INTO 2 PD, ROLL INTO MPAC FROM 2PD
0325					26,2342	77634 0	RTB		VDEF MAKES V(MPAC) = ROLL, PITCH, YAW
0326	REF	2	LAST	365	26,2343	21620 0		VISTD2S	
0327	REF	2	LAST	305	26,2344	02345 1	STORE	FDAIX	MODE IS TP
0328					26,2345	77776 1	EXIT		
0329	REF	2	LAST	477	26,2346	3 1342 0	ENDBALL	CA	BALLEEXIT

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03295 REF 7 LAST 474 26.2347 0 4640 1 TC BANKJUMP

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P0330 PROGRAM DESCRIPTION - VECPOINT

R0331 THIS INTERPRETIVE SUBROUTINE MAY BE USED TO POINT A SPACECRAFT AXIS IN A DESIRED DIRECTION. THE AXIS
 R0333 TO BE POINTED MUST APPEAR AS A HALF UNIT DOUBLE PRECISION VECTOR IN SUCCESSIVE LOCATIONS OF ERASABLE MEMORY
 R0335 BEGINNING WITH THE LOCATION CALLED SCAXIS. THE COMPONENTS OF THIS VECTOR ARE GIVEN IN SPACECRAFT COORDINATES.
 R0337 THE DIRECTION IN WHICH THIS AXIS IS TO BE POINTED MUST APPEAR AS A HALF UNIT DOUBLE PRECISION VECTOR IN
 R0339 SUCCESSIVE LOCATIONS OF ERASABLE MEMORY BEGINNING WITH THE ADDRESS CALLED POINTVSM. THE COMPONENTS OF THIS
 R0341 VECTOR ARE GIVEN IN STABLE MEMBER COORDINATES. WITH THIS INFORMATION VECPOINT COMPUTES A SET OF THREE GIMBAL
 R0343 ANGLES (2S COMPLEMENT) CORRESPONDING TO THE CROSS-PRODUCT ROTATION BETWEEN SCAXIS AND POINTVSM AND STORES THEM
 R0345 IN T(MPAC) BEFORE RETURNING TO THE CALLER.

R0346 THIS ROTATION, HOWEVER, MAY BRING THE S/C INTO GIMBAL LOCK. WHEN POINTING A VECTOR IN THE Y-Z PLANE,
 R0348 THE TRANSPONDER AXIS, OR THE ADT FOR THE LEM, THE PROGRAM WILL CORRECT THIS PROBLEM BY ROTATING THE CROSS-
 R0350 PRODUCT ATTITUDE ABOUT POINTVSM BY A FIXED AMOUNT SUFFICIENT TO ROTATE THE DESIRED S/C ATTITUDE OUT OF GIMBAL
 R0352 LOCK. IF THE AXIS TO BE POINTED IS MORE THAN 40.6 DEGREES BUT LESS THAN 60.5 DEG FROM THE +X (OR -X) AXIS,
 R0354 THE ADDITIONAL ROTATION TO AVOID GIMBAL LOCK IS 35 DEGREES. IF THE AXIS IS MORE THAN 60.5 DEGREES FROM +X (OR -X)
 R0356 THE ADDITIONAL ROTATION IS 35 DEGREES. THE GIMBAL ANGLES CORRESPONDING TO THIS ATTITUDE ARE THEN COMPUTED AND
 R0358 STORED AS 2S COMPLIMENT ANGLES IN T(MPAC) BEFORE RETURNING TO THE CALLER.

R0360 WHEN POINTING THE X-AXIS, OR THE THRUST VECTOR, OR ANY VECTOR WITHIN 40.6 DEG OF THE X-AXIS, VECPOINT
 R0362 CANNOT CORRECT FOR A CROSS-PRODUCT ROTATION INTO GIMBAL LOCK. IN THIS CASE A PLATFORM REALIGNMENT WOULD BE
 R0364 REQUIRED TO POINT THE VECTOR IN THE DESIRED DIRECTION. AT PRESENT NO INDICATION IS GIVEN FOR THIS SITUATION
 R0366 EXCEPT THAT THE FINAL MIDDLE GIMBAL ANGLE IN MPAC +2 IS GREATER THAN 59 DEGREES.

R0368 CALLING SEQUENCE -
 R0369 1) LOAD SCAXIS, POINTVSM
 R0370 2) CALL
 R0371 VECPOINT

R0372 RETURNS WITH

R0373 1) DESIRED OUTER GIMBAL ANGLE IN MPAC
 R0374 2) DESIRED INNER GIMBAL ANGLE IN MPAC +1
 R0375 3) DESIRED MIDDLE GIMBAL ANGLE IN MPAC +2

R0376 ERASABLES USED -

R0377	1) SCAXIS	6
R0378	2) POINTVSM	6
R0379	3) MIS	18
R0380	4) DEL	18
R0381	5) COF	6
R0382	6) VECQTEMP	1
R0383	7) ALL OF VAC AREA	43

R0384 TOTAL 99

0385	REF 1	27.2000	SETLOC VECPT
0386		27.2032	BANK

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0387	REF	1				COUNT*	\$\$/VECPT		
0388	REF	11	LAST	366	E6.1676		EBANK=	BCDU	
038805					27,2032	40020 1	VECPNT1	STQ	BOV
03881	REF	1			27,2033	03325 0			VECQTEMP
038815	REF	1			27,2034	56035 1			VECPNT2
03882					27,2035	52164 0	VECPNT2	AXC.2	GOTO
038825	REF	10	LAST	365	27,2036	03246 1			MIS
038865	REF	1			27,2037	56046 0			STORANG
0389					27,2040	40020 1	VECPNT	STQ	BOV
0390	REF	2	LAST	481	27,2041	03325 0			VECQTEMP
0391	REF	1			27,2042	56043 0			VECCLEAR
0392					27,2043	47164 1	VECCLEAR	AXC.2	RTB
0393	REF	11	LAST	481	27,2044	03246 1			MIS
0394	REF	2	LAST	351	27,2045	44403 0			READCDUK
0395					27,2046	34032 1	STORANG	STCALL	25D
0396	REF	3	LAST	351	27,2047	44410 1			CDUTODCM
0397					27,2050	61375 1	VLOAD	VXM	
0398	REF	3	LAST	339	27,2051	03773 1			POINTVSM
0399	REF	12	LAST	481	27,2052	03247 0			MIS
0400					27,2053	77656 1	UNIT		
0401					27,2054	00035 1	STORE	28D	
A0402									PD 28 29 30 31 32 33
0403					27,2055	53435 0	VXV	UNIT	TAKE THE CROSS PRODUCT VF X VI
0404	REF	12	LAST	340	27,2056	03765 0			SCAXIS
0405					27,2057	57400 1	BOV	VCOMP	WHERE VI = SCAXIS
0406	REF	1			27,2060	56170 1			PICKAXIS
0407	REF	40	LAST	364	27,2061	17271 0	STODL	COF	CHECK MAGNITUDE
0408					27,2062	00045 0			36D
0409					27,2063	50025 0	DSU	BMN	OF CROSS PRODUCT
0410	REF	1			27,2064	14411 0			VECTOR, IF LESS
0411	REF	2	LAST	481	27,2065	56170 1			DPB-14
0412					27,2066	50375 0	VLOAD	DOT	THAN B-14 ASSUME
0413	REF	13	LAST	481	27,2067	03765 0			PICKAXIS
0414					27,2070	00035 1			UNIT OPERATION
0415					27,2071	65552 0	SL1	ARCCOS	INVALID.
0416					27,2072	77624 1	COMPMATX	CALL	
0417	REF	2	LAST	364	27,2073	44527 1			DELCOMP
0418					27,2074	75160 1	AXC.1	AXC.2	
0419	REF	13	LAST	481	27,2075	03246 1			MIS
0420	REF	11	LAST	365	27,2076	02230 1			KEL
0421					27,2077	77624 1	CALL		
0422	REF	3	LAST	365	27,2100	44312 1			MXM3
0423					27,2101	51545 1	DLOAD	ABS	
0424					27,2102	00007 0			6
0425					27,2103	50025 0	DSU	BMN	MFS6 = SIN(CPSI)
0426	REF	1			27,2104	14376 0			SINGIMLC
0427	REF	1			27,2105	56160 0			FINDGINB

MFS6 = SIN(CPSI) \$2

= SIN(59 DEGS) \$2

/CPSI/ LESS THAN 59 DEGS

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A0428

I.E. DESIRED ATTITUDE NOT IN GIMBAL LOCK

0429				27,2106	51545 1	DLOAD	ABS	CHECK TO SEE IF WE ARE POINTING
0430	REF	14	LAST	481	27,2107		SCAXIS	THE THRUST AXIS
0431				27,2110	51025 1	DSU	BPL	
0432	REF	1			27,2111		SINVEC1	SIN 49.4 DEGS \$2
0433	REF	2	LAST	481	27,2112		FINDGIMB	IF SO, WE ARE TRYING TO POINT IT INTO
0434				27,2113	77775 1	VLOAD		GIMBAL LOCK. ABORT COULD GO HERE
0435				27,2114	77626 0	STADR		
0436	REF	14	LAST	481	27,2115		STOVL	MIS +120
0437				27,2116	77626 0	STADR		STORE MFS (IN PD LIST) IN MIS
0438	REF	15	LAST	482	27,2117		STOVL	MIS +6
0439				27,2120	77626 0	STADR		
0440	REF	16	LAST	482	27,2121		STOVL	MIS
0441	REF	17	LAST	482	27,2122		MIS +6	INNER GIMBAL AXIS IN FINAL S/C AXES
0442				27,2123	57444 1	BPL	VCOMP	LOCATE THE IG AXIS DIRECTION CLOSEST TO
0443	REF	1		27,2124	56125 1		IGSAMX	FINAL X S/C AXIS
0444				27,2125	50035 1	IGSAMX	VXV	FIND THE SHORTEST WAY OF ROTATING THE
0445	REF	15	LAST	482	27,2126		SCAXIS	S/C OUT OF GIMBAL LOCK BY A ROTATION
0446	REF	1		27,2127	56134 1		U=SCAXIS	ABOUT +- SCAXIS. I.E. IF (IG (SGN MFS3)
A0447								X SCAXIS . XF) LESS THAN 0, U = SCAXIS
A0448								OTHERWISE U = -SCAXIS

0449				27,2130	57575 1	VLOAD	VCOMP	
0450	REF	16	LAST	482	27,2131		SCAXIS	
0451	REF	41	LAST	481	27,2132		STCALL	COF
0452	REF	1		27,2133	56137 1		CHEKAXIS	ROTATE ABOUT -SCAXIS
0453				27,2134	77775 1	U=SCAXIS	VLOAD	
0454	REF	17	LAST	482	27,2135		SCAXIS	
0455	REF	42	LAST	482	27,2136		STORE	COF
0456				27,2137	51545 1	CHEKAXIS	DLOAD	ABS
0457	REF	18	LAST	482	27,2140		SCAXIS	SEE IF WE ARE POINTING THE AOT
0458				27,2141	51025 1	DSU	SPL	
0459	REF	1		27,2142	14402 1		SINVEC2	SIN 29.5 DEGS \$2
0460	REF	1		27,2143	56147 0		PICKANG1	IF SO, ROTATE 50 DEGS ABOUT +- SCAXIS
0461				27,2144	52145 0	DLOAD	GUTO	IF NOT, MUST BE POINTING THE TRANSPONDER
0462	REF	1		27,2145	14406 0		VEGANG2	OR SOME VECTOR IN THE Y, OR Z PLANE
0463	REF	1		27,2146	56151 1		COMPMFSN	IN THIS CASE ROTATE 35 DEGS TO GET OUT
A0464								OF GIMBAL LOCK (VEGANG2 \$360)
0465				27,2147	77745 1	PICKANG1	DLOAD	
0466	REF	1		27,2150	14404 1		VEGANG1	= 50 DEGS \$ 360
0467				27,2151	77624 1	COMPMFSN	CALL	
0468	REF	3	LAST	481	27,2152		DELCOMP	COMPUTE THE ROTATION ABOUT SCAXIS TO
0469				27,2153	75160 1	AXC,1	AXC,2	BRING MFS OUT OF GIMBAL LOCK
0470	REF	18	LAST	482	27,2154		MIS	
0471	REF	12	LAST	481	27,2155		KEL	
0472				27,2156	77624 1	CALL		COMPUTE THE NEW TRANSFORMATION FROM
0473	REF	4	LAST	481	27,2157		MXM	DESIRED S/C AXES TO STABLE MEMBER AXES
A0474								WHICH WILL ALIGN VI WITH VF AND AVOID

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A0475									GIMBAL LOCK
0476				27,2160	45160 1	FINDGIMB	AXC,1	CALL	
0477				27,2161	00000 1			0	EXTRACT THE COMMANDED CDU ANGLES FROM
0478	REF	2	LAST	365	27,2162	44654 0		DCMTOCDU	THIS MATRIX
0479					27,2163	40234 0		RTB	
0480	REF	3	LAST	478	27,2164	21620 0		V1ST02S	CONVERT TO 2:S COMPLEMENT
0481					27,2165	00001 0		0	
0482					27,2166	77650 1		GOTO	
0483	REF	3	LAST	481	27,2167	03325 0		VECQTEMP	RETURN TO CALLER
0484					27,2170	50375 0	PICKAXIS	VLOAD	DOT
0485					27,2171	00035 1		280	IF VF X VI = 0, FIND VF . VI
0486	REF	19	LAST	482	27,2172	03765 0		SCAXIS	
0487					27,2173	72240 1	BMN	TLOAD	
0488	REF	1			27,2174	54350 0		ROT180	
0489					27,2175	00032 0		250	
0490					27,2176	77650 1	GOTO		IF VF = VI, CDU DESIRED = PRESENT CDU
0491	REF	4	LAST	483	27,2177	03325 0		VECQTEMP	PRESENT CDU ANGLES
0492					35,2000		BANK	35	
0493	REF	1			26,2000		SETLOC	MANUVER1	
0494					26,2350		BANK		
0495					26,2350	47375 0	ROT180	VLOAD	IF VF, VI ANTIPARALLEL, 108 DEG ROTATION
0496	REF	19	LAST	482	26,2351	03255 0		MIS +5	IS REQUIRED. Y STABLE MEMBER AXIS IN
0497	REF	1			26,2352	06520 0		HIDPHALF	INITIAL S/C AXES.
0498					26,2353	47256 0	UNIT	VXV	FIND Y(SM) X X(I)
0499	REF	20	LAST	483	26,2354	03765 0		SCAXIS	FIND UNIT(VI X UNIT(Y(SM) X X(I)))
0500					26,2355	40056 0	UNIT	BOV	I.E. PICK A VECTOR IN THE PLANE OF X(I),
0501	REF	1			26,2356	54372 0		PICKX	Y(SM) PERPENDICULAR TO VI
0502	REF	43	LAST	482	26,2357	17271 0	STODL	COF	
0503					26,2360	00045 0		360	CHECK MAGNITUDE
0504					26,2361	50025 0	DSU	BMN	OF THIS VECTOR.
0505	REF	2	LAST	481	26,2362	14411 0		DPB-14	IF LESS THAN B-14.
0506	REF	2	LAST	483	26,2363	54372 0		PICKX	PICK X-AXIS.
0507					26,2364	77775 1		VLOAD	
0508	REF	44	LAST	483	26,2365	03271 0		COF	
0509	REF	45	LAST	483	26,2366	17271 0	XROT	STODL	COF
0510	REF	2	LAST	483	26,2367	06520 0		HIDPHALF	
0511					26,2370	77650 1	GOTO		
0512	REF	1			26,2371	56072 1		COMPMATX	
0513					26,2372	52175 0	PICKX	VLOAD	PICK THE XAXIS IN THIS CASE
0514	REF	3	LAST	483	26,2373	06520 0		HIDPHALF	
0515	REF	1			26,2374	54366 0		XROT	
0516					26,2375	15555 0	SINGIMLC	2DEC	.4285836003 = SIN(59) \$2
0516					26,2376	35172 0			
0517					26,2377	14113 1	SINVEC1	2DEC	.3796356537 = SIN(49.4) \$2
0517					26,2400	36326 0			
0518					26,2401	07701 0	SINVEC2	2DEC	.2462117800 = SIN(29.5) \$2
0518					26,2402	35703 0			
0519					26,2403	04343 1	VECANG1	2DEC	.1388888889 = 50 DEGREES \$360
0519					26,2404	21616 0			

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0520	26,2405	03070 0	VECANG2	2DEC	.09722222222	= 35 DEGREES	\$360
0520	26,2406	34344 0					
0521	26,2407	00000 1	1BITDP	OCT	0	KEEP THIS BEFORE DPB(-14)	*****
0522	26,2410	00001 0	DPB-14	OCT	00001		
0523	26,2411	00000 1		OCT	00000		

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P0524 ROUTINE FOR INITIATING AUTOMATIC MANEUVER VIA KEYBOARD (V49)

0525					34,2000			BANK	34		
0526	REF	1			23,2000			SETLOC	R62		
0527					23,2103			BANK			
0528	REF	12	LAST	481	E6,1676			EBANK=	BCDU		
0529	REF	1						COUNT*	\$/R62		
0530	REF	1			23,2103		R62DISP	EQUALS	R62FLASH		
0531	REF	1			23,2103	3 5010 0	R62FLASH	CAF	V06N22	FLASH V06N22 AND	
0532	REF	98	LAST	474	23,2104	0 4616 1		TC	BANKCALL	ICDU ANGLES	
0533	REF	6	LAST	381	23,2105	20476 0		CADR	GOFLASH		
0534	REF	30	LAST	377	23,2106	1 5472 1		TCF	ENDEXT	TERMINATE	
0535	REF	1			23,2107	1 2111 0		TCF	GOMOVE	PROCEED	
0536	REF	2	LAST	485	23,2110	1 2103 0		TCF	R62FLASH	ENTER	
A0537										ASTRONAUT MAY LOAD NEW ICDUS AT THIS	
A0538										POINT	
0539	REF	13	LAST	475	23,2111	0 5504 0	GOMOVE	TC	UPFLAG	SET FOR 3-AXIS MANEUVER	
0540	REF	4	LAST	474	23,2112	00124 0		ADRES	3AXISFLG		
0541	REF	99	LAST	485	23,2113	0 4616 1		TC	BANKCALL		
0542	REF	2	LAST	340	23,2114	54123 0		CADR	R60LEM		
0543	REF	31	LAST	485	23,2115	1 5472 1		TCF	ENDEXT	END R62	

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R2000 SUBROUTINE NAME: R05 - S-BAND ANTENNA FOR LM

R2001 MODD BY T. JAMES

R2002 MOD1 BY P. SHAKIR

R2003 FUNCTIONAL DESCRIPTION

R2004 THE S-BAND ANTENNA ROUTINE, R05, COMPUTES AND DISPLAYS THE PITCH AND
 R2005 YAW ANTENNA GIMBAL ANGLES REQUIRED TO POINT THE LM STEERABLE ANTENNA
 R2006 TOWARD THE CENTER OF THE EARTH. THIS ROUTINE IS SELECTED BY THE ASTRO-
 R2007 NAUT VIA DSKY ENTRY DURING COASTING FLIGHT OR WHEN THE LM IS ON THE MOON
 R2008 SURFACE. THE EARTH OR MOON REFERENCE COORDINATE SYSTEM IS USED DEPENDING
 R2009 ON WHETHER THE LM IS ABOUT TO ENTER OR HAS ALREADY ENTERED THE MOON
 R2010 SPHERE OF INFLUENCE, RESPECTIVELY

R2011 TO CALL SUBROUTINE, ASTRONAUT KEYS IN V 64 E

R2012 SUBROUTINES CALLED-

R2013 R02BOTH
 R2014 INTPRET
 R2015 LOADTIME
 R2016 LEMCONIC
 R2017 LUNPOS
 R2018 CDUTRIG
 R2019 *SMNB*
 R2020 BANKCALL
 R2021 B5OFF
 R2022 ENDOFJOB
 R2023 BLANKET

R2024 RETURNS WITH

R2025 PITCH ANGLE IN PITCHANG REV. 80

R2026 YAW ANGLE IN YAWANG REV. 80

R2027 ERASABLES USED

R2028 PITCHANG
 R2029 YAWANG
 R2030 RLM
 R2031 VAC AREA

2032		41,3731	BANK	41
2033	REF 4 LAST 287	42,2000	SETLOC SBAND	
2034		42,3606	BANK	
2035	REF 1	E7,1471	EBANK=	WHOCARES
2036	REF 2 LAST 46 TO 47: 2 2*		COUNT#	\$5/R05
2037	REF 100 LAST 485	42,3606 0 4616 1	SBANDANT TC	BANKCALL

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2038	REF	2	LAST	339	42,3607	11254 1	CADR	R02BOTH	CHECK IF IMU IS ON AND ALIGNED
2039	REF	30	LAST	478	42,3610	0 6037 0	TC	INTPRET	
2040					42,3611	47001 0	SETPD	RTB	
2041					42,3612	00001 0		OD	
2042	REF	5	LAST	380	42,3613	21573 0		LOADTIME	PICK UP CURRENT TIME
2043	REF	6	LAST	339	42,3614	34041 0	STCALL	TDEC1	ADVANCE INTEGRATION TO TIME IN TDEC1
2044	REF	2	LAST	339	42,3615	27100 0		LEMCONIC	USING CONIC INTEGRATION
2045					42,3616	46135 1	SLOAD	BHIZ	
2046	REF	1			42,3617	00050 1		X2	X2 =0 EARTH SPHERE, X2 =2 MOON SPHERE
2047	REF	1			42,3620	65636 1		CONV4	
2048					42,3621	77775 1	VLOAD		
2049	REF	3	LAST	339	42,3622	00001 0		RATT	
2050	REF	1			42,3623	16205 1	STODL	RLM	
2051	REF	3	LAST	208	42,3624	00015 0		TAT	
2052					42,3625	77624 1	CALL		
2053	REF	1			42,3626	33664 0		LUNPOS	UNIT POSITION VECTOR FROM EARTH TO MOON
2054					42,3627	74375 0	VLOAD	VXSC	
2055	REF	2	LAST	123	42,3630	02723 0		VMOON	
2056	REF	1			42,3631	24001 0		READIST	MEAN DISTANCE FROM EARTH TO MOON
2057					42,3632	53372 1	VSL1	VAD	
2058	REF	2	LAST	487	42,3633	02205 1		RLM	
2059					42,3634	77650 1	GOTO		
2060	REF	1			42,3635	65640 0		CONV5	
2061					42,3636	77775 1	VLOAD		
2062	REF	4	LAST	487	42,3637	00001 0		RATT	UE = -UNIT(RATT) EARTH SPHERE
2063					42,3640	53401 1	CONV5	SETPD	UE = -UNIT((REM)(UEM) + RL) MOON SPHERE
2064					42,3641	00001 0		OD	SET PL POINTER TO 0
2065					42,3642	45076 1	VCOMP	CALL	
2066	REF	1			42,3643	47537 0		COUTRIG	COMPUTE SINES AND COSINES OF CDU ANGLES
2067					42,3644	76521 0	MXV	VSL1	TRANSFORM REF. COORDINATE SYSTEM TO
2068	REF	7	LAST	339	42,3645	01734 0		REFSMAT	STABLE MEMBER B-1 X B-1 X B+1 = B-1
2069					42,3646	71206 0	PUSH	DLOAD	8D
2070	REF	2	LAST	299	42,3647	06522 1		H16ZEROS	
2071	REF	2	LAST	118	42,3650	02201 0	STORE	PITCHANG	
2072	REF	1			42,3651	26203 1	STOVL	YAWANG	ZERO OUT ANGLES
2073					42,3652	77624 1	CALL		
2074	REF	1			42,3653	47671 1		*SMNB*	
2075	REF	3	LAST	487	42,3654	16205 1	STODL	RLM	PRE-MULTIPLY RLM BY (NBSA) MATRIX(B)
2076	REF	4	LAST	487	42,3655	02207 0		RLM +2	
2077					42,3656	45206 1	PUSH	DSU	
2078	REF	5	LAST	487	42,3657	02205 1		RLM	
2079					42,3660	77605 1	DMP		
2080	REF	1			42,3661	25771 1		10VSQRT2	
2081	REF	6	LAST	487	42,3662	16207 0	STODL	RLM +2	
2082					42,3663	41215 1	DAD	DMP	
2083	REF	7	LAST	487	42,3664	02205 1		RLM	
2084	REF	2	LAST	487	42,3665	25771 1		10VSQRT2	
2085	REF	8	LAST	487	42,3666	26205 1	STOVL	RLM	R B-1
2086	REF	9	LAST	487	42,3667	02205 1		RLM	
2087					42,3670	63256 0	UNIT	PDVL	

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2088	REF 10	LAST 487	42,3671	02205 1	RLM	
2089			42,3672	72431 1	VPROJ VSL2	PROJECTION OF R ONTO LM XZ PLANE
2090	REF 1		42,3673	06516 0	HIUNITY	
2091			42,3674	40045 1	BVSU BOV	CLEAR OVERFLOW INDICATOR IF ON
2092	REF 11	LAST 488	42,3675	02205 1	RLM	
2093	REF 1		42,3676	65677 1	COVCNV	
2094			42,3677	40056 0	COVCNV UNIT BOV	EXIT ON OVERFLOW
2095	REF 1		42,3700	65745 1	SBANDEX	
2096			42,3701	47206 0	PUSH VXV	URP VECTOR B-1
2097	REF 1		42,3702	06514 1	HIUNITZ	
2098			42,3703	57572 0	VSL1 VCOMP	UZ X URP = -(URP X UZ)
2099	REF 12	LAST 488	42,3704	02205 1	STORE RLM	X VEC B-1
2100			42,3705	63241 0	DOT PDVL	SGN(X.UY) UNSCALED
2101	REF 2	LAST 488	42,3706	06516 0	HIUNITY	
2102	REF 13	LAST 488	42,3707	02205 1	RLM	
2103			42,3710	75246 0	ABVAL SIGN	
2104			42,3711	77736 0	ASIN	ASIN((SGN(X.UY))ABV(X)) REV B0
2105	REF 2	LAST 487	42,3712	26201 0	STOVL PITCHANG	
2106	REF 1		42,3713	00007 0	URP	
2107			42,3714	51041 0	DOT BPL	
2108	REF 2	LAST 488	42,3715	06514 1	HIUNITZ	
2109	REF 1		42,3716	65723 1	NOADJUST	YES, -90 TO +90
2110			42,3717	45345 1	DLOAD DSU	
2111	REF 4	LAST 483	42,3720	06520 0	HIDPHALF	
2112	REF 4	LAST 488	42,3721	02201 0	PITCHANG	
2113	REF 5	LAST 488	42,3722	02201 0	STORE PITCHANG	
2114			42,3723	47375 0	NOADJUST VLOAD	
2115	REF 1		42,3724	00001 0	UR	Z = (UR X URP)
2116	REF 2	LAST 488	42,3725	00007 0	URP	
2117			42,3726	77772 0	VSL1	
2118	REF 14	LAST 488	42,3727	16205 1	STOVL RLM	Z VEC B-1
2119	REF 6	LAST 488	42,3730	02201 0	PITCHANG	
2120			42,3731	74356 1	SIN VXSC	
2121	REF 3	LAST 488	42,3732	06514 1	HIUNITZ	
2122			42,3733	71525 0	PDDL COS	
2123	REF 7	LAST 488	42,3734	02201 0	PITCHANG	
2124			42,3735	52361 1	VXSC VSU	
2125	REF 1		42,3736	06520 0	HIUNITX	(UX COS ALPHA) - (UZ SIN ALPHA)
2126			42,3737	63241 0	DOT PDVL	YAW.Z
2127	REF 15	LAST 488	42,3740	02205 1	RLM	
2128	REF 16	LAST 488	42,3741	02205 1	RLM	
2129			42,3742	75246 0	ABVAL SIGN	
2130			42,3743	77736 0	ASIN	
2131	REF 2	LAST 487	42,3744	02203 1	STORE YAWANG	
2132			42,3745	77776 1	SBANDEX EXIT	
2133	REF 8	LAST 300	42,3746	3 1044 0	CA EXTVBACT	
2134	REF 24	LAST 465	42,3747	7 4747 0	MASK BIT5	IS BIT5 STILL ON
2135			42,3750	0 0006 1	EXTEND	
2136	REF 32	LAST 485	42,3751	1 5472 1	BZF ENDEXT	NO
21362	REF 4	LAST 299	42,3752	3 5017 1	CAF PRI05	

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21364	REF	7	LAST	475	42,3753	0 5146 1	TC	PRI0CHNG	
2137	REF	1			42,3754	3 3767 1	CAF	V06N51	DISPLAY ANGLES
2138	REF	101	LAST	486	42,3755	0 4616 1	TC	BANKCALL	
2139	REF	4	LAST	299	42,3756	20353 0	CADR	GOMARKFR	
2140	REF	4	LAST	299	42,3757	0 5563 1	TC	B5OFF	TERMINATE
2141	REF	5	LAST	489	42,3760	0 5563 1	TC	B5OFF	PROCEED
2142	REF	66	LAST	475	42,3761	0 5155 0	TC	ENDOFJOB	RECYCLE
2143	REF	23	LAST	457	42,3762	3 4751 0	CAF	BIT3	IMMEDIATE RETURN
2144	REF	8	LAST	299	42,3763	0 5464 1	TC	BLANKET	BLANK R3
2145	REF	4	LAST	299	42,3764	3 4740 0	CAF	PRI04	
2146	REF	8	LAST	489	42,3765	0 5146 1	TC	PRI0CHNG	
2148	REF	2	LAST	280	42,3766	0 3610 0	TC	SBANDANT +2	YES, CONTINUE DISPLAYING ANGLES
2150					42,3767	01463 1	V06N51	VN	0651
2151					42,3770	26501 1	10VSQRT2	2DEC	.7071067815
2151					42,3771	07463 1			1/SQRT(2)
2152					0000		UR	EQUALS	00
2153					0006		URP	EQUALS	60
2154	REF	6	LAST	471	30,2000			SBANK=	LOWSUPER

*** END OF LNYAIDE .001 ***

L RADAR LEADIN ROUTINES

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0001				25,2003			BANK	25
0002	REF	1		25,2000			SETLOC	RRLEADIN
0003				25,2003			BANK	

0004	REF	9	LAST	316	E4,1600		EBANK=	RSTACK
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R0005 RADAR SAMPLING LOOP.

0005	REF	1					COUNT*	\$\$/RLEAD	
0007	REF	7	LAST	279	25,2003	11'755 0	RADSAMP	CCS	RSAMPDT
0008					25,2004	1-2006 1		TCF	+2
0009	REF	15	LAST	468	25,2005	1 5261 0		TCF	TASKOVER
									+0 INSERTED MANUALLY TERMINATES TEST.
0010	REF	19	LAST	467	25,2006	0 5203 0		TC	WAITLIST
0011	REF	10	LAST	490	E4,1600			EBANK=	RSTACK
0012	REF	2	LAST	277	25,2007	02003 0		2CADR	RADSAMP
0012					25,2010	52064 1			
0013	REF	1			25,2011	3 7713 0		CAF	PRI025
0014	REF	9	LAST	468	25,2012	0 5072 1		TC	NOVAC
0015	REF	11	LAST	490	E4,1600			EBANK=	RSTACK
0016	REF	1			25,2013	02023 1		2CADR	DORSAMP
0016	REF	1			25,2014	52064 1			
0017	REF	47	LAST	476	25,2015	3 4736 1		CAF	BIT14
0018					25,2016	0 0006 1		EXTEND	
0019	REF	4	LAST	278	25,2017	7 1754 1		MP	RTSTLOC
0020	REF	3	LAST	279	25,2020	6 1753 1		AD	RTSTBASE
0021	REF	6	LAST	278	25,2021	55'751 1		TS	RTSTDEX
0022	REF	16	LAST	490	25,2022	1 5261 0		TCF	TASKOVER
									FOR CYCLIC SAMPLING, RTSTDEX = RTSTLOC/2 + RTSTBASE 0 FOR RR, 2 FOR LR.

R0023 DO THE ACTUAL RADAR SAMPLE.

0024	REF	1			25,2023	0 2047 0	DORSAMP	TC	VARADAR	SELECTS VARIABLE RADAR CHANNEL.
0025	REF	102	LAST	489	25,2024	0 4616 1		TC	BANKCALL	
0026	REF	4	LAST	269	25,2025	17714 0		CADR	KADSTALL	
0027	REF	2	LAST	276	25,2026	25'756 1		INCR	RFAILCNT	ADVANCE FAIL COUNTER BUT ACCEPT BAD DATA
0028					25,2027	0 0004 0	DORSAMP2	INHINT		
00281	REF	15	LAST	474	25,2030	3 0101 1		CA	FLAGWRD5	DON'T UPDATE RSTACK IF IN R77.
00282	REF	3	LAST	280	25,2031	7 4741 0		MASK	R77FLBIT	
00283	REF	160	LAST	475	25,2032	10 000 0		CCS	A	
00284					25,2033	1 2037 0		TCF	+4	
0029	REF	2	LAST	103	25,2034	53'102 1		DXCH	SAMPLSUM	
0030	REF	5	LAST	490	25,2035	51'754 0		INDEX	RTSTLOC	
0031	REF	12	LAST	490	25,2036	53'601 0		DXCH	RSTACK	
0038	REF	6	LAST	490	25,2037	4 1754 1		CS	RTSTLOC	CYCLE RTSTLOC.
0039	REF	2	LAST	277	25,2040	6 1752 0		AD	RTSTMAX	
0040					25,2041	0 0006 1		EXTEND		

L RADAR LEADIN ROUTINES

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0041				25,2042	1 2045 0
0042	REF	7	LAST	490	25,2043 3 1754 0
0043	REF	32	LAST	458	25,2044 6 4752 0
0044	REF	8	LAST	491	25,2045 55 754 1
0045	REF	67	LAST	489	25,2046 1 5155 1

BZF	+3
CA	RTSTLOC
AD	TWO
TS	RTSTLOC
TCF	ENDOFJOB

STORAGE IS DP

CONTINUOUS SAMPLING AND 2N TRIES - GONE.

R0056 VARIABLE RADAR DATA CALLER FOR ONE MEASUREMENT ONLY.

0057	REF	60	LAST	470	25,2047 3 4753 1
0058	REF	5	LAST	474	25,2050 54 133 1
0059	REF	7	LAST	490	25,2051 51 751 0
0060	REF	1			25,2052 3 2054 1
0061	REF	3	LAST	370	25,2053 1 4622 1

VARADAR

CAF	ONE
TS	BUF2
INDEX	RTSTDEX
CAF	RDRLOCS
TCF	SWCALL

WILL BE SENT TO RADAR ROUTINE IN A BY
SWCALL.

NOT TOUCHING Q.

0062	REF	1			25,2054 53105 0
0063	REF	1			25,2055 53103 0
0064	REF	1			25,2056 53101 1
0065	REF	1			25,2057 53077 1
0066	REF	1			25,2060 53075 0
0067	REF	1			25,2061 53073 0

RDRLOCS

CADR	RRRANGE
CADR	RRRDOT
CADR	LRVELX
CADR	LRVELY
CADR	LRVELZ
CADR	LRALT

=0
=1
=2
=3
=4
=5

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P0001 RENDEZVOUS NAVIGATION PROGRAM 20

R0002 PROGRAM DESCRIPTION

R0003 MOD NO - 2

R0004 BY P. VULANTE

R0005 FUNCTIONAL DESCRIPTION

R0006

R0007 THE PURPOSE OF THIS PROGRAM IS TO CONTROL THE RENDEZVOUS RADAR FROM

R0008 STARTUP THROUGH ACQUISITION AND LOCKON TO THE CSM AND TO UPDATE EITHER

R0009 THE LM OR CSM STATE VECTOR (AS SPECIFIED BY THE ASTRONAUT BY DSKY ENTRY)

R0010 ON THE BASIS OF THE RR TRACKING DATA.

R0011 CALLING SEQUENCE -

R0012

R0013 ASTRONAUT REQUEST THROUGH DSKY V37E20E

R0014 SUBROUTINES CALLED

R0015 R02BOTH (IMU STATUS CHECK) FLAGUP

R0016 GOFLLASH (PINBALL DISPLAY) FLAGDOWN

R0017 R23LEM (MANUAL ACQUISITION) BANKCALL

R0018 LS201 (LOS DETERMINATION) TASKOVER

R0019 LS202 (RANGE LIMIT TEST)

R0020 R61LEM (PREFERRED TRACKING ATTITUDE)

R0021 R21LEM (RR DESIGNATE) ENDDFJOB

R0022 R22LEM (DATA READ) GOPERF1

R0023 R31LEM (RENDEZVOUS PARAMETER DISPLAY)

R0024 PRIOLARM (PRIORITY DISPLAY)

R0025 NORMAL EXIT MODES-

R0026 P20 MAY BE TERMINATED IN TWO WAYS-ASTRONAUT SELECTION OF IDLING

R0027 PROGRAM (P00) BY KEYING V37E00E OR BY KEYING IN V56E

R0028 ALARM OR ABORT EXIT MODES-

R0029 RANGE GREATER THAN 400 NM DISPLAY

R0030 OUTPUT

R0031 TRKMKCNT = NO OF RENDEZVOUS TRACKING MARKS TAKEN (COUNTER)

R0032 ERASABLE INITIALIZATION REQUIRED

R0033 FLAGS SET + RESET

R0034 SRCHOPT, RNDVZFLG, ACMODFLG, VEHUPFLG, UPDATFLG, TRACKFLG,

R0035 DEBRIS

R0036 CENTRAL S-A, Q, L

0037 REF 7 LAST 489 30,2000 SBANK= LOWSUPER FOR LOW 2CADR'S.

0038 33,2045

BANK 33

0039 REF 1 24,2000

SETLOC P20S

0040 24,2000

BANK

0041 REF 7 LAST 269 E7,1456

EBANK= LOSCOUNT

0042 REF 1

COUNT* \$\$/P20

00421 REF 2 LAST 234 24,2000

PROG22

= PROG20

0043 REF 1 24,2000 0 5327-1

PROG20

TC 2PHSCHNG

0044 24,2001 00004-0

OCT 4

0045 24,2002 05022-1

OCT 05022

0046 24,2003 26000-0

OCT 26000

PRIORITY 26

0047 REF 1 24,2004 0 2667-1

TC LUNSFCHK

CHECK IF ON LUNAR SURFACE

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0048	REF	1		24,2005	0 2007 1	TC	ORBCHG0	YES
0049	REF	1		24,2006	0 2036 0	TC	PROG20A -2	NO - CONTINUE WITH P20
0050	REF	14	LAST	485	24,2007 0 5504 0	TC	ORBCHG0	UPFLAG SET-VEHUPFLG - CSM STATE
0051	REF	3	LAST	289	24,2010 00026 0	ADRES	VEHUPFLG	VECTOR TO BE UPDATED
0052	REF	61	LAST	491	24,2011 3 4753 1	CAF	ONE	SET R2 FOR OPTION CSM WILL NOT
0053	REF	1		24,2012	55 145 1	TS	OPTION2	CHANGE PRESENT ORBIT
0054	REF	1		24,2013	3 2311 0	CAF	OCT00012	
0055	REF	103	LAST	490	24,2014 0 4616 1	TC	BANKCALL	DISPLAY ASSUMED CSM ORBIT OPTION
0056	REF	1		24,2015	20633 0	CADR	GOPERF4	
0057	REF	4	LAST	475	24,2016 0 6001 0	TC	GOTOPDOH	TERMINATE
0058	REF	1		24,2017	0 2021 0	TC	ORBCHG1	PROCEED VALUE OF ASSUMED OPTION OK
0059				24,2020	0 2013 1	TC	-5	R2 LOADED THRU DSKY
0060	REF	1		24,2021	4 2312 1	CS	P22ONE	
0061	REF	2	LAST	493	24,2022 6 1145 0	AD	OPTION2	
0062				24,2023	0 0006 1	EXTEND		
0063	REF	2	LAST	493	24,2024 1 2040 0	BZF	PROG20A	
0064	REF	1		24,2025	3 2315 1	CAF	VO6N33*	
0065	REF	104	LAST	493	24,2026 0 4616 1	TC	BANKCALL	FLASH VERB-NOON TO REQUEST ESTIMATED
0066	REF	7	LAST	485	24,2027 20476 0	CADR	GOFASH	TIME OF LAUNCH
0067	REF	5	LAST	493	24,2030 0 6001 0	TC	GOTOPDOH	TERMINATE
0068	REF	1		24,2031	0 2033 0	TC	ORBCHG2	PROCEED VALUES OK
0069				24,2032	0 2025 1	TC	-5	TIME LOADED THRU DSKY
0070	REF	31	LAST	487	24,2033 0 6037 0	TC	ORBCHG2	
0071				24,2034	77650 1	GOTO		
0072	REF	1		24,2035	64217 1		ORBCHG3	
0073				32,2217		BANK	32	
0074	REF	1		32,2000		SETLOC	P20S4	
0075				32,2217		BANK		
0076	REF	1				COUNT*	\$\$/P20	
0077				32,2217	77624 1	ORBCHG3	CALL	
0078	REF	5	LAST	297	32,2220 27414 0		INTSTALL	
0079				32,2221	77745 1	DLOAD		
0080	REF	8	LAST	306	32,2222 03442 0		TIG	
00801	REF	2	LAST	148	32,2223 03661 0	STORE	LNCHTM	
0081	REF	7	LAST	487	32,2224 00041 1	STORE	TDEC1	ESTIMATED LAUNCH TIME
0082				32,2225	43014 0	CLEAR	CLEAR	
0083	REF	4	LAST	237	32,2226 01674 0		VINTFLAG	LM INTEGRATION
0084	REF	1		32,2227	01673 1		INTYPFLG	PRECISION - ENCKE
0085				32,2230	43014 0	CLEAR	CLEAR	
0086	REF	3	LAST	236	32,2231 01676 1		DIMOFLEG	NO W-MATRIX
0087	REF	2	LAST	236	32,2232 01675 1		DOR9FLG	
0088				32,2233	77624 1	CALL		
0089	REF	3	LAST	236	32,2234 27134 1		INTEGRV	PLANETARY INERTIAL ORIENTATION
0090				32,2235	77624 1	CALL		
0091	REF	1		32,2236	11244 0		GRP2PC	
0092				32,2237	77775 1	VLOAD		
0093	REF	2	LAST	209	32,2240 00017 1		RATT1	
0094	REF	2	LAST	148	32,2241 17631 0	STODL	RSUBL	SAVE LM POSITION
0095	REF	4	LAST	487	32,2242 00015 0		TAT	

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0096	REF	8	LAST	493	32,2243	34041 0	STCALL	TDEC1	
0097	REF	6	LAST	493	32,2244	27414 0		INTSTALL	
0098					32,2245	43014 0	SET	CLEAR	
0099	REF	5	LAST	493	32,2246	01474 1		VINTFLAG	CSM INTEGRATION
0100	REF	2	LAST	493	32,2247	01673 1		INTYPFLG	
0101					32,2250	43014 0	CLEAR	BOFF	
0102	REF	4	LAST	493	32,2251	01676 1		DIMOFLEG	
0103	REF	3	LAST	236	32,2252	02756 1		RENDWFLG	W MATRIX VALID
0104	REF	1			32,2253	64257 0		NOWMATX	NO
0105					32,2254	43014 0	SET	SET	YES - SET FOR W MATRIX
0106	REF	5	LAST	494	32,2255	01476 0		DIMOFLEG	
0107	REF	3	LAST	493	32,2256	01475 0		D6OR9FLG	
0108					32,2257	77624 1	CALL	NOWMATX	
0109	REF	4	LAST	493	32,2260	27134 1		INTEGRV	CSM INTEGRATION
0110					32,2261	77624 1	CALL		
0111	REF	2	LAST	493	32,2262	11244 0		GRP2PC	
0112					32,2263	77775 1	VLOAD		
0113	REF	6	LAST	209	32,2264	00025 0		VATT1	
0114	REF	1			32,2265	25761 0	STOVL	VSUBC	SAVE CSM VELOCITY
0115	REF	3	LAST	493	32,2266	00017 1		RATT1	
0116	REF	1			32,2267	01102 0	STORE	RSUBC	SAVE CSM POSITION
0117					32,2270	53435 0	VXV	UNIT	COMPUTE NORMAL TO CSM ORBITAL PLANE
0118	REF	2	LAST	494	32,2271	01761 0		VSUBC	NSUB1=UNIT(R(CM) CROSS V(CM)
0119					32,2272	24025 0	STOVL	200	SAVE NSUB1
0120	REF	3	LAST	493	32,2273	03631 0		RSUBL	COMPUTE ESTIMATED ORBITAL
0121					32,2274	53435 0	VXV	UNIT	PLANE CHANGE
0122					32,2275	00025 0		200	UCSM = UNIT(R(LM) CROSS NSUB1)
0123	REF	2	LAST	148	32,2276	27637 0	STOVL	UCSM	
0124	REF	2	LAST	494	32,2277	01102 0		RSUBC	COMPUTE ANGLE BETWEEN UCSM
0125					32,2300	50256 0	UNIT	DOT	AND RSUBC
0126	REF	3	LAST	494	32,2301	03637 0		UCSM	COS A = UCSM DOT UNIT (R(CM))
0127					32,2302	77752 1	SL1		
0128	REF	2	LAST	125	32,2303	02732 0	STORE	CSTH	SAVE DOE TIME-THETA SUBROUTINE
0129					32,2304	44316 0	DSQ	BDSU	COMPUTE SINE A
0130	REF	1			32,2305	10314 0		ONER-2	
0131					32,2306	77766 0	SQRT		
0132	REF	2	LAST	125	32,2307	26730 1	STOVL	SNTH	SAVE FOR TIME-THETA SUBROUTINE
0133	REF	3	LAST	494	32,2310	01102 0		RSUBC	POSITION OF CSM AT EST. LAUNCH
0134	REF	1			32,2311	26655 0	STOVL	RVEC	TIME FOR TIME-THETA B-27
0135	REF	3	LAST	494	32,2312	01761 0		VSUBC	VELOCITY OF CSM AT EST. LAUNCH
01351					32,2313	77676 0	VCOMP		
0136	REF	2	LAST	125	32,2314	02744 1	STORE	VVEC	TIME FOR TIME THETA B-5
0137					32,2315	45014 0	CLEAR	CALL	
0138	REF	1			32,2316	03666 1		RVSU	
0139	REF	1			32,2317	24732 1		TIMETHET	
01391					32,2320	77676 0	VCOMP		
0140	REF	2	LAST	148	32,2321	03645 0	STORE	NEWVEL	TERMINAL VELOCITY OF CSM
01401					32,2322	77745 1	DLGAD		
01402	REF	1			32,2323	00037 0		T	
01403	REF	2	LAST	148	32,2324	27663 1	STOVL	TRANSTM	TRANSFER TIME

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01404	REF	3	LAST	494	32,2325	03645 0		NEWVEL	
0141					32,2326	77646 0	ABVAL		
01411					32,2327	24025 0	STOVL	200	
0142					32,2330	00001 0		00	
0143	REF	2	LAST	148	32,2331	03653 1	STORE	NEWPOS	TERMINAL POSITION OF CSM
0144					32,2332	53435 0	VXV	UNIT	COMPUTE NORMAL TO CSM ORBITAL PLANE
0145	REF	4	LAST	494	32,2333	03631 0		RSUBL	NSUB2 = UNIT(NEWPOS CROSS R(LM))
0146					32,2334	53435 0	VXV	UNIT	ROTATE TERMINAL VEL INTO DESIRED
0147	REF	3	LAST	495	32,2335	03653 1		NEWPOS	ORBITAL PLANE
0148					32,2336	76561 1	VXSC	VSL1	VSUBC = ABVAL(NEWVEL) \$ UNIT(NSUB2
0149					32,2337	00025 0		200	
0150	REF	1			32,2340	37665 0	STCALL	NCSMVEL	NEW CSM VELOCITY
0151	REF	3	LAST	494	32,2341	11244 0		GRP2PC	
0152					32,2342	77624 1	CALL		
0153	REF	7	LAST	494	32,2343	27414 0		INTSTALL	
0154					32,2344	44345 0	DLOAD	BDSU	
0155	REF	3	LAST	494	32,2345	03663 1		TRANSTM	LAUNCH TIME - TRANSFER TIME
01551	REF	3	LAST	493	32,2346	03661 0		LNCHTM	
0156	REF	4	LAST	320	32,2347	25517 0	STOVL	TET	
0157	REF	4	LAST	495	32,2350	03653 1		NEWPOS	
0158	REF	4	LAST	321	32,2351	01535 0	STORE	RCV	
0159	REF	2	LAST	110	32,2352	25503 0	STOVL	RRECT	
0160	REF	2	LAST	495	32,2353	03665 1		NCSMVEL	
0161	REF	2	LAST	110	32,2354	35511 1	STCALL	VRECT	
0162	REF	1			32,2355	23455 1		MINIRECT	
01621					32,2356	45174 1	AXT,2	CALL	
01622					32,2357	00002 0		2	
0163	REF	2	LAST	37	32,2360	26661 1		ATOPCSM	
0164					32,2361	77624 1	CALL		
0165	REF	1			32,2362	27423 1		INTWAKEO	
0166					32,2363	77776 1	EXIT		
0167	REF	105	LAST	493	32,2364	0 4616 1	TC	BANKCALL	
0168	REF	3	LAST	493	32,2365	50040 0	CADR	PROG20A	
0169					24,2036		BANK	24	
0170	REF	2	LAST	492	24,2000		SETLOC	P20S	
0171					24,2036		BANK		
0172	REF	2	LAST	492 TO 493:	30	30*	COUNT*	\$/P20	
0173	REF	30	LAST	474	24,2036	0 5516 0	TC	DOWNFLAG	RESET VEHUPFLG- LM STATE VECTOR
0174	REF	4	LAST	493	24,2037	00026 0	ADRES	VEHUPFLG	TO BE UPDATED
0175	REF	106	LAST	495	24,2040	0 4616 1	TC	BANKCALL	
0176	REF	3	LAST	487	24,2041	11254 1	CADR	R02BOTH	
0177	REF	15	LAST	493	24,2042	0 5504 0	TC	UPFLAG	
0178	REF	2	LAST	287	24,2043	00027 1	ADRES	UPDATFLG	SET UPDATE FLAG
0179	REF	16	LAST	495	24,2044	0 5504 0	TC	UPFLAG	
0180	REF	2	LAST	287	24,2045	00031 0	ADRES	TRACKFLG	SET TRACK FLAG
0181	REF	17	LAST	495	24,2046	0 5504 0	TC	UPFLAG	
0182	REF	2	LAST	287	24,2047	00010 0	ADRES	RNDVZFLG	SET RENDEZVOUS FLAG
0183	REF	31	LAST	495	24,2050	0 5516 0	TC	DOWNFLAG	
0184	REF	2	LAST	287	24,2051	00037 0	ADRES	SRCHOPTN	INSURE SEARCH OPTION OFF

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0185	REF	32	LAST	495	24,2052	0 5516 0	TC	DOWNFLAG	ALSO MANUAL ACQUISITION FLAG RESET
0186	REF	1			24,2053	00040 0	ADRES	ACMODFLG	
0187	REF	33	LAST	496	24,2054	0 5516 0	TC	DOWNFLAG	TURN OFF R04FLAG TO ENSURE GETTING
0188	REF	5	LAST	279	24,2055	00063 1	ADRES	R04FLAG	ALARM 521 IF CANT READ RADAR
0189	REF	34	LAST	496	24,2056	0 5516 0	TC	DOWNFLAG	ENSURE R25 GIMBAL MONITOR IS ENABLED
0190	REF	3	LAST	271	24,2057	00126 1	ADRES	NORRMON	(RESET NORRMON FLAG)
0191	REF	35	LAST	496	24,2060	0 5516 0	TC	DOWNFLAG	RESET LOS BEING COMPUTED FLAG
0192	REF	1			24,2061	00041 1	ADRES	LOSCMFLG	
0193	REF	5	LAST	288	24,2062	0 6011 1	TC	CLRADM0D	
0195	REF	6	LAST	475	24,2063	0 5353 1	TC	PHASCHNG	
0196					24,2064	04022 0	OCT	04022	
0197	REF	107	LAST	471	24,2065	3 4755 1	CAF	ZERO	ZERO MARK COUNTER
0198	REF	1			24,2066	55'462 1	TS	MARKCTR	
0199	REF	32	LAST	493	24,2067	0 6037 0	TC	INTPRET	LOS DETERMINATION ROUTINE
0200					24,2070	77634 0	RTB		
0201	REF	6	LAST	487	24,2071	21573 0		LOADTIME	
0202	REF	9	LAST	494	24,2072	34041 0	STCALL	TDEC1	
0203	REF	1			24,2073	51255 1		LPS20.1	
0204					24,2074	77624 1	CALL		
0205	REF	1			24,2075	53565 1		LPS20.2	TEST RANGE R/UTINE
0206					24,2076	77776 1	EXIT		
0207	REF	229	LAST	474	24,2077	50 154 1	INDEX	MPAC	
0208					24,2100	0 2101 0	TC	+1	
0209	REF	1			24,2101	0 2111 1	TC	P2OLEMA	NORMAL RETURN WITHIN 400 N.M
0210	REF	1			24,2102	3 2305 0	CAF	ALRM526	ERROR EXIT - RANGE > 400 N. MI.
0211	REF	107	LAST	495	24,2103	0 4616 1	TC	BANKCALL	
0212	REF	1			24,2104	21562 0	CADR	PRIOLARM	
0213	REF	2	LAST	475	24,2105	0 6022 1	TC	GOTOV56	TERMINATE EXITS P20 VIA V56 CODING
0214					24,2106	0 2102 0	TC	-4	PROC (ILLEGAL
0215	REF	1			24,2107	0 2063 0	TC	P2OLEM1	ENTER RECYCLE
0216	REF	68	LAST	491	24,2110	0 5155 0	TC	ENDOFJOB	
0217	REF	7	LAST	496	24,2111	0 5353 1	TC	PHASCHNG	
0218					24,2112	04022 0	OCT	04022	
0219	REF	2	LAST	492	24,2113	0 2667 1	TC	LUNSFCHK	CHECK LUNAR SURFACE FLAG (P22 FLAG)
0220	REF	1			24,2114	0 2117 1	TC	P2OLEMB	
0221	REF	108	LAST	496	24,2115	0 4616 1	TC	BANKCALL	
0222	REF	1			24,2116	46116 0	CADR	R61LEM	PREFERRED TRACKING ATTITUDE ROUTINE
0223	REF	8	LAST	496	24,2117	0 5353 1	TC	PHASCHNG	
0224					24,2120	05022 1	OCT	05022	RESTART AT PRIORITY 10 TO ALLOW V37
0225					24,2121	10000 0	OCT	10000	REQUESTED PROGRAM TO RUN FIRST
0226	REF	3	LAST	475	24,2122	3 7714 1	CAF	PRI026	RESTORE PRIORITY 26
0227	REF	9	LAST	489	24,2123	0 5146 1	TC	PRI0CHNG	
02272	REF	16	LAST	475	24,2124	3 0075 0	CA	FLAGWRDI	IS THE TRACK FLAG SET
02274	REF	4	LAST	475	24,2125	7 4747 0	MASK	TRACKBIT	
02276					24,2126	0 0006 1	EXTEND		
02278	REF	1			24,2127	1 2232 1	BZF	P2OLEMWT	BRANCH - NO - WAIT FOR IT TO BE SET
0228	REF	26	LAST	457	24,2130	3 4752 0	CAF	BIT?	IS RR AUTO MODE DISCRETE PRESENT
0229					24,2131	0 0006 1	EXTEND		

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0230	REF	7	LAST	418	24,2132	02 033 0		RAND	CHAN33	
0231					24,2133	0 0006 1		EXTEND		
0232	REF	1			24,2134	1 2170 1		BZF	P20LEMB3	YES - DO AUTOMATIC ACQUISITION (R21)
0233	REF	5	LAST	295	24,2135	4 6007 1	P20LEMB5	CS	OCT24	RADAR NOT IN AUTO CHECK IF
0234	REF	10	LAST	475	24,2136	6 1011 0		AD	MODREG	MAJOR MODE IS 20
0235					24,2137	0 0006 1		EXTEND		
0236	REF	1			24,2140	1 2153 0		BZF	P20LEMB6	BRANCH - YES-OK TO DO PLEASE PERFORM
02363	REF	3	LAST	404	24,2141	6 7746 0		AD	NEG2	ALSO CHECK FOR P22
02366					24,2142	0 0006 1		EXTEND		
02369	REF	2	LAST	497	24,2143	1 2153 0		BZF	P20LEMB6	BRANCH - YES OK TO DO PLEASE PERFORM
0241	REF	1			24,2144	3 2307 1		CAF	ALRM514	TRACK FLAG SET-FLASH PRIORITY ALARM 514-
0242	REF	109	LAST	496	24,2145	0 4616 1		TC	BANKCALL	RADAR GOES OUT OF AUTO MODE WHILE IN USE
0243	REF	2	LAST	496	24,2146	21562 0		CADR	PRIOLARM	
0244	REF	3	LAST	496	24,2147	0 6022 1		TC	GOTOV56	TERMINATE EXITS VIA V56
0245	REF	2	LAST	496	24,2150	0 2117 1		TC	P20LEMB	PROCEED AND ENTER BOTH GO BACK
0246	REF	3	LAST	497	24,2151	0 2117 1		TC	P20LEMB	TO CHECK AUTO MODE AGAIN
0247	REF	69	LAST	496	24,2152	0 5155 0		TC	ENDOFJOB	
0248	REF	1			24,2153	3 2306 0	P20LEMB6	CAF	OCT201	REQUEST RR AUTO MODE SELECTION
0249	REF	110	LAST	497	24,2154	0 4616 1		TC	BANKCALL	
0250	REF	1			24,2155	20623 1		CADR	GOPERF1	
0251	REF	4	LAST	497	24,2156	0 6022 1		TC	GOTOV56	TERMINATE EXITS P20 VIA V56 CODING
0252	REF	4	LAST	497	24,2157	0 2117 1		TC	P20LEMB	PROCEED CHECKS AUTO MODE DISCRETE AGAIN
0253	REF	3	LAST	496	24,2160	0 2667 1		TC	LUNSFCHK	ENTER INDICATES MANUAL ACQUISITION (R23)
0254	REF	1			24,2161	0 2166 1		TC	P20LEMB2	YES - R23 NOT ALLOWED-TURN-ON OPR ERROR
0255	REF	1			24,2162	0 3135 0		TC	R23LEM	NO - DO MANUAL ACQUISITION
0256	REF	18	LAST	495	24,2163	0 5504 0	P20LEMB1	TC	UPFLAG	RETURN FROM R23 - LOCKON ACHIEVED
0257	REF	2	LAST	496	24,2164	00040 0		ADRES	ACMODFLG	SET MANUAL FLAG AND GO BACK TO CHECK
0258	REF	5	LAST	497	24,2165	0 2117 1		TC	P20LEMB	RR AUTO MODE
0259	REF	7	LAST	446	24,2166	0 4364 1	P20LEMB2	TC	FALTON	TURNS ON OPERATOR ERROR LIGHT ON DSKY
0260	REF	6	LAST	497	24,2167	0 2117 1		TC	P20LEMB	AND GOES BACK TO CHECK AUTO MODE
0261	REF	31	LAST	470	24,2170	4 0110 0	P20LEMB3	CS	RADMODES	ARE RR CDUS BEING ZEROED
0262	REF	1			24,2171	7 4737 1		MASK	PCDU0BIT	
0263					24,2172	0 0006 1		EXTEND		
0264	REF	1			24,2173	1 2205 0		BZF	P20LEMB4	BRANCH - YES - WAIT
0265	REF	5	LAST	293	24,2174	3 4355 0		CAF	BIT13-14	IS SEARCH OR MANUAL ACQUISITION FLAG SET
0266	REF	7	LAST	334	24,2175	7 0076 1		MASK	FLAGWRD2	
0267					24,2176	0 0006 1		EXTEND		
0268	REF	1			24,2177	1 2211 0		BZF	P20LEMB3	ZERO MEANS AUTOMATIC RR ACQUISITION
0269	REF	36	LAST	496	24,2200	0 5516 0		TC	DOWNFLAG	RESET TO AUTO MODE
0270	REF	3	LAST	495	24,2201	00037 0		ADRES	SRCHOPTN	

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0271	REF	37	LAST	497	24,2202	0 5516 0	TC	DOWNFLAG	
0272	REF	3	LAST	497	24,2203	00040 0	ADRES	ACMODFLG	
0273	REF	2	LAST	496	24,2204	0 2232 0	TC	P20LEMWT	WAIT 2.5 SECONDS THEN GO TO RR DATA HEAD
0274	REF	1			24,2205	3 2304 1	P20LEMB4	CAF	250DEC
0275	REF	111	LAST	497	24,2206	0 4516 1	TC	BANKCALL	WAIT 2.5 SECONDS WHILE RR CDUS ARE BEING
0276	REF	8	LAST	300	24,2207	01735 1	CADR	DELAYJOB	ZERGED-THEN GO BACK AND CHECK AGAIN
0277	REF	2	LAST	497	24,2210	0 2170 0	TC	P20LEMB3	
027705	REF	33	LAST	496	24,2211	0 6037 0	P20LEMC3	TC	INTPRET
02771					24,2212	77634 0	RTB		
027715	REF	7	LAST	496	24,2213	21573 0			LOADTIME
02772	REF	10	LAST	496	24,2214	34041 0	STCALL	TDEC1	
027725	REF	1			24,2215	50316 0			UPPSV
02779					24,2216	77776 1	P20LEMC4	EXIT	
0278	REF	9	LAST	496	24,2217	0 5353 1	P20LEMC	TC	PHASCHNG
0279					24,2220	04022 0	OCT	04022	
0280	REF	22	LAST	475	24,2221	30 074 1	CAE	FLAGWRD0	IS THE RENDEZVOUS FLAG SET
0281	REF	6	LAST	475	24,2222	7 4745 1	MASK	RNDVZBIT	
0282					24,2223	0 0006 1	EXTEND		
0283	REF	70	LAST	497	24,2224	1 5155 1	BZF	ENDOFJOB	NO - EXIT P20
0284	REF	17	LAST	496	24,2225	30 075 0	CAE	FLAGWRD1	IS TRACK FLAG SET (BIT 5 FLAGWORD)
0285	REF	5	LAST	496	24,2226	7 4747 0	MASK	TRACKBIT	
0286					24,2227	0 0006 1	EXTEND		
0287	REF	1			24,2230	1 2264 1	BZF	P20LEMD	BRANCH-TRACK FLAG NOT ON-WAIT 2.5 SECONDS
0288	REF	1			24,2231	0 2674 0	P20LEMF	TC	R21LEM
0291	REF	2	LAST	498	24,2232	3 2304 1	P20LEMWT	CAF	250DEC
0294	REF	5	LAST	334	24,2233	0 5173 1	TC	TWIDDLE	USE INSTEAD OF WAITLIST SINCE SAME BANK
0294	REF	2	LAST	240	24,2234	02244 1	ADRES	P20LEMC1	WAIT 2.5 SECONDS
0295	REF	18	LAST	498	24,2235	30 075 0	CAE	FLAGWRD1	IS TRACK FLAG SET
0296	REF	6	LAST	498	24,2236	7 4747 0	MASK	TRACKBIT	
0297					24,2237	0 0006 1	EXTEND		
0298	REF	71	LAST	498	24,2240	1 5155 1	BZF	ENDOFJOB	NO-EXIT WITHOUT DOING 2.7 PHASE CHANGE
0299	REF	10	LAST	498	24,2241	0 5353 1	P20LMWT1	TC	PHASCHNG
0300					24,2242	40072 0	OCT	40072	
0301	REF	72	LAST	498	24,2243	0 5155 0	TC	ENDOFJOB	
0302	REF	23	LAST	498	24,2244	30 074 1	P20LEMC1	CAE	FLAGWRD0
0303	REF	7	LAST	498	24,2245	7 4745 1	MASK	RNDVZBIT	IS RENDEZVOUS FLAG SET
0304					24,2246	0 0006 1	EXTEND		
0305	REF	17	LAST	490	24,2247	1 5261 0	BZF	TASKOVER	NO - EXIT P20/R22
0306	REF	19	LAST	498	24,2250	30 075 0	CAE	FLAGWRD1	IS TRACK FLAG SET
0307	REF	7	LAST	498	24,2251	7 4747 0	MASK	TRACKBIT	
0308					24,2252	0 0006 1	EXTEND		
0309	REF	1			24,2253	1 2261 1	BZF	P20LEMC2	NO-DONT SCHEDULE R22 JOB

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0310	REF	4	LAST	496	24,2254	3 7714 1	CAF	PRI026	YES-SCHEDULE R22-JOB (RR-DATA-READ)
0311	REF	17	LAST	461	24,2255	0 5105 0	TC	FINDVAC	
0312	REF	8	LAST	492	E7,1456		EBANK=	LOSCOUNT	
0313	REF	1			24,2256	02627 0	2CADR	R22LEM42	
0313	REF	1			24,2257	50067 0			
0314	REF	18	LAST	498	24,2260	0 5261 1	TC	TASKOVER	

0315	REF	1			24,2261	0 5221 0	P20LEMC2	TC	FIXDELAY	TRACK FLAG NOT SET .WAIT 15 SECONDS
0316					24,2262	02734 0		DEC	:500	AND CHECK AGAIN

0317	REF	3	LAST	498	24,2263	0 2244 1	TC	P20LEMC1	
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0318	REF	1			24,2264	3 2666 0	P20LEMD	CAF	1500DEC	
0319	REF	6	LAST	498	24,2265	0 5173 1	TC	TWIDDLE	WAITLIST FOR 15 SECONDS	
0320	REF	1			24,2266	02270 0	ADRES	P20LEMD1		
0321	REF	73	LAST	498	24,2267	0 5155 0	TC	ENDOFJOB		

0322	REF	20	LAST	498	24,2270	30 075 0	P20LEMD1	CAE	FLAGWRD1	IS TRACK FLAG SET
0323	REF	8	LAST	498	24,2271	7 4747 0	MASK	TRACKBIT		
0324	REF	161	LAST	490	24,2272	10 000 0	CCS	A		
0325	REF	1			24,2273	1 2277 0	TCF	P20LEMD2	YES-SCHEDULE DESIGNATE JOB	
0326	REF	2	LAST	499	24,2274	0 5221 0	TC	FIXDELAY	NO-WAIT 15 SECONDS	
0327					24,2275	02734 0	DEC	1500		
0328	REF	2	LAST	499	24,2276	0 2270 0	TC	P20LEMD1		

0329	REF	5	LAST	499	24,2277	3 7714 1	P20LEMD2	CAF	PRI026	SCHEDULE JOB TO DO R21
0330	REF	18	LAST	499	24,2300	0 5105 0	TC	FINDVAC		
0331	REF	9	LAST	499	E7,1456		EBANK=	LOSCOUNT		
0332	REF	2	LAST	497	24,2301	02211 1	2CADR	P20LEMC3	START AT PERM. MEMORY INTEGRATION	
0332					24,2302	50067 0				
0333	REF	19	LAST	499	24,2303	0 5261 1	TC	TASKOVER		

0334					24,2304	00372 1	250DEC	DEC	250	
0335					24,2305	00526 0	ALRM526	OCT	00526	
0336					24,2306	00201 1	OCT201	OCT	00201	
0337					24,2307	00514 1	ALRM514	OCT	514	
0338					24,2310	00074 1	MAXTRIES	DEC	60	
0339					24,2311	00012 1	OCT00012	OCT	00012	
0340					24,2312	00001 0	P22ONE	OCT	00001	
0341					24,2313	10000 0	ONEB-2	2DEC	1.0 B-2	
0341					24,2314	00000 1				
03415					24,2315	01441 1	VO6N33*	VN	0632	
0342					24,2316	45020 1	UPPSV	STQ	CALL	UPDATES PERMANENT STATE VECTORS
0343	REF	1			24,2317	01757 0			LS2IX	TO PRESENT TIME
0344	REF	8	LAST	495	24,2320	27414 0			INTSTALL	
0345					24,2321	77624 1		CALL		

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0346	REF	2	LAST	236	24,2322	26644 0		SETIFLGS	
0347					24,2323	43014 0	BOF	SET	IF W-MATRIX INVALID,DONT INTEGRATE IT
0348	REF	4	LAST	494	24,2324	02756 1		RENDWFLG	
0349	REF	1			24,2325	50336 1		UPPSV1	
0350	REF	6	LAST	494	24,2326	01476 0		DIMOFFLAG	SET DIMOFFLAG TO INTEGRATE W-MATRIX
0351					24,2327	43014 0	BON	SET	
0352	REF	4	LAST	253	24,2330	04307 1		SURFFLAG	IF ON LUNAR SURFACE W IS 6X6
0353	REF	1			24,2331	50333 1		UPPSV5	
0354	REF	4	LAST	494	24,2332	01475 0		D6OR9FLG	OTHERWISE 9X9
0355					24,2333	77614 1	UPPSV5	BOF	
0356	REF	5	LAST	495	24,2334	00747 0		VEHUPFLG	
0357	REF	1			24,2335	50370 0		UPPSV3	
0358					24,2336	77614 1	UPPSV1	SET	
0359	REF	6	LAST	494	24,2337	01474 1		VINTFLAG	
0361					24,2340	77624 1		CALL	
0362	REF	5	LAST	494	24,2341	27134 1		INTEGRV	
0363					24,2342	77624 1		CALL	GROUP 2 PHASE CHANGE
0364	REF	4	LAST	495	24,2343	11244 0		GRP2PC	TO PROTECT INTEGRATION
0365					24,2344	77524 1		CALL	
0366	REF	9	LAST	499	24,2345	27414 0		INTSTALL	
0367					24,2346	43145 0	DLOAD	CLEAR	GET TETCSM TO STORE IN TDEC FOR LM INT.
0368	REF	4	LAST	236	24,2347	01571 0		TETCSM	
0369	REF	7	LAST	500	24,2350	01674 0		VINTFLAG	
0370					24,2351	77624 1	UPPSV4	CALL	INTEGRATE OTHER VEHICLE
0371	REF	3	LAST	500	24,2352	26644 0		SETIFLGS	WITHOUT W-MATRIX
0372	REF	11	LAST	498	24,2353	34041 0		STCALL	TDEC1
0373	REF	6	LAST	500	24,2354	27134 1		INTEGRV	
0374					24,2355	77214 0	BOFF	VLOAD	
0375	REF	5	LAST	500	24,2356	04347 0		SURFFLAG	
0376	REF	1			24,2357	50216 1		P20LEMC4	
0377	REF	1			24,2360	01661 1		RCVLEM	
0378					24,2361	77742 0	VSR2		
0379	REF	2	LAST	119	24,2362	26352 1	STOVL	LMPOS	
0380	REF	1			24,2363	01667 1		VCVLEM	
0381					24,2364	77742 0	VSR2		
0382	REF	2	LAST	119	24,2365	02360 0	STORE	LMVEL	
0383					24,2366	77650 1	GUTO		
0384	REF	2	LAST	499	24,2367	01757 0		LS21X	
0385					24,2370	45014 0	UPPSV3	CLEAR	CALL
0386	REF	8	LAST	500	24,2371	01674 0		VINTFLAG	
0387	REF	7	LAST	500	24,2372	27134 1		INTEGRV	
0390					24,2373	77624 1		CALL	
0391	REF	5	LAST	500	24,2374	11244 0		GRP2PC	
0392					24,2375	77624 1		CALL	
0393	REF	10	LAST	500	24,2376	27414 0		INTSTALL	
0394					24,2377	71214 0	SET	DLOAD	
0395	REF	9	LAST	500	24,2400	01474 1		VINTFLAG	
0396	REF	2	LAST	111	24,2401	01643 1		TETLEM	GET TETLEM TO STORE IN TDEC FOR CSM INT.

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0397 24,2402 77650 1
0398 REF 1 24,2403 50351 0

GOTO
UPPSV4

0399 REF 10 LAST 499 E7,1456
0400 REF 1

EBANK= LOSCOUNT
COUNT* \$\$/P22

L P20-P25

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P0401 PROGRAM DESCRIPTION

R0402 PREFERRED TRACKING ATTITUDE PROGRAM P25

R0403 MOD NO - 3

R0404 BY P. VOLANTE

R0405 FUNCTIONAL DESCRIPTION

R0406

R0407 THE PURPOSE OF THIS PROGRAM IS TO COMPUTE THE PREFERRED TRACKING

R0408 ATTITUDE OF THE LM TO CONTINUOUSLY POINT THE LM TRACKING BEACON AT THE

R0409 CSM AND TO PERFORM THE MANEUVER TO THE PREFERRED TRACKING ATTITUDE AND

R0410 CONTINUOUSLY MAINTAIN THIS ATTITUDE WITHIN PRESCRIBED LIMITS

R0411 CALLING SEQUENCE -

R0412 ASTRONAUT REQUEST THROUGH DSKY V37E25E

R0413 SUBROUTINES CALLED -

R0414 BANKCALL FLAGUP

R0415 R02BOTH (IMU STATUS CHECK) ENDOFJOB

R0416 R61LEM (PREF TRK ATT ROUT) WAITLIST

R0417 TASKOVER FINDVAC

R0418 NORMAL EXIT MODES -

R0419 P25 MAY BE TERMINATED IN TWO WAYS-ASTRONAUT SELECTION OF IDLING

R0420 PROGRAM(P00) BY KEYING V37E00E OR BY KEYING IN V56E

R0421 ALARM OR ABORT EXIT MODES -

R0422 NONE

R0423 OUTPUT

R0424 ERASABLE INITIALIZATION REQUIRED

R0425 FLAGS SET + RESET

R0426 TRACKFLG, P25FLAG

R0427 DEBRIS

R0428 NONE

0429 REF 11 LAST 501 E7,1456

0430 REF 1

0431 REF 2 LAST 492 24,2404 0 5327 1 PROG25

0432 24,2405 00004 0

0433 24,2406 05022 1

0434 24,2407 26000 0

EBANK= LOSCOUNT

COUNT* \$\$/P25

TC 2PHSCHNG

PCT 4

MAKE GROUP 4 INACTIVE (VERB 37)

OCT 05022

OCT 26000

PRIORITY 26

0435 REF 112 LAST 498 24,2410 0 4616 1

0436 REF 4 LAST 495 24,2411 11254 1

0437 REF 19 LAST 497 24,2412 0 5504 0

0438 REF 3 LAST 495 24,2413 00031 0

0439 REF 20 LAST 502 24,2414 0 5504 0

0440 REF 2 LAST 287 24,2415 00006 1

0441 REF 11 LAST 498 24,2416 0 5353 1 P25LEM1

0442 24,2417 04022 0

0443 REF 2 LAST 228 24,2420 3 4743 0

0444 REF 31 LAST 239 24,2421 7 0074 0

0445 24,2422 0 0006 1

0446 REF 74 LAST 499 24,2423 1 5155 1

0447 REF 9 LAST 499 24,2424 3 4747 1

0448 REF 32 LAST 502 24,2425 7 0075 1

0449 24,2426 0 0006 1

TC BANKCALL

CADR R02BOTH

IMU STATUS CHECK

TC UPFLAG

ADRES TRACKFLG

SET TRACK FLAG

TC UPFLAG

ADRES P25FLAG

SET P25FLAG

TC PHASCHNG

OCT 04022

CAF P25FLBIT

MASK STATE

IS P25FLAG SET

EXTEND

BZF ENDOFJOB

CAF TRACKBIT

IS TRACKFLAG SET?

MASK STATE +1

EXTEND

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0450	REF	1		24,2427	1 2437 1	BZF	P25LMWT1	NO-SKIP PHASE CHANGE AND WAIT 1 MINUTE
0451	REF	7	LAST 456	24,2430	3 4757 0	CAF	SEVEN	CALL R65 - FINE PREFERRED
0452	REF	2	LAST 146	24,2431	55 745 1	TS	R65CNTR	
0453	REF	113	LAST 502	24,2432	0 4616 1	TC	BANKCALL	TRACKING ATTITUDE ROUTINE
0454	REF	1		24,2433	46123 0	CADR	R65LEM	
0455	REF	2	LAST 240	24,2434	0 2416 0	TC	P25LEM1	THEN GO CHECK FLAGS
0456	REF	12	LAST 502	24,2435	0 5353 1	P25LEMWT TC	PHASCHNG	
0457				24,2436	00112 0	OCT	00112	
0458	REF	1		24,2437	3 2450 1	P25LMWT1 CAF	60SCNDS	
0460	REF	7	LAST 499	24,2440	0 5173 1	TC	TWIDDLE	WAIT ONE MINUTE THEN CHECK AGAIN
0461	REF	1		24,2441	02443 0	ADRES	P25LEM2	
0462	REF	75	LAST 502	24,2442	0 5155 0	TC	ENDOFJOB	
0463	REF	1		24,2443	3 5024 1	P25LEM2 CAF	PRI014	
0464	REF	19	LAST 499	24,2444	0 5105 0	TC	FINDVAC	
0465	REF	12	LAST 502	E7,1456		EBANK=	LUSCOUNT	
0466	REF	3	LAST 503	24,2445	02416 0	2CADR	P25LEM1	
0466				24,2446	50067 0			
0467	REF	20	LAST 499	24,2447	0 5261 1	TC	TASKOVER	
0458				24,2450	13560 0	60SCNDS DEC	6000	

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P0471 DATA READ ROUTINE 22 (LEM)

R0472 PROGRAM DESCRIPTION

R0473 MOD NO - 2

R0474 BY P-VOLANTE

R0475 FUNCTIONAL DESCRIPTION

R0476

R0477 TO PROCESS AUTOMATIC RR MARK DATA TO UPDATE THE STATE VECTOR OF EITHER

R0478 LM OR CSM AS DEFINED IN THE RENDEZVOUS NAVIGATION PROGRAM (P20)

R0479 CALLING SEQUENCE -

R0480 TC BANKCALL

R0481 CADR R22LEM

R0482 SUBROUTINES CALLED -

R0483 LSR22.1 GOFLASH WAITLIST

R0484 LSR22.2 PRIOLARM BANKCALL

R0485 LSR22.3 P6ILEM

R0486 NORMAL EXIT MODES-

R0487 R22 WILL CONTINUE TO RECYCLE, UPDATING STATE VECTORS WITH RADAR DATA

R0488 UNTIL P20 CEASES TO OPERATE (RENDEZVOUS FLAG SET TO ZERO) AT WHICH TIME

R0489 R22 WILL TERMINATE SELF.

R0490 ALARM OR ABORT EXIT MODES-

R0491 PRIORITY ALARM

R0492 PRIORITY ALARM 525 LOS NOT WITHIN 3 DEGREE LIMIT

R0493 OUTPUT

R0494 SEE OUTPUT FROM LSR22.3

R0495 ERASABLE INITIALIZATION REQUIRED

R0496 SEE LSR22.1, LSR22.2, LSR22.3

R0497 FLAGS SET + RESET

R0498 NOANGFLG

R0499 DEBRIS

R0500 SEE LSR22.1, LSR22.2, LSR22.3

0501 REF 2 LAST 146 E7,1737

0502 REF 1

0503 REF 13 LAST 503 24,2451 0 5353 1 R22LEM

0504 24,2452 04022 0

0505 REF 8 LAST 498 24,2453 3 4745 0

0506 REF 33 LAST 502 24,2454 7 0074 0

0507 24,2455 0 0006 1

0508 REF 76 LAST 503 24,2456 1 5155 1

0509 REF 10 LAST 502 24,2457 3 4747 1

0510 REF 34 LAST 504 24,2460 7 0075 1

0511 24,2461 0 0006 1

0512 REF 1 24,2462 1 2636 1

0513 REF 48 LAST 490 24,2463 3 4736 1 R22LEM12

0514 24,2464 0 0006 1

0515 REF 23 LAST 463 24,2465 02 012 0

0516 24,2466 0 0006 1

0517 REF 2 LAST 496 24,2467 1 2111 0

0518 REF 27 LAST 496 24,2470 3 4752 0

0519 24,2471 0 0006 1

0520 REF 8 LAST 497 24,2472 02 033 0

EBANK= LRS22.1X

COUNT* \$\$/R22

TC PHASCHNG

UCT 04022

CAF RNDVZBIT IS RENDESVOUS FLAG SET?

MASK STATE

EXTEND

BZF ENDOFJOB NO-EXIT-R22 AND P20

CAF TRACKBIT IS TRACKFLAG SET?

MASK STATE +1

EXTEND

BZF R22WAIT NO WAIT

CAF BIT14 IS RR AUTO TRACK ENABLE DISCRETE STILL

EXTEND ON (A MONITOR REPOSITION BY R25 CLEARST

RAND CHAN12

EXTEND

BZF P20LEMA NO - RETURN TO P20

CAF BIT2 YES

EXTEND IS RR AUTO MODE DISCRETE PRESENT

RAND CHAN33

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0521				24,2473	0 0006 1	EXTEND		
0522				24,2474	1 2476 1	BZF	+2	YES CONTINUE
0523	REF	1		24,2475	0 2135 1	TC	P20LEMB5	NO - SET IT
0524	REF	32	LAST	497	24,2476	4 0110 0	CS	RADMODES
0525	REF	2	LAST	497	24,2477	7 4737 1	MASK	RCDUOBIT
0526				24,2500	0 0006 1	EXTEND		
0527	REF	2	LAST	499	24,2501	1 2627 1	BZF	R22LEM42
0528	REF	14	LAST	504	24,2502	0 5353 1	TC	PHASCHNG
0529				24,2503	00152 1	OCT	00152	CDUS BEING ZEROED
0530	REF	114	LAST	503	24,2504	0 4616 1	TC	PHASCHNG
0531	REF	1		24,2505	64366 0	CADR	LRS22.1	IF A RESTART OCCURS, AN EXTRA RADAR
0532	REF	230	LAST	496	24,2506	50 154 1	INDEX	MPAC
0533				24,2507	0 2510 1	TC	+1	READING IS TAKEN, SO BAD DATA ISN'T USED
0534	REF	1		24,2510	0 2531 1	TC	R22LEM2	YES READ DATA + CALCULATE LOS
0535	REF	1		24,2511	0 2217 1	TC	P20LEMC	DATA READ SUBROUTINE
0536	REF	1		24,2512	3 2663 0	CAF	ALRM525	
0537	REF	115	LAST	505	24,2513	0 4616 1	TC	BANKCALL
0538	REF	3	LAST	497	24,2514	21562 0	CADR	PRIOLARM
0539	REF	5	LAST	497	24,2515	0 6022 1	TC	GOTOV56
0540	REF	1		24,2516	0 2521 0	TC	R22LEM1	TERMINATE EXITS P20 VIA V56 CODING
0541				24,2517	0 2512 0	TC	-5	PROC (DISPLAY DELTA THETA)
0542	REF	77	LAST	504	24,2520	0 5155 0	TC	ENDCFJOB
								ENTER (ILLEGAL OPTION)

0543	REF	15	LAST	505	24,2521	0 5353 1	R22LEM1	TC	PHASCHNG	
0544					24,2522	04022 0		OCT	04022	
0545	REF	1			24,2523	3 2664 1		CAF	V06N05	DISPLAY DELTA THETA
0546	REF	116	LAST	505	24,2524	0 4616 1		TC	BANKCALL	
0547	REF	1			24,2525	20507 1		CADR	PRIODSP	
0548	REF	6	LAST	505	24,2526	0 6022 1		TC	GOTOV56	TERMINATE EXITS P20 VIA V56 CODING
0549	REF	2	LAST	505	24,2527	0 2531 1		TC	R22LEM2	PROC (OK CONTINUE)
0550	REF	2	LAST	505	24,2530	0 2217 1		TC	P20LEMC	ENTER (RECYCLE)
0551	REF	16	LAST	505	24,2531	0 5353 1	R22LEM2	TC	PHASCHNG	
0552					24,2532	04022 0		OCT	04022	
0553	REF	4	LAST	497	24,2533	0 2667 1		TC	LUNSFCHK	CHECK IF ON LUNAR SURFACE (P22FLAG SET)
0554	REF	1			24,2534	0 2551 1		TC	R22LEM3	YES-BYPASS FLAG CHECKS AND LRS22.2
0555	REF	21	LAST	499	24,2535	3 0075 0		CA	FLAGWRD1	IS TRACK FLAG SET
0556	REF	11	LAST	504	24,2536	7 4747 0		MASK	TRACKBIT	
0557					24,2537	0 0006 1		EXTEND		
0558	REF	2	LAST	504	24,2540	1 2636 1		BZF	R22WAIT	NO - WAIT
0559	REF	117	LAST	505	24,2541	0 4616 1		TC	BANKCALL	YES
0560	REF	1			24,2542	51333 0		CADR	LRS22.2	CHECKS RP BORESIGHT WITHIN 30 DEG OF +Z
0561	REF	231	LAST	505	24,2543	50 154 1		INDEX	MPAC	
0562					24,2544	0 2545 1		TC	+1	
0563	REF	2	LAST	505	24,2545	0 2551 1		TC	R22LEM3	NORMAL RETURN (LOS WITHIN 30 OF Z-AXIS)
0564	REF	118	LAST	505	24,2546	0 4616 1		TC	BANKCALL	
0565	REF	2	LAST	496	24,2547	46116 0		CADR	R61LEM	
0566	REF	3	LAST	505	24,2550	0 2636 0		TC	R22WAIT	NOT WITHIN 30 DEG OF Z-AXIS
0567	REF	22	LAST	505	24,2551	4 0075 1	R22LEM3	CS	FLAGWRD1	SHOULD WE BYPASS STATE VECTOR UPDATE
0568	REF	1			24,2552	7 4746 1		MASK	NOUPFBIT	(IS NOUPDATE FLAG SET?)

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0569				24,2553	0 0006 1	EXTEND		
0570	REF	3	LAST	505	24,2554 1 2627 1	BZF	R22LEM42	BRANCH-YES
0571	REF	23	LAST	505	24,2555 3 0075 0	CA	FLAGWRD1	IS UPDATE FLAG SET
0572	REF	1			24,2556 7 4745 1	MASK	UPDATBIT	
0573					24,2557 0 0006 1	EXTEND		
0574	REF	4	LAST	506	24,2560 1 2627 1	BZF	R22LEM42	UPDATE FLAG NOT SET
0575	REF	6	LAST	499	24,2561 3 7714 1	CAF	PRI026	INSURE HIGH-PRI0 IN RESTART
0576	REF	2	LAST	229	24,2562 55 056 1	TS	PHSPRDT2	
0577	REF	34	LAST	498	24,2563 0 6037 0	TC	INTPRET	
0578					24,2564 77650 1	GOTO		
0579	REF	1			24,2565 54412 1		LSR22.3	
0580					24,2566 77776 1	R22LEM93 EXIT		NORMAL EXIT FROM LSR22.3
0581	REF	17	LAST	505	24,2567 0 5353 1	TC	PHASCHNG	PHASE CHANGE TO PROTECT AGAINST
0582					24,2570 04022 0	OCT	04022	CONFLICT WITH GRP2PC ERASEABLE
0583	REF	1			24,2571 1 2622 1	TCF	R22LEM44	
0584					24,2572 77776 1	R22LEM96 EXIT		
0585	REF	108	LAST	496	24,2573 3 4755 1	CAF	ZERO	SET N49FLAG = ZERO TO INDICATE
0586	REF	2	LAST	152	24,2574 55 746 1	TS	N49FLAG	V06 N49 DISPLAY HASNT BEEN ANSWERED
0587	REF	18	LAST	506	24,2575 0 5353 1	TC	PHASCHNG	
0588					24,2576 04022 0	OCT	04022	TO PROTECT DISPLAY
0589	REF	2	LAST	192	24,2577 3 7715 0	CAF	PRI027	PROTECT DISPLAY
0590	REF	10	LAST	490	24,2600 0 5072 1	TC	NOVAC	
0591	REF	3	LAST	506	E7,1746	EBANK=	N49FLAG	
0592	REF	1			24,2601 02644 0	2CADR	N49DSP	
0592	REF	1			24,2602 50067 0			
0593	REF	35	LAST	506	24,2603 0 6037 0	TC	INTPRET	
0594					24,2604 77735 0	SLOAD		
0595	REF	4	LAST	506	24,2605 03747 0		N49FLAG	
0596					24,2606 50054 0	BZE	8MN	LOOP TO CHECK IF FLAG
0597					24,2607 50604 0		-3	SETTING CHANGED-BRANCH -- NO
0598	REF	1			24,2610 50616 0		R22LEM7	PROCEED
0599					24,2611 77776 1	EXIT		DISPLAY ANSWERED BY RECYCLE
0600	REF	5	LAST	505	24,2612 0 2667 1	TC	LUNSFCHK	ARE WE ON LUNAR SURFACE
0601	REF	4	LAST	505	24,2613 0 2636 0	TC	R22WAIT	YES -- 15 SECOND DELAY
0602	REF	109	LAST	506	24,2614 3 4755 1	CA	ZERO	NO -- SET R65COUNTER = 0, DO FINE
0603	REF	1			24,2615 0 2632 1	TC	R22LEM45	TRACKING TAKE ANOTHER RADAR READING
0604					24,2616 77624 1	R22LEM7 CALL		PROCEED
0605	REF	6	LAST	500	24,2617 11244 0		GRP2PC	PHASE CHANGE AND
0606					24,2620 77650 1	GOTO		GO TO INCORPORATE DATA.
0607	REF	1			24,2621 55431 1		ASTOK	
0608	REF	2	LAST	496	24,2622 25 462 0	R22LEM44 INCR	MARKCTR	INCREMENT COUNT OF MARKS INCORPORATED.
0609	REF	6	LAST	505	24,2623 0 2667 1	TC	LUNSFCHK	ARE WE ON LUNAR SURFACE
0610	REF	1			24,2624 0 2640 1	TC	R22LEM46	YES -- WAIT 2 SECONDS
0611	REF	10	LAST	426	24,2625 3 4756 1	CA	FIVE	NOT ON LUNAR SURFACE
0612	REF	2	LAST	506	24,2626 0 2632 1	TC	R22LEM45	R65COUNTER = 5
0613	REF	7	LAST	506	24,2627 0 2667 1	R22LEM42 TC	LUNSFCHK	CHECK IF ON LUNAR SURFACE (P22FLAG SET)
0614	REF	2	LAST	506	24,2630 0 2640 1	TC	R22LEM46	YES -- WAIT 2 SECONDS
0615	REF	33	LAST	491	24,2631 3 4752 0	CA	TWO	NO-SET R65COUNTER = 2
0616	REF	3	LAST	503	24,2632 55 745 1	R22LEM45 TS	R65GNTR	

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0617	REF 119	LAST 505	24,2633	0 4616 1	TC	BANKCALL	
0618	REF 2	LAST 503	24,2634	46123 0	CADR	R65LEM	FINE PREFERRED TRACKING ATTITUDE
0619	REF 1		24,2635	0 2451 0	TC	R22LEM	
0620	REF 2	LAST 499	24,2636	3 2665 0	CAF	1500DEC	
0621	REF 3	LAST 498	24,2637	0 2233 1	TC	P20LEMWT +1	
0622	REF 2	LAST 278	24,2640	3 5000 1	R22LEM46	CAF	2SECS
06223	*REF 120	LAST 507	24,2641	0 4616 1	TC	BANKCALL	WAIT 2 SECONDS AND TAKE ANOTHER MARK
06226	*REF 9	LAST 498	24,2642	01735 1	CADR	DELAYJOB	
0623	*REF 2	LAST 507	24,2643	0 2451 0	TC	P22LEM	
0624	REF 1		24,2644	3 2665 0	N49DSP	CAF	V06N49NB
0625	REF 121	LAST 507	24,2645	0 4616 1	TC	BANKCALL	EXCESSIVE STATE VECTOR UPDATE - FLASH
0626	REF 2	LAST 505	24,2646	20507 1	CADR	PRIDSP	VERB 06 NOUN 49 R1=DELTA R, R2=DELTA-V
0627	REF 7	LAST 505	24,2647	0 6022 1	TC	GOTOV56	TERMINATE - EXIT R22 AND P20
0628	REF 62	LAST 493	24,2650	4 4753 0	CS	ONE	PROCEED - N49FLAG = -1
0629	REF 5	LAST 506	24,2651	55 746 1	TS	N49FLAG	RECYCLE - N49FLAG = + VALUE
0630	REF 78	LAST 505	24,2652	0 5155 0	TC	ENDOFJOB	
0631	REF 19	LAST 506	24,2653	0 5353 1	R22RSTRT	TC	PHASCHNG
0632			24,2654	00152 1	OCT	00152	IF A RESTART OCCURS WHILE READING RADAR
0633	REF 122	LAST 507	24,2655	0 4616 1	TC	BANKCALL	COME HERE TO TAKE A RANGE-RATE READING
0634	REF 2	LAST 491	24,2656	53103 0	CADR	RRDOT	WHICH ISNT USED TO PREVENT TAKING A BAD
0635	REF 123	LAST 507	24,2657	0 4616 1	TC	BANKCALL	READING AND TRYING TO INCORPORATE THE
0636	REF 5	LAST 490	24,2660	17714 0	CADR	RADSTALL	BAD DATA
0637	REF 3	LAST 505	24,2661	0 2217 1	TC	P20LEM	WAIT FOR READ COMPLETE
0638	REF 3	LAST 507	24,2662	0 2451 0	TC	R22LEM	COULD NOT READ RADAR-TRY TO REDESIGNATE

0639			24,2663	00525 0	ALRM525	OCT	00525
0640			24,2664	01405 1	V06N05	VN	00605
0641			24,2665	01461 0	V06N49NB	VN	00649
0642			24,2666	02734 0	1500DEC	DEC	1500
R0644	LUNSFCHK-CLOSED SUBROUTINE TO CHECK IF ON LUNAR SURFACE (P22FLAG)						
R0645	RETURNS TO CALLER +1 IF P22FLAG SET						
R0646	TO CALLER +2 IF P22FLAG NOT SET						

0647	REF 2	LAST 501	TO 502:	0 0*	COUNT*	\$\$/P22	
0648	REF 4	LAST 336	24,2667	4 0104 0	LUNSFCHK	CS	FLAGWRD8
0649	REF 3	LAST 336	24,2670	7 4744 0		MASK	SURFFBIT
0650	REF 162	LAST 499	24,2671	10 000 0		CCS	A
0651	REF 147	LAST 476	24,2672	24 002 0		INCR	Q
0652	REF 148	LAST 507	24,2673	0 0002 0		TC	Q

CHECK IF ON LUNAR SURFACE
IS SURFFLAG SET?
BRANCH - P22FLAG SET
NOT SET
RETURN

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R0653 RR DESIGNATE ROUTINE (R21LEM)

R0654 PROGRAM DESCRIPTION

R0655 MOD NO - 2

R0656 BY P-VOLANTE

R0657 FUNCTIONAL DESCRIPTION

R0658

R0659 TO POINT THE RENDEZVOUS RADAR AT THE CSM UNTIL AUTOMATIC ACQUISITION
 R0660 OF THE CSM IS ACCOMPLISHED BY THE RADAR. ROUTINE IS CALLED BY P20.

R0661 CALLING SEQUENCE -

R0662 TC BANKCALL

R0663 CADR R21LEM

R0664 SUBROUTINES CALLED -

R0665 FINDVAC FLAGUP ENDOFJOB PRIOLARM

R0666 NOVAC INTPRET LPS20.1 PHASCHNG

R0667 WAITLIST JOBSLEEP JOBWAKE FLAGDOWN

R0668 TASKOVER BANKCALL RADSTALL RRDESSM

R0669 NORMAL EXIT MODES

R0670 WHEN LOCK-ON IS ACHIEVED, BRANCH WILL BE TO P20 WHERE R22 (DATA READ

R0671 WILL BE SELECTED OR A NEED FOR A MANEUVER (BRANCH TO P20LEMA)

R0672 ALARM OR ABORT EXIT MODES -

R0673 PRIORITY ALARM 503 WHEN LOCK-ON HASN'T BEEN ACHIEVED AFTER 30 SECS -

R0674 THIS REQUIRES ASTRONAUT INTERFACE- SELECTION OF SEARCH OPTION OF

R0675 ACQUISITION

R0676 OUTPUT

R0677 SEE LPS20.1, RRDESSM

R0678 ERASABLE INITIALIZATION REQUIRED

R0679 RRTARGET, RADMODES ARE USED BY LPS20.1 AND RRDESSM

R0680 FLAGS SET + RESET

R0681 LOSCMFLG LOKONSW

R0682 DEBRIS

R0683 SEE LPS20.1, RRDESSM

R0684 REF 13 LAST 503 E7, 1456

R0685 REF 1

R0686 REF 49 LAST 504 24,2674 4 4736 0 R21LEM

R0687 24,2675 0 0006 1

R0688 REF 24 LAST 504 24,2676 03 012 1

R0689 REF 8 LAST 506 24,2677 0 2667 1

R0690 REF 1 24,2700 0 2705 1

R0691 REF 110 LAST 506 24,2701 3 4755 1

R0692 REF 4 LAST 316 24,2702 55 107 1

R0693 REF 5 LAST 508 24,2703 55 110 1

R0694 REF 1 24,2704 0 2715 0

R0695 REF 22 LAST 453 24,2705 3 4740 0 R21LEM5

R0696 REF 33 LAST 505 24,2706 7 0110 0

R0697 REF 163 LAST 507 24,2707 10 000 0

R0698 REF 1 24,2710 0 2725 0

R0699 REF 27 LAST 470 24,2711 3 4735 1

R0700 REF 6 LAST 508 24,2712 55 107 1

R0701 REF 4 LAST 373 24,2713 4 4736 0

R0702 REF 7 LAST 508 24,2714 55 110 1

EBANK= LOSCOUNT

COUNT* \$\$/R21

CS BIT 4

EXTEND

WAND CHAN12

TC LUNSFCHK

TC R21LEM5

CAF ZERO

TS TANG

TS TANG +1

TC R21LEM6

CAF BIT12

MASK RADMODES

CCS A

TC R21LEM10

CAF BIT15

TS TANG

CS HALF

TS TANG +1

REMOVE RR SELF TRACK ENABLE

COMMAND-ANTENNA TO MODE CENTER
 IF NOT ON SURFACE-MODE 1-(T=0,S=0)

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0703	REF	38	LAST	498	24,2715	0 5516 0	R21LEM6	TC	DOWNFLAG	
0704	REF	3	LAST	271	24,2716	00012 1		ADRES	LOKONSW	
0705	REF	124	LAST	507	24,2717	0 4616 1		TC	BANKCALL	
0706	REF	2	LAST	269	24,2720	52475 0		CADR	RRDESNB	
0707					24,2721	0 2722 1		TC	+1	
0708	REF	125	LAST	509	24,2722	0 4616 1		TC	BANKCALL	
0709	REF	6	LAST	507	24,2723	17714 0		CADR	RADSTALL	
0710	REF	1			24,2724	0 2760 1		TC	R21-503	BAD RETURN FROM DESIGNATE -ISSUE ALARM
0711	REF	21	LAST	502	24,2725	0 5504 0	R21LEM10	TC	UPFLAG	
0712	REF	2	LAST	496	24,2726	00041 1		ADRES	LOSCMFLG	EVERY FOURTH PASS THRU DODES
0713	REF	1			24,2727	3 2310 1		CAF	MAXTRIES	ALLOW 60 PASSES (APPROX 45 SECONDS)
0714	REF	1			24,2730	55'114 0		TS	DESCOUNT	TO DESIGNATE AND LOCK ON
0715	REF	17	LAST	474	24,2731	3 6245 1	R21LEM2	CAF	THREE	
0716	REF	14	LAST	508	24,2732	55'456 0		TS	LOSCOUNT	
0717	REF	36	LAST	506	24,2733	0 6037 0	R21LEM1	TC	INTPRET	
0718					24,2734	43234 0		RTB	DAD	
0719	REF	8	LAST	498	24,2735	21573 0			LOADTIME	
0720	REF	1			24,2736	11120 1			HALFSEC	EXTRAPOLATE TO PRESENT TIME + .5 SEC.
0721	REF	12	LAST	500	24,2737	34041 0		STCALL	TDECI	LOS DETERMINATION ROUTINE
0722	REF	2	LAST	496	24,2740	51255 1			LPS20.1	
0723					24,2741	77776 1		EXIT		
0724	REF	22	LAST	509	24,2742	0 5504 0	R21LEM3	TC	UPFLAG	SET LOKONSW TO RADAR-ON DESIRED
0725	REF	4	LAST	509	24,2743	00012 1		ADRES	LOKONSW	
0726	REF	39	LAST	509	24,2744	0 5516 0		TC	DOWNFLAG	
0727	REF	4	LAST	496	24,2745	00126 1		ADRES	NORRMON	
0728	REF	37	LAST	509	24,2746	0 6037 0		TC	INTPRET	
0729					24,2747	77624 1		CALL		INPUT (RRTARGET UPDATED BY LPS20.1)
0730	REF	1			24,2750	52373 1			RFDESSM	DESIGNATE ROUTINE
0731					24,2751	77776 1		EXIT		
0732	REF	1			24,2752	0 2777 1		TC	R21LEM4	LOS NOT IN MODE 2 COVERAGE
A0733										ON LUNAR SURFACE
0734	REF	3	LAST	504	24,2753	0 2111 1		TC	P20LEMA	VEHICLE MANEUVER REQUIRED.
0735	REF	126	LAST	509	24,2754	0 4616 1		TC	BANKCALL	NO VEHICLE MANEUVER REQUIRED
0736	REF	7	LAST	509	24,2755	17714 0		CADR	PADSTALL	WAIT FOR DESIGNATE COMPLETE - LOCKON OR
0737					24,2756	0 2760 1		TC	+2	BADEND-LOCKON NOT ACHIEVED IN 60 TRLS
0738	REF	1			24,2757	0 2767 0		TC	R21END	EXIT ROUTINE RETURN TO P20 (LOCK-ON)
0739	REF	1			24,2760	3 2775 0	R21-503	CAF	ALRM503	ISSUE ALARM 503
0740	REF	127	LAST	509	24,2761	0 4616 1		TC	BANKCALL	
0741	REF	4	LAST	505	24,2762	21562 0		CADR	PRIOLARM	
0742	REF	8	LAST	507	24,2763	0 6022 1		TC	GOTV56	TERMINATE EXITS P20 VIA V56 CODING
0743	REF	1			24,2764	0 2772 1		TC	R21SRCH	PROC
0744	REF	3	LAST	499	24,2765	0 2211 1		TC	P20LEMC3	
0745	REF	79	LAST	507	24,2766	0 5155 0		TC	ENDOFJOB	
0746	REF	40	LAST	509	24,2767	0 5516 0	R21END	TC	DOWNFLAG	
0747	REF	3	LAST	509	24,2770	00041 1		ADRES	LOSCMFLG	RESET LOSCMFLG
0748	REF	1			24,2771	0 3121 0		TC	P21DISP	PUT UP VERIFY MAIN LOBE LOCKON DISPLAY
0749	REF	20	LAST	507	24,2772	0 5353 1	R21SRCH	TC	PHASCHNG	
0750					24,2773	04022 0		OCT	04022	
0751	REF	1			24,2774	0 3206 0		TC	R24LEM	SEARCH ROUTINE
0752					24,2775	00503 1	ALRM503	OCT	00503	

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0753 24,2776 00527 1 ALRM527 OCT 527

0754	REF	2	LAST	509	24,2777	3 2310 1	R21LEM4	CAF	MAXTRIES	SET-UP COUNTER FOR
0755	REF	2	LAST	139	24,3000	55 423 1		TS	REPOSCNT	60 PASSES (APPROX 600 SECS.)
0756	REF	23	LAST	509	24,3001	0 5504 0		TC	UPFLAG	
0757	REF	1			24,3002	00005 1		ADRES	FSPASFLG	SET FIRST PASS FLAG
0758	REF	41	LAST	509	24,3003	0 5516 0		TC	DOWNFLAG	RESET LOS BEING
0759	REF	4	LAST	509	24,3004	00041 1		ADRES	LOSCMFLG	COMPUTED FLAG
0760	REF	38	LAST	509	24,3005	0 6037 0		TC	INTPRET	
0761					24,3006	77634 0	R21LEM12	RTB		
0762	REF	9	LAST	509	24,3007	21573 0			LOADTIME	
07621					24,3010	77615 0		DAD		
0763	REF	1			24,3011	11116 1			TENSEC	TIME T = T + 10 SECS.
0764	REF	2	LAST	139	24,3012	03425 1		STORE	REPOSTM	SAVE FOR LONGCALL AND UPPSV
0765	REF	13	LAST	509	24,3013	34041 0		STCALL	TDEC1	
0766	REF	3	LAST	509	24,3014	51255 1			LPS20.1	COMPUTE LOS AT TIME T
0767					24,3015	77624 1		CALL		
0768	REF	2	LAST	509	24,3016	52373 1			RRDESSM	
0769					24,3017	77776 1		EXIT		
0770	REF	1			24,3020	0 3033 1		TC	R21LEM13	LOS NOT IN MODE 2 COVERAGE
0771	REF	80	LAST	509	24,3021	0 5155 0		TC	ENDOFJOB	VEHICLE MANEUVER REQUIRED
07721	REF	1			24,3022	0 6027 1		TC	KILLTASK	
07722	REF	1			24,3023	52573 1		CADR	BEGDES	
07724	REF	39	LAST	510	24,3024	0 6037 0		TC	INTPRET	
0773					24,3025	77614 1		BOF		
0774	REF	2	LAST	510	24,3026	00345 0			FSPASFLG	FIRST PASS THRU REPOSITION
0775	REF	1			24,3027	51043 1			R21LEM8	NO-GO TO CONTINUOUS DESIGNATE
0776					24,3030	77614 1		CLRGO		
0777	REF	3	LAST	510	24,3031	00225 1			FSPASFLG	YES-RESET FIRST PASS FLAG
0778	REF	1			24,3032	51037 1			R21LEM7 +1	
0779	REF	3	LAST	510	24,3033	11 423 1	R21LEM13	CCS	REPOSCNT	HAVE WE TRIED 60 TIMES?
0780	REF	2	LAST	510	24,3034	0 3036 1		TC	R21LEM7	NO-ADD 10 SECS. RECOMPUTE LOS
0781	REF	1			24,3035	0 3105 0		TC	R21LEM11	YES-PUT OUT ALARM 530
0782	REF	4	LAST	510	24,3036	55 423 1	R21LEM7	TS	REPOSCNT	
07821	REF	40	LAST	510	24,3037	0 6037 0		TC	INTPRET	
07822					24,3040	52145 0		DLOAD	GOTO	
07823	REF	3	LAST	510	24,3041	03425 1			REPOSTM	
07824	REF	1			24,3042	51010 1			R21LEM12 +2	
0784					24,3043	77745 1	R21LEM8	DLOAD		
0785	REF	4	LAST	510	24,3044	03425 1			REPOSTM	
0786	REF	14	LAST	510	24,3045	34041 0		STCALL	TDEC1	
0787	REF	2	LAST	498	24,3046	50316 0			UPPSV	
0788					24,3047	77776 1		EXIT		
0789	REF	24	LAST	510	24,3050	0 5504 0		TC	UPFLAG	SET RADMODES BIT-15 FOR
0790	REF	2	LAST	271	24,3051	00264 1		ADRES	CDESFLAG	CONTINUOUS DESIGNATION
0791	REF	42	LAST	510	24,3052	0 5516 0		TC	DOWNFLAG	
0792	REF	5	LAST	509	24,3053	00012 1		ADRES	LOKONSW	
0793	REF	25	LAST	510	24,3054	0 5504 0		TC	UPFLAG	
0794	REF	5	LAST	509	24,3055	00126 1		ADRES	NORRMON	

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0795	REF 128	LAST	509	24,3056	0 4616 1	TC	BANKCALL	
0796	REF 3	LAST	509	24,3057	52475 0	CADR	RRDESNB	
0797				24,3060	0 3061 0	TC	+1	
07971	REF 41	LAST	510	24,3061	0 6037 0	TC	INTPRET	
0798				24,3062	44234 1	RTB	RDSU	
0799	REF 10	LAST	510	24,3063	21573 0		LOADTIME	COMPUTE DELTA TIME
0800	REF 5	LAST	510	24,3064	03425 1		REPOSTM	FOR LONGCALL
0801	REF 1			24,3065	03427 0	STORE	DELTATM	
0802				24,3066	77776 1	EXIT		
08021				24,3067	0 0006 1	EXTEND		
0803	REF 2	LAST	511	24,3070	3 1427 1	DCA	DELTATM	
0804	REF 2	LAST	374	24,3071	0 5277 0	TC	LONGCALL	
0805	REF 15	LAST	509	E7,1456		EBANK=	LOSCOUNT	
0806	REF 1			24,3072	03075 0	2CADR	R21LEM9	
0806	REF 1			24,3073	50067 0			
0807	REF 81	LAST	510	24,3074	0 5155 0	TC	ENDOFJOB	
0808	REF 2	LAST	510	24,3075	0 6027 1	TC	KILLTASK	
0809	REF 1			24,3076	52602 1	CADR	STDESIG	
0810	REF 6	LAST	496	24,3077	0 6011 1	TC	CLRADM00	
0811	REF 7	LAST	506	24,3100	3 7714 1	CAF	PRI026	
0812	REF 20	LAST	503	24,3101	0 5105 0	TC	FINDVAC	
0813	REF 16	LAST	511	E7,1456		EBANK=	LOSCOUNT	
0814	REF 2	LAST	508	24,3102	02725 0	2CADR	R21LEM10	
0814				24,3103	50067 0			
0815	REF 21	LAST	503	24,3104	0 5261 1	TC	TASKOVER	
0816	REF 1			24,3105	3 3114 0	CAF	ALRM530	ALARM 530-LOS NOT IN COVERAGE
0817	REF 129	LAST	511	24,3106	0 4616 1	TC	BANKCALL	AFTER TRYING TO DESIGNATE FOR
0818	REF 5	LAST	509	24,3107	21562 0	CADR	PRI0LARM	600 SECS.
0819	REF 9	LAST	509	24,3110	0 6022 1	TC	GOTOV56	
0820	REF 10	LAST	511	24,3111	0 6022 1	TC	GOTOV56	
0821	REF 11	LAST	511	24,3112	0 6022 1	TC	GOTOV56	
0822	REF 82	LAST	511	24,3113	0 5155 0	TC	ENDOFJOB	
0824				24,3114	00530 1	OCT	00530	
0825				24,3115	00000 1	TENSEC	2DEC	1000 B-28
0825				24,3116	01750 1			
0826				24,3117	00000 1	HALFSEC	2DEC	50
0826				24,3120	00062 0			
0827	REF 21	LAST	509	24,3121	0 5353 1	R21DISP	TC	PHASCHNG
0828				24,3122	04022 0	OCT	04022	
0829	REF 1			24,3123	3 3134 1	CAF	V06N72PV	FLASH V 50 N 72 - PLEASE PERFORM RK
0830	REF 130	LAST	511	24,3124	0 4616 1	TC	BANKCALL	MAIN LOBE LOCKON VERIFICATION
0831	REF 2	LAST	473	24,3125	20710 0	CADR	GOPERF2R	
0832	REF 12	LAST	511	24,3126	0 6022 1	TC	GOTOV56	TERMINATE EXITS VIA V 56
0833	REF 4	LAST	507	24,3127	0 2232 0	TC	P20LEMT	PROCEED CONTINUES TO R22
0834				24,3130	0 3123 1	TC	-5	ENTER ILLEGAL
0835	REF 23	LAST	474	24,3131	3 4745 0	CAF	BIT7	
0836	REF 2	LAST	474	24,3132	0 5464 1	TC	LINUS	SET BITS TO MAKE THIS A PRIORITY DISPLAY
0837	REF 83	LAST	511	24,3133	0 5155 0	TC	ENDOFJOB	

GAP: ASSEMBLE REVISION 001 OF AGC PROGRAM LMY99 BY NASA 2021112-061

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24.3134 01510-1 V06N72PV VN 00672

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P0839 MANUAL ACQUISITION ROUTINE R23LEM

R0840 PROGRAM DESCRIPTION

R0841 MOD NO - 2

R0842 BY P VOLANTE

R0843 FUNCTIONAL DESCRIPTION

R0844

R0845 TO ACQUIRE THE CSM BY MANUAL OPERATION OF THE RENDEZVOUS RADAR

R0846 CALLING SEQUENCE -

R0847 TC R23LEM

R0848 SUBROUTINES CALLED

R0849 BANKCALL R61LEM

R0850 SETMINDB GOPERF1

R0851 NORMAL EXIT MODES -

R0852 IN RESPONSE TO THE GOPERF1 , SELECTION OF ENTER WILL RECYCLE R23

R0853 , SELECTION OF PROC WILL CONTINUE R23

R0854 , SELECTION OF TERM WILL TERMINATE R23 +P20

R0855 ALARM OR ABORT EXIT MODES -

R0856 SEE NORMAL EXIT MODES ABOVE

R0857 OUTPUT

R0858 N.A.

R0859 ERASABLE INITIALIZATION REQUIRED-

R0860 ACMODFLG MUST BE SET TO 1 (MANUAL MODE)

0861 REF 1 1143

0862 REF 1

0863 REF 26 LAST 510 24,3135 0 5504 0 R23LEM

0864 REF 6 LAST 510 24,3136 00126 1

0865 24,3137 0 0004 0

0866 REF 17 LAST 334 24,3140 0 4674 0

0867 REF 1 24,3141 40140 0

0868 24,3142 0 0002 1

0869 REF 50 LAST 508 24,3143 3 4736 1 R23LEM1

0870 24,3144 0 0006 1

0871 REF 25 LAST 508 24,3145 05 012 1

0872 REF 1 24,3146 3 3205 0

0873 REF 131 LAST 511 24,3147 0 4616 1

0874 REF 2 LAST 497 24,3150 20623 1

0875 REF 1 24,3151 0 3176 1

0876 REF 1 24,3152 0 3154 1

0877 REF 1 24,3153 0 3201 1

0878 24,3154 0 0004 0 R23LEM11

0879 REF 2 LAST 187 24,3155 0 4522 1

0880 REF 4 LAST 316 24,3156 00035 1

0881 REF 1 24,3157 0 3166 0

0882 REF 18 LAST 513 24,3160 0 4674 0

0883 REF 4 LAST 295 24,3161 40123 0

0884 24,3162 0 0003 1

0885 REF 43 LAST 510 24,3163 0 5516 0

0886 REF 7 LAST 513 24,3164 00126 1

0887 REF 1 24,3165 0 2163 1

0888 24,3166 0 0003 1 OUTOFLIM RELINT

EBANK= GENRET

COUNT* \$\$/R23

TC UPFLAG

SET NO ANGLE MONITOR FLAG

ADRES NORRMON

INHINT

TC IBNKCALL

SELECT MINIMUM DEADBAND

CADR SETMINDB

RELINT

CAF BIT14

ENABLE TRACKER

EXTEND

WOR CHAN12

CAF OCT205

TC BANKCALL

CADR GOPERF1

TC R23LEM12

TERMINATE

TC R23LEM11

PROCEDE

TC R23LEM13

ENTER- DO ANOTHER MANUEVER

INHINT

TC RRLIMCHK

YES - CHECK IF ANTENNA IS WITHIN LIMITS

ADRES CDUT

TC OUTOFLIM

NOT WITHIN LIMITS

TC IBNKCALL

RESTORE DEADBAND TO

CADR RESTORDB

ASTRONAUT SELECTED VALUE

RELINT

TC DOWNFLAG

CLEAR NO ANGLE MONITOR FLAG

ADRES NORRMON

TC P20LEMB1

RADAR IS LOCKED ON CONTINUE IN P20

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0889	REF	1		24,3167	3	3204	1	CAF	OCT501PV	
0890	REF	132	LAST	513	24,3170	0	4616	1	TC	BANKCALL
0891	REF	6	LAST	511	24,3171	21562	0	CADR	PRIOLARM	ISSUE ALARM - RR ANTENNA NOT WITHIN
0892	REF	2	LAST	513	24,3172	0	3176	1	TC	R23LEM2
0893	REF	2	LAST	513	24,3173	0	3167	1	TC	OUTOFLIM +1
0894	REF	2	LAST	513	24,3174	0	3201	1	TC	R23LEM3
0895	REF	84	LAST	511	24,3175	0	5155	0	TC	ENDOFJOB
0896	REF	44	LAST	513	24,3176	0	5516	0	TC	DOWNFLAG
0897	REF	8	LAST	513	24,3177	00126	1	ADRES	NORRMON	TERMINATE - EXIT R23 TO R00 (GO TO P00H)
0898	REF	13	LAST	511	24,3200	0	6022	1	TC	GOTOV56
0899	REF	133	LAST	514	24,3201	0	4616	1	TC	BANKCALL
0900	REF	3	LAST	505	24,3202	46116	0	CADR	R61LEM	PROCEED ILLEGAL
0901	REF	1			24,3203	0	3143	1	TC	R23LEM1
										RECYCLE- DO ANOTHER MANUVER
										CLEAR NO ANGLE MONITOR FLAG
										AND EXIT VIA V56

0902		24,3204	00501	0	OCT501PV	OCT	501
0903		24,3205	00205	0	OCT205	OCT	205

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P0904 SEARCH ROUTINE R24LEM
R0905 PROGRAM DESCRIPTION
R0906 MOD NO - 2
R0907 BY P. VOLANTE
R0908 FUNCTIONAL DESCRIPTION
R0909
R0910 TO ACQUIRE THE CSM BY A SEARCH PATTERN WHEN THE RENDEZVOUS RADAR HAS
R0911 FAILED TO ACQUIRE THE CSM IN THE AUTOMATIC TRACKING MODE AND TO ALLOW
R0912 THE ASTRONAUT TO CONFIRM THAT REACQUISITION HAS NOT BEEN BY SIDELOBE.
R0913 CALLING SEQUENCE
R0914 CAF PRIONN
R0915 TC FINDVAC
R0916 EBANK= DATAGOOD
R0917 2CADR R24LEM
R0918 SUBROUTINES CALLED
R0919 FLAGUP FLAGDOWN BANKCALL
R0920 R61LEM GOFLASHR FINDVAC
R0921 ENDOFJOB NOVAC LSR24.1
R0922 NORMAL EXIT MODES-
R0923 ASTRONAUT RESPONSE TO DISPLAY OF OMEGA AND DATAGOOD. HE CAN EITHER
R0924 REJECT BY TERMINATING (SEARCH OPTION AND RESELECTING P20) OR ACCEPT BY
R0925 PROCEEDING (EXIT ROUTINE AND RETURN TO AUTO MODE IN P20)
R0926 ALARM OR ABORT EXIT MODES-
R0927 SEE NORMAL EXIT MODES ABOVE
R0928 OUTPUT -
R0929 SEE OUTPUT FROM LSR24.1 + R61LEM
R0930 ERASABLE INITIALIZATION REQUIRED
R0931 SEE INPUT FOR LSR24.1
R0932 FLAGS SET + RESET
R0933 SRCHOPT,ACMODELG
0934 REF 3 LAST 316 E7.1733 EBANK= DATAGOOD
0935 REF 1 COUNT* $$$/R24
0936 REF 27 LAST 513 24,3206 0 5504 0 R24LEM TC UPFLAG
0937 REF 4 LAST 497 24,3207 00037 0 ADRES SRCHOPTN SET SRCHOPT FLAG
0938 REF 45 LAST 514 24,3210 0 5516 0 TC DOWNFLAG RESET LOS BEING COMPUTED FLAG TO MAKE
0939 REF 5 LAST 510 24,3211 00041 1 ADRES LOSCMFLG SURE DODES DOESN'T GO TO R21
0940 REF 111 LAST 508 24,3212 3 4755 1 R24LEM1 CAF ZERO
0941 REF 4 LAST 515 24,3213 55'733 0 TS DATAGOOD ZERO OUT DATA INDICATOR
0942 REF 2 LAST 316 24,3214 55'734 1 TS OMEGAD ZERO OMEGA DISPLAY REGS
0943 REF 3 LAST 515 24,3215 55'735 0 TS OMEGAD +1 ZERO OMEGA DISPLAY REGS
0944 REF 22 LAST 511 24,3216 0 5353 1 R24LEM2 TC PHASCHNG
0945 24,3217 04022 0 OCT 04022
0946 REF 1 24,3220 3 3254 1 CAF VI6N80
0947 REF 134 LAST 514 24,3221 0 4616 1 TC BANKCALL
0948 REF 1 24,3222 20504 1 CADR PRIODSPR
0949 REF 14 LAST 514 24,3223 0 6022 1 TC GOTOV56
0950 REF 1 24,3224 0 3230 0 TC R24END PROCEED EXIT R24 TO P20LEM1

0951 REF 1 24,3225 0 3234 1 TC R24LEM3 RECYCLE - CALL R61 TO MANEUVER S/C

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0952	REF 135	LAST 515	24,3226	0 4616 1	TC	BANKCALL	
0953	REF 1		24,3227	55442 0	CADR	LR524.1	
0955	REF 3	LAST 511	24,3230	0 6027 1	TC	KILLTASK	
0956	REF 1		24,3231	55643 0	CADR	CALDGCH	
0957	REF 7	LAST 511	24,3232	0 6011 1	TC	CLRADM0D	CLEAR BITS 10 & 15 OF RADMODES.
0958	REF 2	LAST 496	24,3233	1 2063 1	TCF	P20LEM1	AND GO TO 400 MI. RANGE CHECK IN P20.

0959			6011		BLOCK	3	
0960	REF 1		6000		SETLOC	FFTAG6	
0961			6011		BANK		
0962	REF 1				COUNT*	\$\$/R24	

0963	REF 1		6011	4 6021 0	CLRADM0D	CS	BIT10+15	
0964			6012	0 0004 0		INHINT		
0965	REF 34	LAST 508	6013	7 0110 0		MASK	RADMODES	
0966	REF 35	LAST 516	6014	54 110 0		TS	RADMODES	
0967	REF 28	LAST 504	6015	4 4752 1		CS	BIT2	DISABLE RR ERROR COUNTERS
0968			6016	0 0006 1		EXTEND		
0969	REF 26	LAST 513	6017	03 012 1		WAND	CHAN12	USER WILL RELINT

0970	REF 149	LAST 507	6020	0 0002 0	TC	Q	
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0971			6021	41000 1	BIT10+15	DCT	41000	
0972			24,3234			BANK	24	
0973	REF 3	LAST 495	24,2000			SETLOC	P20S	
0974			24,3234			BANK		
0975	REF 2	LAST 515 TO 516:	22	22*		COUNT*	\$\$/R24	

0976	REF 23	LAST 515	24,3234	0 5353 1	R24LEM3	TC	PHASCHNG	
0977			24,3235	04022 0		DCT	04022	
0979	REF 4	LAST 516	24,3236	0 6027 1		TC	KILLTASK	
0980	REF 2	LAST 516	24,3237	55643 0		CADR	CALDGCH	KILL WAITLIST FOR NEXT POINT IN PATTERN
0981	REF 8	LAST 516	24,3240	0 6011 1		TC	CLRADM0D	CLEAR BITS 10 + 15 OF RADMODES TO KILL
0982			24,3241	0 0003 1		RFLINT		HALF SECOND DESIGNATE LOOP
0983	REF 1		24,3242	3 4774 1		CAF	.5SEC	
0984	REF 136	LAST 516	24,3243	0 4616 1		TC	BANKCALL	WAIT FOR DESIGNATE LOOP TO DIE
0985	REF 10	LAST 507	24,3244	01735 1		CADR	DELAYJOB	
0986	REF 9	LAST 508	24,3245	0 2667 1		TC	LUNSFCHK	CHECK IF ON LUNAR SURFACE
0987	REF 1		24,3246	0 3251 1		TC	R24LEM4	YES-DONT DO ATTITUDE MANEUVER
0988	REF 137	LAST 516	24,3247	0 4616 1		TC	BANKCALL	CALL R61 TO DO PREFERRED TRACKING
0989	REF 4	LAST 514	24,3250	46116 0		CADR	R61LEM	ATTITUDE MANEUVER
0990	REF 112	LAST 515	24,3251	3 4755 1	R24LEM4	CAF	ZERO	ZERO OUT RADCADR (WHICH WAS SET BY
0991	REF 2	LAST 222	24,3252	55 306 1		TS	RADCADR	ENDRADAR WHEN DESIGNATE STOPPED) SO THAT
AC992								RRDESSM WILL RETURN TO CALLER
0993	REF 1		24,3253	0 3216 1		TC	R24LEM2	AND GO BACK TO PUT UP V16 N80 DISPLAY

0994			24,3254	04120 0	V16N80	VN	01580	
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P0995 PREFERRED TRACKING ATTITUDE ROUTINE R61LEM
R0996 PROGRAM DESCRIPTION
R0997 MOD NO : 3 DATE : 4-11-67
R0998 MOD BY : P VOLANTE SDC

R0999 FUNCTIONAL DESCRIPTION-
R1000 TO COMPUTE THE PREFERRED TRACKING ATTITUDE OF THE LM TO ENABLE RR
R1001 TRACKING OF THE CSM AND TO PERFORM THE MANEUVER TO THE PREFERRED
R1002 ATTITUDE.
R1003 CALLING SEQUENCE-
R1004 TC BANKCALL
R1005 CADR R61LEM
R1006 SUBROUTINES CALLED
R1007 LPS20.1 VECPOINT
R1008 KALCMAN3

R1009 NORMAL EXIT MODES-
R1010 NORMAL RETURN IS TO CALLER + 1
R1011 ALARM OR ABORT EXIT MODES-
R1012 TERMINATE P20 + R61 BY BRANCHING TO P20END IF BOTH TRACKFLAG +
R1013 RENDEZVOUS FLAG ARE NOT SET.
R1014 OUTPUT -
R1015 SEE OUTPUT FOR LPS20.1 + ATTITUDE MANEUVER ROUTINE (R60)
R1016 ERASABLE INITIALIZATION REQUIRED
R1017 GENRET USED TO SAVE Q FOR RETURN
R1018 FLAGS SET + RESET
R1019 3AXISFLG
R1020 DEBRIS
R1021 SEE SUBROUTINES

1022	REF	1		23,2000			SETLOC R61
1023				23,2116			BANK
1024	REF	17	LAST	511	E7,1456		EBANK= LOSCOUNT
1025	REF	1					COUNT* \$\$/R61
1026	REF	4	LAST	477	23,2116	0 4645 1	R61LEM TC MAKECADR
1027	REF	2	LAST	513	23,2117	55*143 1	TS GENRET
1028	REF	28	LAST	515	23,2120	0 5504 0	TC UPFLAG SET R61 FLAG
1029	REF	1			23,2121	00024 1	ADRES R61FLAG
1030	REF	1			23,2122	0 2127 1	TC R61C+L01
1031	REF	5	LAST	517	23,2123	0 4645 1	R65LEM TC MAKECADR
1032	REF	3	LAST	517	23,2124	55*143 1	TS GENRET
1033	REF	46	LAST	515	23,2125	0 5516 0	TC DOWNFLAG RESET R61 FLAG
1034	REF	2	LAST	517	23,2126	00024 1	ADRES R61FLAG
1035	REF	12	LAST	505	23,2127	3 4747 1	R61C+L01 CAP TRACKBIT TRACKFLAG
1036	REF	35	LAST	504	23,2130	7 0075 1	MASK STATE +1
1037					23,2131	0 0006 1	EXTEND
1038	REF	1			23,2132	1 2271 0	BZF R65WAIT NOT SET
1039	REF	42	LAST	511	23,2133	0 6037 0	R61C+L03 TC INTERPRET
1040					23,2134	77775 1	VLOAD

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1041	REF	4	LAST	488	23,2135	06514 1		HIUNITZ	
1042	REF	21	LAST	483	23,2136	03765 0		SCAXIS	TRACK AXIS UNIT VECTOR
1043					23,2137	43234 0	R61LEM1	RTB	DAD
1044	REF	11	LAST	511	23,2140	21573 0		LOADTIME	EXTRAPOLATE FORWARD TO CENTER
1046	REF	1			23,2141	15712 1		3SECONDS	SIX-SECOND PERIOD.
1047	REF	15	LAST	510	23,2142	34041 0		STCALL	TDEC1
1048	REF	4	LAST	510	23,2143	51255 1		LPS20.1	LOS DETERMINATION + VEH ATTITUDE
1049					23,2144	77775 1		VLOAD	
1050	REF	2	LAST	103	23,2145	01102 0		RRTARGET	
1051	REF	4	LAST	481	23,2146	03773 1		STORE	POINTVSM
1052					23,2147	45034 1		RTB	CALL
10525	REF	1			23,2150	46277 1		READCDUD	GET DESIRED CDU'S FOR VECPNT1
1053	REF	1			23,2151	56032 0		VECPNT1	COMPUTES FINAL ANGLES FROM PRESENT CDUDS
1054	REF	8	LAST	477	23,2152	00322 1		STORE	CPHI
1055					23,2153	77776 1		EXIT	STORE FINAL ANGLES - CPHI,CTHETA,CPSI
1056	REF	24	LAST	516	23,2154	0 5353 1		TC	PHASCHNG
1057					23,2155	04022 0		OCT	04022
1058	REF	13	LAST	517	23,2156	3 4747 1		CAF	TPACKBIT
1059	REF	24	LAST	506	23,2157	7 0075 1		MASK	FLAGWRD1
1060					23,2160	0 0006 1		EXTEND	
1061	REF	2	LAST	517	23,2161	1 2271 0		BZF	R65WAIT
1062	REF	138	LAST	516	23,2162	0 4616 1		TC	BANKCALL
1063	REF	2	LAST	474	23,2163	54255 1		CADR	G+N,AUTO
1064	REF	164	LAST	508	23,2164	10 000 0		CCS	A
1065	REF	1			23,2165	0 2257 0		TC	R61C+L04
1072	REF	43	LAST	517	23,2166	0 6037 0		TC	INTPRET
1073					23,2167	45175 0		VLOAD	CALL
1074	REF	3	LAST	518	23,2170	01102 0		RRTARGET	
1075	REF	1			23,2171	47646 0		CDU*SMNB	
1076					23,2172	45345 1		DLOAD	DSU
1077	REF	232	LAST	505	23,2173	00162 1		MPAC +5	GET PHI - ARCCOS OF Z-COMPONENT OF LOS
1079	REF	1			23,2174	06275 1		COS15DEG	
1080					23,2175	77440 1	R61LEM2	BMN	EXIT
1082	REF	1			23,2176	46213 0		R61C+L05	BRANCH - PHI > 15 DEGREES
1083	REF	9	LAST	369	E6,1635			EBANK=	CDUXD
1085	REF	4	LAST	293	23,2177	3 5015 0		CAF	EBANK6
1086	REF	15	LAST	460	23,2200	54 003 0		TS	EBANK
1087					23,2201	0 0004 0		INHINT	
1088					23,2202	0 0006 1		EXTEND	
1089	REF	9	LAST	518	23,2203	3 0322 1		DCA	CPHI
1090	REF	10	LAST	518	23,2204	53 636 1		DXCH	CDUXD
1091	REF	4	LAST	478	23,2205	3 0323 0		CA	CPSI
1092	REF	2	LAST	369	23,2206	55 637 0		TS	CDUZO
1093					23,2207	0 0003 1		RELINT	
1094	REF	18	LAST	517	E7,1456			EBANK=	LOSCOUNT
1095	REF	2	LAST	387	23,2210	3 5016 0		CAF	EBANK7
1096	REF	16	LAST	518	23,2211	54 003 0		TS	EBANK
1097	REF	1			23,2212	0 2236 1		TC	R61C+L06
1098					23,2213	77776 1	R61C+L05	EXIT	
1099					23,2214	0 0004 0		INHINT	

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1100	REF	19	LAST	513	23,2215	0 4674 0	TC	IBNKCALL	
1101	REF	3	LAST	363	23,2216	40153 1	FCADR	ZATTEROR	
1102	REF	20	LAST	519	23,2217	0 4674 0	TC	IBNKCALL	
1103	REF	2	LAST	513	23,2220	40140 0	FCADR	SETMINDB	REDUCE ATTITUDE ERROR
1104	REF	47	LAST	517	23,2221	0 5516 0	TC	DOWNFLAG	
1105	REF	5	LAST	485	23,2222	00124 0	ADRES	3AXISFLG	
1106	REF	29	LAST	517	23,2223	0 5504 0	TC	UPFLAG	
1107	REF	2	LAST	475	23,2224	00077 1	ADRES	PDSPFLAG	SET PRIORITY DISPLAY FLAG
1108	REF	139	LAST	518	23,2225	0 4616 1	TC	BANKCALL	
1109	REF	3	LAST	485	23,2226	54123 0	CADR	R60LEM	
1110					23,2227	0 0004 0	INHINT		
1111	REF	21	LAST	519	23,2230	0 4674 0	TC	IBNKCALL	
1112	REF	5	LAST	513	23,2231	40123 0	FCADR	RESTORD8	
1113	REF	25	LAST	518	23,2232	0 5353 1	TC	PHASCHNG	
1114					23,2233	04022 0	OCT	04022	
1115	REF	48	LAST	519	23,2234	0 5516 0	TC	DOWNFLAG	
1116	REF	3	LAST	519	23,2235	00077 1	ADRES	PDSPFLAG	RESET PRIORITY DISPLAY FLAG
1117	REF	25	LAST	518	23,2236	3 0075 0	R61C+L06 CA	FLAGWRD1	
1118	REF	1			23,2237	7 4742 0	MASK	R61FLBIT	
1119	REF	165	LAST	518	23,2240	10 000 0	CCS	A	
1120	REF	1			23,2241	0 2262 0	TC	R61C+L4	
1123	REF	4	LAST	506	23,2242	11 745 1	CCS	R65CNTR	
1124					23,2243	0 2245 0	TC	+2	
1125	REF	2	LAST	519	23,2244	0 2262 0	TC	R61C+L4	R65CNTR = 0 - EXIT ROUTINE
1126	REF	5	LAST	519	23,2245	55 745 1	TS	R65CNTR	
1127	REF	1			23,2246	3 2276 0	CAF	06SEC	
1129	REF	8	LAST	503	23,2247	0 5173 1	TC	TWIDDLE	
1130	REF	1			23,2250	02252 0	ADRES	R61C+L2	
1131	REF	85	LAST	514	23,2251	0 5155 0	TC	ENDOFJOB	
1132	REF	8	LAST	511	23,2252	3 7714 1	R61C+L2 CAF	PR1026	
1133	REF	21	LAST	511	23,2253	0 5105 0	TC	FINDVAC	
1134	REF	19	LAST	518	E7,1456		EBANK=	LOSCOUNT	
1135	REF	2	LAST	517	23,2254	02127 1	2CADR	R61C+L01	
1135					23,2255	46067 1			
1136	REF	22	LAST	511	23,2256	0 5261 1	TC	TASKOVER	
1137	REF	140	LAST	519	23,2257	0 4616 1	R61C+L04 TC	BANKCALL	TO CONVERT ANGLES TO FDI
1138	REF	4	LAST	474	23,2260	54266 1	CADR	BALLANGS	
1139	REF	2	LAST	518	23,2261	0 2236 1	TC	R61C+L06	
1140	REF	4	LAST	517	23,2262	31 143 0	R61C+L4 CAE	GENRET	
1141	REF	8	LAST	479	23,2263	1 4640 0	TCF	BANKJUMP	EXIT R61
1142	REF	1			23,2264	3 2273 0	R61C+L1 CAF	BIT7+9PV	IS RENDEZVOUS OR P25FLAG SET
1143	REF	36	LAST	517	23,2265	7 0074 0	MASK	STATE	
1144					23,2266	0 0006 1	EXTEND		
1145	REF	86	LAST	519	23,2267	1 5155 1	BZF	ENDOFJOB	NO-EXIT ROUTINE AND PROGRAM.
1146	REF	3	LAST	519	23,2270	0 2236 1	TC	R61C+L06	YES EXIT ROUTINE
11463	REF	36	LAST	468	23,2271	0 4635 0	R65WAIT TC	POSTJUMP	
11466	REF	5	LAST	511	23,2272	50232 1	CADR	P20LEMWT	

1147 23,2273 00500 1 BIT7+9PV OCT 00500

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1148		23,2274	17350 1	COS15DEG 2DEC	0.96593 B-1
1148		23,2275	34602 1		
1149		23,2276	01150 1	06SEC DEC	600
1150		0024		PHI	EQUALS 200
1152		23,2277	0 0004 0	READCDUD INHINT	
11521	REF 5 LAST 518	23,2300	3 5015 0	CAF	EBANK6
11522	REF 17 LAST 518	23,2301	56 003 1	XCH	EBANK
11523	REF 20 LAST 258	23,2302	54 070 1	TS	RUP TREG1
11524	REF 11 LAST 518	E6.1635		EBANK=	CDUXD
11525	REF 12 LAST 520	23,2303	3 1635 0	CA	CDJXD
11526	REF 233 LAST 518	23,2304	54 154 0	TS	MPAC
11527		23,2305	0 0006 1	EXTEND	
11528	REF 2 LAST 369	23,2306	3 1637 1	DCA	CDJYD
11529	REF 234 LAST 520	23,2307	52 156 1	DXCH	MPAC +1
1153	REF 21 LAST 520	23,2310	3 0070 0	CA	RUP TREG1
11531	REF 18 LAST 520	23,2311	54 003 0	TS	EBANK
11532		23,2312	0 0008 1	RELINT	
11533	REF 1	23,2313	1 6477 1	TCF	TMODE
1155		4512		BLOCK	02
1156	REF 1	4000		SETLOC	RADAPFF
1157		4512		BANK	
1158	REF 20 LAST 519	E7.1456		EBANK=	LOSCOUNT
1159	REF 1			COUNT*	\$/RRSUB

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P1150 THE FOLLOWING SUBROUTINE RETURNS TO CALLER + 2 IF THE ABSOLUTE VALUE OF VALUE OF C(A) IS GREATER THAN THE
 R1152 NEGATIVE OF THE NUMBER AT CALLER +1. OTHERWISE IT RETURNS TO CALLER +3. MAY BE CALLED IN RUPT OR UNDER EXEC.

1164		4512	0 0006 1	MAGSUB	EXTEND	
1165		4513	6 4515 1		BZMF	+2
1166		4514	1 4516 0		TCF	+2
1167		4515	4 0000 0		CON	
1168	REF 150 LAST 516	4516	50 002 0		INDEX	0
1169		4517	6 0000 1		AD	0
1170		4520	0 0006 1		EXTEND	
1171	REF 1	4521	6 6741 0		BZMF	0+2 ABS(A) <= CONST GO TO L+3
1172	REF 3 LAST 268	4522	1 6737 0		TCF	0+1 ABS(A) > CONST GO TO L+2

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P1173 PROGRAM NAME_ RRLIMCHK

ARE IN THE LIMITS OF THE CURRENT MODE.

R1175 FUNCTIONAL DESCRIPTION_

R1176 RRLIMCHK CHECKS RR DESIRED GIMBAL ANGLES TO SEE IF THEY ARE WITHIN

R1177 THE LIMITS OF THE CURRENT MODE. INITIALLY THE DESIRED TRUNNION AND

R1178 SHAFT ANGLES ARE STORED IN ITEMP1 AND ITEMP2. THE CURRENT RR

R1179 ANTENNAE MODE (RADMODES BIT 12) IS CHECKED WHICH IS = 0 FOR

R1180 MODE 1 AND =1 FOR MODE 2.

R1181 MODE 1 - THE TRUNNION ANGLE IS CHECKED AT MAGSUB TO SEE IF IT IS

R1182 BETWEEN -55 AND +55 DEGREES. IF NOT, RETURN TO L +2. IF WITHIN LIMITS,

R1183 THE SHAFT ANGLE IS CHECKED TO SEE IF IT IS BETWEEN -70 AND +59 DEGREES.

R1184 IF NOT, RETURN TO L +2. IF IN LIMITS, RETURN TO L +3.

R1185 MODE 2 - THE SHAFT ANGLE IS CHECKED AT MAGSUB TO SEE IF IT IS

R1186 BETWEEN -139 AND -25 DEGREES. IF NOT, RETURN TO L +2. IF WITHIN

R1187 LIMITS, THE TRUNNION ANGLE IS CHECKED TO SEE IF IT IS BETWEEN +125

R1188 AND -125 (+235) DEGREES. IF NOT, RETURN TO L +2. IF IN LIMITS, RETURN

R1189 TO L +3.

R1190 CALLING SEQUENCE:

R1191 L TO RRLIMCHK (WITH INTERRUPT INHIBITED)

R1192 L +1 ADRES T,S (DESIRED TRUNNION ANGLE ADDRESS)

R1193 ERASABLE INITIALIZATION REQUIRED:

R1194 RADMODES, MODEA, MODEB (OR DESIRED TRUNNION AND SHAFT

R1195 ANGLES ELSEWHERE IN CONSECUTIVE LOCATIONS - UNSWITCHED ERASABLE OR

R1196 CURRENT EBANK).

R1197 SUBROUTINES CALLED_ MAGSUB

R1198 JOBS OR TASKS INITIATED_ NONE

R1199 ALARMS_ NONE

R1200 EXIT_ L + 2 (EITHER OR BOTH ANGLES NOT WITHIN LIMITS OF CURRENT MODE)

R1201 L + 3 (BOTH ANGLES WITHIN LIMITS OF CURRENT MODE)

1202			4523	0 0006 1	RRLIMCHK	EXTEND	
1203	REF 151	LAST 521	4524	5 0002 0	INDEX	Q	
1204			4525	5 0000 1	INDEX	0	
1205			4526	3 0001 0	DCA	0	
1206	REF 152	LAST 522	4527	24 002 0	INCR	Q	
1207	REF 6	LAST 258	4530	52 062 1	DXCH	ITEMP1	
1208	REF 153	LAST 522	4531	22 002 0	LXCH	Q	L(CALLER +2) TO L.
1209	REF 2	LAST 323	4532	3 4740 0	CAF	ANTENBIT	SEE WHICH MODE RR IS IN.
1210	REF 36	LAST 516	4533	7 0110 0	MASK	RADMODES	
1211	REF 166	LAST 519	4534	10 000 0	CCS	A	
1212	REF 1		4535	1 4550 1	TCF	MODE2CHK	
1213	REF 7	LAST 522	4536	3 0061 0	CA	ITEMP1	MODE 1 IS DEFINED AS

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1214	REF	1		4537	0 4512 0	TC	MAGSUB	1. ABS(T) L 55 DEGS.
1215				4540	66161 1	DEC	-.30555	2. ABS(S + 5.5 DEGS) L 64.5 DEGS
1216	REF	63	LAST 464	4541	0 0001 0	TC	L	(SHAFT LIMITS AT +59, -70 DEGS)
1217	REF	1		4542	3 4562 1	CAF	5.5DEGS	
1218	REF	3	LAST 95	4543	6 0062 0	AD	ITEMP2	S
1219	REF	2	LAST 523	4544	0 4512 0	TC	MAGSUB	
1220				4545	64420 0	DEC	-.35833	64.5 DEGS
1221	REF	64	LAST 523	4546	0 0001 0	TC	L	
1222	REF	1		4547	0 4560 0	TC	RRLIMOK	IN LIMITS.
1223	REF	1		4550	3 4563 0	MODE2CHK CAF	82DEGS	MODE 2 IS DEFINED AS
1224	REF	4	LAST 523	4551	6 0062 0	AD	ITEMP2	1. ABS(T) G 125 DEGS.
1225	REF	3	LAST 523	4552	0 4512 0	TC	MAGSUB	2. ABS(S + 82 DEGS) L 57 DEGS
1226				4553	65673 0	DEC	-.31667	(SHAFT LIMITS AT -25, -129 DEGS)
1227	REF	65	LAST 523	4554	0 0001 0	TC	L	
1228	REF	8	LAST 522	4555	3 0061 0	CA	ITEMP1	
1229	REF	4	LAST 523	4556	0 4512 0	TC	MAGSUB	
1230				4557	51615 1	DEC	-.69444	125 DEGS
1231	REF	66	LAST 523	4560	50 001 0	RRLIMOK INDEX	L	
1232	REF	67	LAST 523	4561	0 0001 0	TC	L	(= TC 1)
1233				4562	00765 0	5.5DEGS DEC	.03056	
1234				4563	16450 1	82DEGS DEC	.45556	

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P1235 PROGRAM NAME_ SETTRKF

. IF EITHER:

R1237 FUNCTIONAL DESCRIPTION_

R1238 SETTRKF UPDATES THE TRACKER FAIL LAMP ON THE DSKY.

HER THE ALT OR VEL INFORMATION.

R1240 INITIALLY THE LAMP TEST FLAG (IMODES33 BIT 1) IS CHECKED.

R1241 IF A LAMP TEST IS IN PROGRESS, THE PROGRAM EXITS TO L +1.

R1242 IF NO LAMP TEST THE FOLLOWING IS CHECKED SEQUENTIALLY_

R1243 1) RR CDU:S BEING ZEROED, RR CDU OK, AND RR NOT IN

R1244 AUTO MODE (RADMODES BITS 13, 7, 2).

R1245 2) LR VEL DATA FAIL AND NO LR POS DATA (RADMODES BITS

R1246 8,5)

R1247 3) NO RR DATA (RADMODES BIT 4)

R1248 THE ABSENCE OF ALL THREE SIMULTANEOUSLY IN (1), THE PRESENCE OF BOTH

R1249 IN (2), AND THE PRESENCE OF (3) RESULTS IN EITHER THE TRACKER FAIL

R1250 LAMP (DSPTAB +110 BIT 8) BEING TURNED ON OR LEFT ON. OTHERWISE,

R1251 THE TRACKER FAIL LAMP IS TURNED OFF OR IS LEFT OFF. THEREFORE, THE

R1252 TRACKER FAIL LAMP IS TURNED ON IF_

R1253 A) RR CDU FAILED WITH RR IN AUTO MODE AND RR CDU:S NOT BEING ZEROED.

R1254 B) N SAMPLES OF LR DATA COULD NOT BE TAKEN IN 2N TRIES WITH

R1255 EITHER THE ALT OR VEL INFORMATION

R1256 C) N SAMPLES OF RR DATA COULD NOT BE OBTAINED FROM 2N TRIES

R1257 WITH EITHER THE AL

R1258 CALLING SEQUENCE:

R1259 L TC SETTRKF

R1250 ERASABLE INITIALIZATION REQUIRED: IMODES33, RADMODES, DSPTAB +110

R1261 SUBROUTINES CALLED_ NONE

R1262 JOBS OR TASKS INITIATED_ NONE

R1263 ALARMS_ TRACKER FAIL LAMP

R1264 EXIT_ L +1 (ALWAYS)

ED.

1266 REF 25 LAST 467 4564 3 4753 1 SETTRKF CAF BIT1 NO ACTION IF DURING LAMP TEST.

1267 REF 25 LAST 470 4565 7 1303 1 MASK IMODES33

1268 REF 167 LAST 522 4566 10 000 0 CCS A

1269 REF 154 LAST 522 4567 0 0002 0 TC Q

1270 REF 24 LAST 334 4570 3 4744 1 RRTRKF CA BIT8

1271 REF 68 LAST 523 4571 54 001 1 TS L

1272 REF 1 4572 3 4615 1 CAF 13,7,2 SEE IF CDU FAILED.

1273 REF 37 LAST 522 4573 7 0110 0 MASK RADMODES

1274 4574 0 0006 1 EXTEND

1275 REF 1 4575 1 4601 0 BZF TRKFLOD CONDITION 3 ABOVE.

1276 REF 1 4576 3 4750 1 RRCHECK CAF RRDATA BT SEE IF RR DATA FAILED.

1277 REF 38 LAST 524 4577 7 0110 0 MASK RADMODES

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1278	REF 168	LAST 524	4600	10 000 0	CCS	A	
1279	REF 69	LAST 524	4601	3 0001 0	CA	L	
1280	REF 39	LAST 471	4602	6 1036 0	AD	DSPTAB +11D	HALF ADD DESIRED AND PRESENT STATES.
1281	REF 70	LAST 525	4603	7 0001 1	MASK	L	
1282			4604	0 0006 1	EXTEND		
1283	REF 4	LAST 274	4605	1 6742 1	BZF	TCN	NO CHANGE.
1284	REF 40	LAST 525	4606	3 1036 0	FLIP	CA	DSPTAB +11D CANT USE LXCH DSPTAB +11D (RESTART PROB)
1285			4607	0 0006 1	EXTEND		
1286	REF 10	LAST 259	4610	06 001 0	RXOR	LCHAN	
1287	REF 10	LAST 432	4611	7 4733 0	MASK	POSMAX	
1288	REF 28	LAST 508	4612	6 4735 1	AD	BIT15	
1289	REF 41	LAST 525	4613	55 036 1	TS	DSPTAB +11D	
1290	REF 155	LAST 524	4614	0 0002 0	TC	Q	
1291			4615	10102 0	13.7.2	OCT	10102
1292			4616		ENDRMODE	EQUALS	

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P1293 PROGRAM NAME_ RRTURNON

R1294 FUNCTIONAL DESCRIPTION_

R1295 RRTURNON IS THE TURN-ON SEQUENCE WHICH, ALONG WITH
 R1296 RRZEROSB, ZEROS THE CDU:S AND DETERMINES THE RR MODE.
 R1297 INITIALLY, CONTROL IS TRANSFERRED TO RRZEROSB FOR THE
 R1298 ACTUAL TURN-ON SEQUENCE. UPON RETURN THE PROGRAM
 R1299 WAITS 1 SECOND BEFORE REMOVING THE TURN-ON FLAG
 R1300 (RADMODES BIT1) SO THE REPOSITION ROUTINE WON'T
 R1301 INITIATE PROGRAM ALARM 00501. A CHECK IS THEN MADE
 R1302 TO SEE IF A PROGRAM IS USING THE RR (STATE BIT 7). IF
 R1303 SO, THE PROGRAM EXITS TO ENDRADAR SO THAT THE RR CDU
 R1304 FAIL FLAG (RADMODES BIT 7) CAN BE CHECKED BEFORE
 R1305 RETURNING TO THE WAITING PROGRAM. IF NOT, THE PROGRAM EXITS
 R1306 TO TASKOVER.

R1307 CALLING SEQUENCE: WAITLIST TASK FROM RRAUTCHK IF THE RR POWER ON AUTO
 R1308 BIT (CHAN 33 BIT 2) CHANGES TO 0 AND NO PROGRAM WAS USING
 R1309 THE RR (STATE BIT 7).

R1310 ERASABLE INITIALIZATION REQUIRED:
 R1311 RADMODES, STATE

R1312 SUBROUTINES CALLED_ RRZEROSB, FIXDELAY, TASKOVER, ENDRADAR

R1313 JOBS OR TASKS INITIATED_
 R1314 NONE

R1315 ALARMS_ NONE (SEE RRZEROSB)

R1316 EXIT_ TASKOVER, ENDRADAR (WAITING PROGRAM)

1317				24,3255		BANK	24
1318	REF	1		25,2000		SETLOC	P20S1
1319				25,2062		BANK	

1320	REF	21	LAST	520	E7,1456		EBANK=	LOSCOUNT
1321	REF	1					COUNT*	\$/RSUB
1322	REF	1			25,2062	0 2071 0	RRTURNON	TC
1323	REF	3	LAST	499	25,2063	0 5221 0		TC
1324					25,2064	00144 0		DEC
1325	REF	1			25,2065	4 4753 0		CS
1326	REF	39	LAST	524	25,2066	7 0110 0		MASK
1327	REF	40	LAST	526	25,2067	54 110 0		TS
1328	REF	23	LAST	519	25,2070	1 5261 0		TCF

WAIT 1 SEC BEFORE REMOVING TURN ON FLAG
 SO-A-MONITOR REPOSITION WONT ALARM.

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P1329 PROGRAM NAME RRZEROSB

RT330 FUNCTIONAL DESCRIPTION

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R1331 RRZEROSB IS A CLOSED SUBROUTINE TO ZERO THE RR CDU:S,
R1332 DETERMINE THE RR MODE, AND TURNS ON THE TRACKER FAIL
R1333 LAMP IF REQUIRED. INITIALLY THE RR CDU ZERO BIT (CHAN 12
R1334 BIT 1) IS SET. FOLLOWING A 20 MILLISECOND WAIT, THE LGC
R1335 RR CDU COUNTERS (OPTY, OPTX) ARE SET = 0 AFTER
R1336 WHICH THE RR CDU ZERO DISCRETE (CHAN 12 BIT 1) IS
R1337 REMOVED. A 4 SECOND WAIT IS SET TO ALL THE RR CDU:S
R1338 TO REPEAT THE ACTUAL TRUNNION AND SHAFT ANGLES. THE
R1339 RR CDU ZERO FLAG (RADMODES BIT 13) IS REMOVED. THE
R1340 CONTENTS OF OPTY IS THEN CHECKED TO SEE IF THE TRUNNION
R1341 ANGLE IS LESS THAN 90 DEGREES. IF NOT, BIT 12 OF
R1342 RADMODES IS SET = 1 TO INDICATE RR ANTENNA MODE 2.
R1343 IF LESS THAN 90 DEGREES, BIT 12 OF RADMODES IS SET = 0 TO
R1344 INDICATE RR ANTENNA MODE 1. SETTRKF IS THEN CALLED TO
R1345 SEE IF THE TRACKER FAIL LAMP SHOULD BE TURNED ON.

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~~RT346 CALLING SEQUENCE: L TC RRZEROSB (FROM RRTURNON AND RRZERO)~~

31347 FBA SABLE INITIALIZATION REQUIRED:

31348 BADMODES (BIT 13 SET), DSPTAB +110

81349 SUBROUTINES CALLED FIXDELAY, MAGSUB, SETTRKF

RI350	JOB S DR TASKS INITIATED
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
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92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

R1350	8888
R1351	NONE

R1352 ALARMS TRACKER FAIL

R1353 EXIT L +1 (ALWAYS)

1354					25,2071	0 0006 1	RRZEROSB	EXTEND		
1355	REF	2	LAST	106	25,2072	23'315 1		QXCH	RRRET	
1356	REF	26	LAST	524	25,2073	3 4753 1		CAF	BITI	BIT-13 OF RADMODES MUST BE SET BEFORE
1357					25,2074	0 0006 1		EXTEND		COMING HERE.
1358	REF	27	LAST	516	25,2075	05 012 1		WOR	CHAN12	TURN ON ZERO PR CDU
1359	REF	4	LAST	526	25,2076	0 5221 0		TC	FIXDELAY	
1360					25,2077	00002 0		DEC	2	
1361	REF	113	LAST	516	25,2100	3 4755 1		CAF	ZERO	
1362	REF	5	LAST	513	25,2101	54 035 0		TS	CDUT	
1363	REF	4	LAST	316	25,2102	54 036 0		TS	CDUS	
1364	REF	63	LAST	507	25,2103	4 4753 0		CS	ONE	REMOVE ZEROING BIT.
1365					25,2104	0 0006 1		EXTEND		
1366	REF	28	LAST	527	25,2105	03 012 1		WAND	CHAN12	
1367	REF	5	LAST	527	25,2106	0 5221 0		TC	FIXDELAY	
1368					25,2107	01750 1		DEC	1000	RESET FAIL INHIBIT IN 10 SECS - D.281
1369	REF	3	LAST	505	25,2110	4 4737 1		CS	PCDUOBT	REMOVE ZEROING IN PROCESS BIT.

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1370	REF 41	LAST 526	25,2111	7 0110 0	MASK	RADMODES	
1371	REF 42	LAST 528	25,2112	54 110 0	TS	RADMODES	
1372	REF 6	LAST 527	25,2113	3 0035 1	CA	CDUT	
1373	REF 5	LAST 523	25,2114	0 4512 0	TC	MAGSUB	
1374			25,2115	57777 1	DEC	-.5	
1375			25,2116	1 2121 0	TCF	+3	IF MODE 2.
1376	REF 114	LAST 527	25,2117	3 4755 1	CAF	ZERO	
1377			25,2120	1 2122 0	TCF	+2	
1378	REF 3	LAST 522	25,2121	3 4740 0	CAF	ANTENBIT	
1379	REF 43	LAST 528	25,2122	56 110 1	XCH	RADMODES	
1380	REF 1		25,2123	7 7741 0	MASK	-BIT12	
1381	REF 44	LAST 528	25,2124	26 110 0	ADS	RADMODES	
1382	REF 2	LAST 185	25,2125	0 4564 1	TC	SETTRKF	TRACKER LAMP MIGHT GO ON NOW.
1383	REF 3	LAST 527	25,2126	0 1315 1	TC	RRRET	DONE.
1384	REF 1		7741	-BIT12	EQUALS	-1/8	IN SPROOT

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P1385 PROGRAM NAME_ DORREPOS
R1386 FUNCTIONAL DESCRIPTION_
R1387 DORREPOS IS A SEQUENCE OF TASKS TO DRIVE THE RENDEZVOUS RADAR
R1388 TO A SAFE POSITION. INITIALLY SETRRECR IS CALLED WHERE THE RR
R1389 ERROR COUNTERS (CHAN 12 BIT 2) ARE ENABLED AND LASTXCMD
R1390 AND LASTXCMD SET = 0 TO INDICATE THE DIFFERENCE BETWEEN THE
R1391 DESIRED STATE AND PRESENT STATE OF THE COMMANDS. THE RR
R1392 TURN-ON FLAG (RADMODES BIT 1) IS CHECKED AND IF NOT PRESENT,
R1393 PROGRAM ALARM 00501 IS REQUESTED BEFORE CONTINUING. IN EITHER
R1394 CASE, FOLLOWING A 20 MILLISECOND WAIT THE PROGRAM CHECKS THE CURRENT
R1395 RR ANTENNA MODE (RADMODES BIT 12). RRONLY IS THEN CALLED
R1396 TO DRIVE THE TRUNNION ANGLE TO 0 DEGREES IF IN MODE 1 AND TO 180
R1397 DEGREES IF IN MODE 2. UPON RETURN, THE CURRENT RR ANTENNA
R1398 MODE (RADMODES BIT 12) IS AGAIN CHECKED. RRONLY IS THEN
R1399 CALLED TO DRIVE THE SHAFT ANGLE TO 0 DEGREES IF IN MODE 1 AND TO
R1400 -90 DEGREES IF IN MODE 2. IF DURING RRONLY OR RRONLY A
R1401 REMODE HAS BEEN REQUESTED (RADMODES BIT 14), AND ALWAYS
R1402 FOLLOWING COMPLETION OF RRONLY, CONTROL IS TRANSFERRED TO
R1403 REPOSRT. HERE THE REPOSITION FLAG (RADMODES BIT 11) IS
R1404 REMOVED. A CHECK IS THEN MADE ON THE DESIGNATE FLAG (RADMODES
R1405 BIT 10). IF PRESENT, CONTROL IS TRANSFERRED TO BEGDES. IF NOT PRESENT
R1406 INDICATING NO FURTHER ANTENNA CONTROL REQUIRED, THE RR ERROR
R1407 COUNTER BIT (CHAN 12 BIT 2) IS REMOVED AND THE ROUTINE EXITS TO
R1408 TASKOVER.

R1409 CALLING SEQUENCE:
R1410 WAITLIST CALL FROM RRGINON IF TRUNNION AND SHAFT CDU ANGLES
R1411 NOT WITHIN LIMITS OF CURRENT MODE.

R1412 ERASABLE INITIALIZATION REQUIRED:
R1413 RADMODES

R1414 SUBROUTINES CALLED_
R1415 RRONLY, RRONLY, BEGDES (EXIT)

R1416 JOBS OR TASKS INITIATED_
R1417 NONE

R1418 ALARMS- NONE

R1419 EXIT_ TASKOVER, BEGDES

1420 REF 1 25,2127 0 2156 1 DORREPOS TC SETRRECR SET UP RR CDU ERROR COUNTERS.

R1421 ALARM 501 DELETED IN DANCE 279 PER PCR 97.

1422 REF 6 LAST 527 25,2130 0 5221 0 TC FIXDELAY
1423 25,2131 00002 0 DEC 2

1424 REF 4 LAST 528 25,2132 3 4740 0 CAF ANTENBIT MANEUVER TRUNNION ANGLE TO NOMINAL POS.

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1425	REF 45	LAST 528	25,2133	7 0110 0	MASK	RADMODES	
1426	REF 169	LAST 525	25,2134	10 000 0	CCS	A	
1427	REF 29	LAST 525	25,2135	3 4735 1	CAF	BIT 5	0 FOR MODE 1 AND 180 FOR MODE 2.
1428	REF 1		25,2136	0 2241 1	TC	RRONLY	
1429	REF 5	LAST 529	25,2137	3 4740 0	CAF	ANTENBIT	NOW PUT SHAFT IN RIGHT POSITION
1430	REF 46	LAST 530	25,2140	7 0110 0	MASK	RADMODES	
1431	REF 170	LAST 530	25,2141	10 000 0	CCS	A	
1432	REF 5	LAST 508	25,2142	4 4736 0	CS	HALF	90 FOR MODE 2.
1433	REF 1		25,2143	0 2244 1	TC	RRONLY	
1434	REF 2	LAST 187	25,2144	4 4741 0	REPOS RPT CS	REPOSBIT	RETURNS HERE FROM RR1AXIS IF REMODE REQUESTED DURING REPOSITION.
A1435							REMOVE REPOSITION BIT.
1436	REF 47	LAST 530	25,2145	7 0110 0	MASK	RADMODES	
1437	REF 48	LAST 530	25,2146	54 110 0	TS	RADMODES	
1438	REF 1		25,2147	7 4742 0	MASK	DESIGBIT	SEE IF SOMEONE IS WAITING TO DESIGNATE.
1439	REF 171	LAST 530	25,2150	10 000 0	CCS	A	
1440	REF 2	LAST 510	25,2151	1 2573 0	TCF	BEGDES	
1441	REF 29	LAST 516	25,2152	4 4752 1	CS	BIT 2	IF NO FURTHER ANTENNA CONTROL REQUIRED, REMOVE ERROR COUNTER ENABLE.
1442			25,2153	0 0006 1	EXTEND		
1443	REF 29	LAST 527	25,2154	03 012 1	WAND	CHAN12	
1444	REF 24	LAST 526	25,2155	1 5261 0	TCF	TASKOVER	
1445	REF 30	LAST 530	25,2156	3 4752 0	SETRRECR CAF	BIT 2	SET UP RR ERROR COUNTERS.
1446			25,2157	0 0006 1	EXTEND		
1447	REF 30	LAST 530	25,2160	02 012 0	RAND	CHAN12	
1448	REF 172	LAST 530	25,2161	10 000 0	CCS	A	DO NOT CLEAR LAST COMMAND IF ERROR COUNTERS ARE ENABLED.
1449	REF 156	LAST 525	25,2162	0 0002 0	TC	Q	
1450	REF 7	LAST 202	25,2163	54 112 1	TS	LASTYCMD	
1451	REF 1		25,2164	54 113 0	TS	LASTXCMD	
1452	REF 31	LAST 530	25,2165	3 4752 0	CAF	BIT 2	
1453			25,2166	0 0006 1	EXTEND		
1454	REF 31	LAST 530	25,2167	05 012 1	WOR	CHAN12	ENABLE RR CDU ERROR COUNTERS.
1455	REF 157	LAST 530	25,2170	0 0002 0	TC	Q	

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P1456 PROGRAM NAME_ REMODE

IVES SHAFT TO -45. AND FINALLY DRIVES

S DONE WITH SINGLE AXIS ROTATIONS (SEE

R1458 FUNCTIONAL DESCRIPTION_
 R1460 REMODE IS THE GENERAL REMODING SUBROUTINE. IT DRIVES THE
 R1461 TRUNNION ANGLE TO 0 DEGREES IF THE CURRENT MODE IS MODE 1,
 R1462 180 DEGREES FOR MODE 2, THEN DRIVES THE SHAFT ANGLE TO -45
 R1463 DEGREES, AND FINALLY DRIVES THE TRUNNION ANGLE TO -130 DEGREES,
 R1464 TO PLACE THE RR IN MODE 2. -50 DEGREES FOR MODE 1, BEFORE
 R1465 INITIATING 2-AXIS CONTROL. ALL REMODING IS DONE WITH SINGLE
 R1466 AXIS ROTATIONS (RR1AXIS). INITIALLY THE RR ANTENNA MODE FLAG
 R1467 (RADMODES BIT 12) IS CHECKED. CONTROL IS THEN TRANSFERRED TO
 R1468 RRONLY TO DRIVE THE TRUNNION ANGLE TO 0 DEGREES IF IN MODE 1
 R1469 OR 180 DEGREES IF IN MODE 2. RRONLY IS THEN CALLED TO DRIVE
 R1470 THE SHAFT ANGLE TO -45 DEGREES. THE RR ANTENNA MODE FLAG
 R1471 (RADMODES BIT 12) IS CHECKED AGAIN. CONTROL IS AGAIN
 R1472 TRANSFERRED TO RRONLY TO DRIVE THE TRUNNION ANGLE TO -130
 R1473 DEGREES TO PLACE THE RR IN MODE 2 IF CURRENTLY IN MODE 1 OR TO
 R1474 -50 DEGREES IF IN MODE 2 TO PLACE THE RR IN MODE 1. RMODINV
 R1475 IS THEN CALLED TO SET RADMODES BIT 12 TO INDICATE THE NEW
 R1476 RR ANTENNA MODE. THE REMODE FLAG (RADMODES BIT 14)
 R1477 IS REMOVED TO INDICATE THAT REMODING IS COMPLETE. THE PROGRAM
 R1478 THEN EXITS TO STDESIG TO BEGIN 2-AXIS CONTROL.

R1479 CALLING SEQUENCE:
 R1480 FROM BEGDES WHEN REMODE FLAG (RADMODES BIT 14) IS SET.
 R1481 THIS FLAG MAY BE SET IN RRDESSM AND RRDESMB IF RRLIMCHK
 R1482 DETERMINES THAT THE DESIRED ANGLES ARE WITHIN THE LIMITS OF THE
 R1483 OTHER MODE.

R1484 ERASABLE INITIALIZATION REQUIRED:
 R1485 RADMODES

R1486 SUBROUTINES CALLED_
 R1487 RRONLY, RRONLY, RMODINV (ACTUALLY PART OF)

R1488 JOBS OR TASKS INITIATED_
 R1489 NONE

R1490 ALAPMS_ NONE

R1491 EXIT_ STDESIG

1492	REF	6	LAST	530	25,2171	3 4740 0	REMODE	CAF	ANTENBIT	DRIVE TRUNNION TO 0 (180)
1493	REF	49	LAST	530	25,2172	7 0110 0		MASK	RADMODES	(ERROR COUNTER ALREADY ENABLED)
1494	REF	173	LAST	530	25,2173	10 000 0		CCS	A	
1495	REF	30	LAST	530	25,2174	3 4735 1		CAF	BIT15	
1496	REF	2	LAST	530	25,2175	0 2241 1		TC	RRONLY	
1497	REF	1			25,2176	3 7740 0		CAF	-45DEGSR	
1498	REF	2	LAST	530	25,2177	0 2244 1		TC	RRONLY	

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1499	REF 50	LAST 531	25,2200	4 0110 0	CS	RADMODES	
1500	REF 7	LAST 531	25,2201	7 4740 1	MASK	ANTENBIT	
1501	REF 174	LAST 531	25,2202	10 000 0	CCS	A	
1502	REF 1		25,2203	3 2232 0	CAF	-80DEGSR	GO TO T = -130 (-50).
1503	REF 1		25,2204	6 2231 0	AD	-50DEGSR	
1504	REF 3	LAST 531	25,2205	0 2241 1	TC	RRTONLY	
1505	REF 51	LAST 532	25,2206	4 0110 0	CS	RADMODES	
1506	REF 8	LAST 532	25,2207	7 4740 1	MASK	ANTENBIT	
1507	REF 175	LAST 532	25,2210	10 000 0	CCS	A	
1508	REF 31	LAST 531	25,2211	3 4735 1	CAF	BIT15	GO TO T = -180 (+0).
1509	REF 4	LAST 532	25,2212	0 2241 1	TC	RRTONLY	
1510	REF 52	LAST 532	25,2213	4 0110 0	CS	RADMODES	GO TO S = -90 (+0).
1511	REF 9	LAST 532	25,2214	7 4740 1	MASK	ANTENBIT	
1512	REF 176	LAST 532	25,2215	10 000 0	CCS	A	
1513	REF 6	LAST 530	25,2216	4 4736 0	CS	HALF	
1514	REF 3	LAST 531	25,2217	0 2244 1	TC	RRSONLY	
1515	REF 1		25,2220	0 2233 1	TC	RMODINV	
1516	REF 1		25,2221	4 4736 0	CS	REMOBBIT	END OF REMODE.
1517	REF 53	LAST 532	25,2222	7 0110 0	MASK	RADMODES	
1518	REF 54	LAST 532	25,2223	54 110 0	TS	RADMODES	
1519	REF 2	LAST 530	25,2224	3 4742 1	CAF	DESIGBIT	WAS REMODE CALLED DURING DESIGNATE?
1520	REF 55	LAST 532	25,2225	7 0110 0	MASK	RADMODES	(BIT10 + RADMODES = 1)
1521			25,2226	0 0006 1	EXTEND		
1522	REF 1		25,2227	1 3555 0	BZF	RGDDUEND	NO-RETURN TO CALLER WAITING IN RADSTALL
1523	REF 2	LAST 511	25,2230	0 2602 1	TC	STDESIG	YES -- RETURN TO DESIGNATE
1524	REF 2	LAST 282	7740	-45DEGSR =		13,14,15	
1525			25,2231	67070 1	-50DEGSR DEC	-.27778	
1526			25,2232	61615 1	-80DEGSR DEC	-.44444	
1527	REF 56	LAST 532	25,2233	22 110 1	RMODINV	LXCH	INVERT THE MODE STATUS.
1528	REF 10	LAST 532	25,2234	3 4740 0	CAF	ANTENBIT	
1529			25,2235	0 0006 1	EXTEND		
1530	REF 11	LAST 525	25,2236	06 001 0	RXOR	LCHAN	
1531	REF 57	LAST 532	25,2237	54 110 0	TS	RADMODES	
1532	REF 158	LAST 530	25,2240	0 0002 0	TC	0	

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P1533 PROGRAM NAMES_ RRONLY, RRONLY

R1534 FUNCTIONAL DESCRIPTION_

R1535 RRONLY AND RRONLY ARE SUBROUTINES FOR DOING SINGLE AXIS

R1536 RR-MANEUVERS FOR REMODE AND REPOSITION. IT DRIVES TO

R1537 WITHIN 1 DEGREE. INITIALLY, AT RRIAX2, THE REMODE AND REPOSITION

R1538 FLAGS (RADMODES BITS 14, 11) ARE CHECKED. IF BOTH EXIST,

R1539 THE PROGRAM EXITS TO REPOSRT (SEE DORREPOS). THIS INDICATES

R1540 THAT SOMEONE POSSIBLY REQUESTED A DESIGNATE (RADMODES BIT 10)

R1541 WHICH REQUIRES A REMODE (RADMODES BIT 14) AND THAT A

R1542 REPOSITION IS IN PROGRESS (RADMODES BIT 11). IF NONE

R1543 OR ONLY ONE OF THE FLAGS EXIST, REMODE OR REPOSITION, MAGSUB

R1544 IS CALLED TO SEE IF THE APPROPRIATE ANGLE IS WITHIN 1 DEGREE. IF YES,

R1545 CONTROL RETURNS TO THE CALLING ROUTINE. IF NOT, CONTROL IS

R1546 TRANSFERRED TO RRROT FOR SINGLE AXIS MANEUVERS WITH THE OTHER

R1547 ANGLE SET = 0. FOLLOWING A .5 SECOND WAIT, THE ABOVE PROCEDURE IS

R1548 REPEATED.

R1549 CALLING SEQUENCE: L-1 CAF *ANGLE* (DESIRED ANGLE SCALED PI)

R1550 L TC RRONLY (TRUNION ONLY)

R1551 RRONLY (SHAFT ONLY)

R1552 RRONLY IS CALLED BY PREPOS29;

R1553 RRONLY AND RRONLY ARE CALLED BY DORREPOS AND REMODE

R1554 ERASABLE INITIALIZATION REQUIRED:

R1555 C(A) = DESIRED ANGLE, RADMODES

R1556 SUBROUTINES CALLED_

R1557 FIXDELAY, REPOSRT, MAGSUB, RRROT

R1558 JOBS OR TASKS INITIATED_

R1559 NONE

R1560 ALARMS_ NONE

R1561 EXIT_ REPOSRT (REMODE AND REPOSITION FLAGS PRESENT - RADMODES

R1562 BITS 14, 11)

R1563 L+1 (ANGLE WITHIN ONE DEGREE OR RR OUT OF AUTO MODE)

1564	REF	2	LAST	106	25,2241	55'316 0	RRONLY	TS	RDES	DESIRED TRUNION ANGLE.
1565	REF	115	LAST	528	25,2242	3 4755 1		CAF	ZERO	
1566	REF	1			25,2243	1 2246 1		TCF	RRIAXIS	

1567	REF	3	LAST	523	25,2244	55'316 0	RRONLY	TS	RDES	SHAFT COMMANDS ARE UNRESOLVED SINCE THIS
1568	REF	64	LAST	527	25,2245	3 4753 1		CAF	ONE	ROUTINE ENTERED ONLY WHEN T = 0 OR 180.

1569	REF	1			25,2246	55'317 1	RRIAXIS	TS	RRINDEX	
1570					25,2247	0 0006 1		EXTEND		
1571	REF	4	LAST	528	25,2250	23'315 1		QXCH	RRLET	
1572	REF	1			25,2251	1 2254 1		TCF	RRIAX2	

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1573	REF	7	LAST	529	25,2252	0 5221 0	NXTRR1AX	TC	FIXDELAY	
1574					25,2253	00062 0		DEC	50	2 SAMPLES PER SECOND.
1575	REF	58	LAST	532	25,2254	4 0110 0	RR1AX2	CS	RADMODES	IF SOMEONE REQUESTES AS DESIGNATE WHICH
1576	REF	2	LAST	290	25,2255	7 7710 1		MASK	PRI022	REQUIRES A REMODE AND A REPOSITION IS IN
1577					25,2256	0 0006 1		EXTEND		PROGRESS, INTERRUPT IT AND START THE
1578	REF	1			25,2257	1 2144 0		BZF	REPOSRPT	REMODE IMMEDIATELY.
1579	REF	4	LAST	533	25,2260	3 1316 1		CA	RDES	
1580					25,2261	0 0006 1		EXTEND		
1581	REF	2	LAST	533	25,2262	5 1317 0		INDEX	RRINDEX	
1582	REF	7	LAST	528	25,2263	20 035 0		MSU	CDUT	
1583	REF	9	LAST	523	25,2264	54 061 1		TS	ITEMP1	SAVE ERROR SIGNAL.
1584					25,2265	0 0006 1		EXTEND		
1585	REF	1			25,2266	7 2305 1		MP	RRSPGAIN	TRIES TO NULL .7 OF ERROR OVER NEXT .5
1586	REF	71	LAST	525	25,2267	54 001 1		TS	L	
1587	REF	59	LAST	534	25,2270	3 0110 1		CA	RADMODES	
1588	REF	3	LAST	184	25,2271	7 4752 1		MASK	AUTOMBIT	
1589	REF	10	LAST	534	25,2272	56 061 0		XCH	ITEMP1	STORE RR-OUT-OF-AUTO-MODE BIT.
1590	REF	6	LAST	528	25,2273	0 4512 0		TC	MAGSUB	SEE IF WITHIN ONE DEGREE.
1591					25,2274	77544 1		DEC	-.00555	SCALED IN HALF-REVS.
1592	REF	11	LAST	534	25,2275	10 061 1		CCS	ITEMP1	NO. IF RR OUT OF AUTO MODE, EXIT.
1593	REF	5	LAST	533	25,2276	0 1315 1		TC	RRRET	RETURN TO CALLER.
1594	REF	3	LAST	534	25,2277	11 317 1		CCS	RKINDEX	COMMAND FOR OTHER AXIS IS ZERO.
1595					25,2300	1 2302 0		TCF	+2	SETTING A TO 0.
1596	REF	72	LAST	534	25,2301	56 001 0		XCH	L	
1597	REF	8	LAST	508	25,2302	53 110 1		DXCH	TANG	
1598	REF	1			25,2303	0 2306 0		TC	RROUT	
1599	REF	1			25,2304	1 2252 1		TCF	NXTRR1AX	COME BACK IN .5 SECONDS.
1600					25,2305	22715 1	RRSPGAIN	DEC	.59062	NULL .7 ERROR IN .5 SEC.

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P1601 PROGRAM NAME_ RR0UT

RROR COUNTER SCALING. RR0UT LIMITS THEM

R1603 FUNCTIONAL DESCRIPTION_

R1604 RR0UT RECEIVES RR GYRO COMMANDS IN TANG, TANG +1 IN RR
 R1605 ERROR COUNTER SCALING. RR0UT THEN LIMITS THEM AND
 R1606 GENERATES COMMANDS TO THE CDU TO ADJUST THE ERROR COUNTERS
 R1607 TO THE DESIRED VALUES. INITIALLY MAGSUB CHECKS THE MAGNITUDE OF
 R1608 THE COMMAND (SHAFT ON 1ST PASS) TO SEE IF IT IS GREATER THAN
 R1609 384 PULSES. IF NOT, CONTROL IS TRANSFERRED TO RR0UTLIM TO
 R1610 LIMIT THE COMMAND TO +384 OR -384 PULSES. THE DIFFERENCE IS
 R1611 THEN CALCULATED BETWEEN THE DESIRED STATE AND THE PRESENT STATE OF
 R1612 THE ERROR COUNTER AS RECORDED IN LASTYCMD AND LASTXCMD.
 R1613 THE RESULT IS STORED IN OPTXCMD (1ST PASS) AND OPTYCMD (2ND
 R1614 PASS). FOLLOWING THE SECOND PASS, FOR THE TRUNNION COMMAND, THE
 R1615 OCDUT AND OCDUS ERROR COUNTER DRIVE BITS (CHAN 14 BITS 12, 11)
 R1616 ARE SET. THIS PROGRAM THEN EXITS TO THE CALLING PROGRAM.

R1617 CALLING SEQUENCE:

R1618 L TO RR0UT (WITH RUPT INHIBITED) RR0UT IS CALLED BY
 R1619 RRONLY, RRONLY, AND DODES

R1620 ERASABLE INITIALIZATION REQUIRED:

R1621 TANG, TANG +1 (DESIRED COMMANDS), LASTYCMD, LASTXCMD
 R1622 (1ST PASS = 0), PR ERROR COUNTER ENABLE SET (CHAN 12 BIT 2).

R1623 SUBROUTINES CALLED_

R1624 MAGSUB

R1625 JOBS OR TASKS INITIATED_

R1626 NONE

R1627 ALARMS_ NONE

R1628 EXIT_ L+1 (ALWAYS)

SIRED VALUES. RUPT MUST BE INHIBITED.

1630	REF 159	LAST 532	25,2306	22 002 0	RR0UT	LXCH	Q	SAVE RETURN.
1631	REF 65	LAST 533	25,2307	3 4753 1		CAF	ONE	LOOP TWICE.
1632	REF 5	LAST 523	25,2310	54 062 1	RR0UT2	TS	ITEMP2	
1633	REF 177	LAST 532	25,2311	50 000 1		INDEX	A	
1634	REF 9	LAST 534	25,2312	3 1107 0		CA	TANG	
1635	REF 12	LAST 534	25,2313	54 061 1		TS	ITEMP1	SAVE SIGN OF COMMAND FOR LIMITING.
1636	REF 7	LAST 534	25,2314	0 4512 0		TC	MAGSUB	SEE IF WITHIN LIMITS.
1637			25,2315	77177 0	-RRLIMIT	DEC	-384	
1638	REF 1		25,2316	1 2335 1		TCF	RR0UTLIM	LIMIT COMMAND TO MAG OF 384.
1639	REF 13	LAST 535	25,2317	3 0061 0	SETRRCTR	CA	ITEMP1	COUNT OUT DIFFERENCE BETWEEN DESIRED
1640	REF 6	LAST 535	25,2320	50 062 0		INDEX	ITEMP2	STATE AND PRESENT STATE AS RECORDED IN
1641	REF 8	LAST 530	25,2321	56 112 0		XCH	LASTYCMD	LASTYCMD AND LASTXCMD
1642			25,2322	4 0000 0		COM		

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1643	REF	14	LAST	535	25,2323	6 0061 0	AD	ITEMP1	
1644	REF	9	LAST	231	25,2324	6 4754 0	AD	NEGO	PREVENT +0 IN OUTCOUNTER
1645	REF	7	LAST	535	25,2325	50 062 0	INDEX	ITEMP2	
1646	REF	1			25,2326	54 053 0	TS	CDUTCMD	
1647	REF	8	LAST	536	25,2327	10 062 1	CCS	ITEMP2	PROCESS BOTH INPUTS.
1648	REF	1			25,2330	1 2310 0	TCF	RROUT2	
1649	REF	1			25,2331	3 5020 0	CAF	PRI06	ENABLE COUNTERS.
1650					25,2332	0 0006 1	EXTEND		
1651	REF	7	LAST	282	25,2333	05 014 1	WOR	CHAN14	PUT ON CDU DRIVES S AND T
1652	REF	73	LAST	534	25,2334	0 0001 0	TC	L	RETURN.
1653	REF	15	LAST	536	25,2335	10 061 1	RROUTLIM	CCS	ITEMP1
1654	REF	1			25,2336	4 2315 0	CS	-RRLIMIT	LIMIT COMMAND TO ABS VAL OF 384.
1655					25,2337	1 2341 1	TCF	+2	
1656	REF	2	LAST	536	25,2340	3 2315 1	CA	-RRLIMIT	
1657	REF	16	LAST	536	25,2341	54 061 1	TS	ITEMP1	
1658	REF	1			25,2342	1 2320 0	TCF	SETRKCTR +1	

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P1659 ROUTINE TO ZERO THE RR CDUS AND DETERMINE THE ANTENNA MODE.

1660	REF	1		25,2343	3 2372 0	RRZERO	CAF	BIT11+1	SEE IF MONITOR REPOSITION OR NOT IN AUTO
1661	REF	60	LAST	534	25,2344	7 0110 0	MASK	RADMODES	IF SO, DONT RE-ZERO CDUS.
1662	REF	178	LAST	535	25,2345	10 000 0	CCS	A	
1663	REF	1			25,2346	1 3530 0	TCF	RADNOOP	(IMMEDIATE TASK TO RGOODEND).
1664					25,2347	0 0004 0		INHINT	
1665	REF	4	LAST	527	25,2350	4 4737 1	CS	RCDJOBIT	SET FLAG TO SHOW ZEROING IN PROGRESS.
1666	REF	61	LAST	537	25,2351	7 0110 0	MASK	RADMODES	
1667	REF	5	LAST	537	25,2352	6 4737 0	AD	RCDUOBIT	
1668	REF	62	LAST	537	25,2353	54 110 0	TS	RADMODES	
1669	REF	66	LAST	535	25,2354	3 4753 1	CAF	ONE	
1670	REF	20	LAST	490	25,2355	0 5203 0	TC	WAITLIST	
1671	REF	22	LAST	526	E7,1456		EBANK=	LOSCOUNT	
1672	REF	1			25,2356	02370 1	2CADR	RRZ2	
1672	REF	1			25,2357	52067 1			
1673	REF	63	LAST	537	25,2360	4 0110 0	CS	RADMODES	SEE IF IN AUTO MODE.
1674	REF	4	LAST	534	25,2361	7 4752 1	MASK	AUTOMBIT	
1675	REF	179	LAST	537	25,2362	10 000 0	CCS	A	
1676	REF	1			25,2363	1 2366 1	TCF	ROADBACK	
1677	REF	21	LAST	388	25,2364	0 5567 0	TC	ALARM	AUTO DISCRETE NOT PRESENT - TRYING
1678					25,2365	00510 0	OCT	510	
1679					25,2366	0 0003 1	ROADBACK	RELINT	
1680	REF	3	LAST	328	25,2367	1 4631 0	TCF	SWRETURN	
1681	REF	2	LAST	526	25,2370	0 2071 0	RRZ2	RRZEROSB	COMMON TO TURNON AND RRZERO.
1682	REF	1			25,2371	1 3546 1	TCF	ENDRADAR	
1683					25,2372	02001 1	BIT11+1	OCT	02001

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P1684 PROGRAM NAME_ RRDESSM

R (HALF-UNIT) IN RRTARGET. REMODES IF

R1686 FUNCTIONAL DESCRIPTION_

R1687 THIS INTERPRETIVE ROUTINE WILL DESIGNATE, IF DESIRED ANGLES ARE

R1688 WITHIN THE LIMITS OF EITHER MODE, TO A LINE-OF SIGHT (LOS) VECTOR

R1689 (HALF-UNIT) KNOWN WITH RESPECT TO THE STABLE MEMBER PRESENT

R1690 ORIENTATION. INITIALLY THE IMU CDUS ARE READ AND CONTROL

R1691 TRANSFERRED TO SMNB TO TRANSFORM THE LOS VECTOR FROM STABLE

R1692 MEMBER TO NAVIGATION BASE COORDINATES (SEE STG MEMO -699)

R1693 RRANGLES IS THEN CALLED TO CALCULATE THE RR GIMBAL ANGLES,

R1694 TRUNNION AND SHAFT, FOR BOTH THE PRESENT AND ALTERNATE MODE.

R1695 RRLIMCHK IS CALLED TO SEE IF THE ANGLES CALCULATED FOR THE

R1696 PRESENT MODE ARE WITHIN LIMITS. IF WITHIN LIMITS, THE RETURN

R1697 LOCATION IS INCREMENTED, INASMUCH AS NO VEHICLE MANEUVER IS

R1698 REQUIRED. BEFORE EXITING TO STARTDES. IF NOT WITHIN LIMITS OF THE

R1699 CURRENT MODE, TRYSHS IS CALLED. FOLLOWING INVERTING OF THE RR

R1700 ANTENNA MODE FLAG (RADMODES BIT 12), RRLIMCHK IS CALLED

R1701 TO SEE IF THE ANGLES CALCULATED FOR THE ALTERNATE MODE ARE WITHIN

R1702 LIMITS. IF YES, THE RR ANTENNA MODE FLAG IS AGAIN INVERTED,

R1703 THE REMODE FLAG (RADMODES BIT 14) SET, AND THE RETURN LOCATION

R1704 INCREMENTED, TO INDICATE NO VEHICLE MANEUVER IS REQUIRED. BEFORE

R1705 EXITING TO STARTDES. IF THESE ANGLES ARE NOT WITHIN LIMITS

R1706 OF THE ALTERNATE MODE, THE RR ANTENNA MODE FLAG (RADMODES

R1707 BIT 12) IS INVERTED BEFORE RETURNING DIRECTLY TO THE CALLING PROGRAM

R1708 TO INDICATE THAT A VEHICLE MANEUVER IS REQUIRED.

R1709 CALLING SEQUENCE:

R1710 L STCALL RRTARGET (LOS HALF-UNIT VECTOR IN SM COORDINATES)

R1711 L+1 RRDESSM

R1712 L+2 BASIC (VEHICLE MANEUVER REQUIRED)

R1713 L+3 BASIC (NO VEHICLE MANEUVER REQUIRED)

R1714 ERASABLE INITIALIZATION REQUIRED:

R1715 RRTARGET, RADMODES

R1716 SUBROUTINES CALLED_

R1717 READCDUS, SMNB, RRANGLES, RRLIMCHK, TRYSHS (ACTUALLY

R1718 PART OF), RMODINV

R1719 JOBS OR TASKS INITIATED_

R1720 NONE

R1721 ALARMS_ NONE

R1722 EXIT_ L+2 (NEITHER SET OF ANGLES ARE WITHIN LIMITS OF RELATED MODE)

R1723 STARTDES (DESIGNATE POSSIBLE AT PRESENT VEHICLE ATTITUDE-RETURNS

R1724 TO L+3 FROM STARTDES)

CAN BE DONE IN PRESENT VEH ATTITUDE.

1726 25.2373 43020-1 RRDESSM STQ CLEAR

1727 REF 4 LAST 271 25.2374 01113 0 DESRET

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1728	REF	1		25,2375	00271 0		RRNBSW	
1729				25,2376	77624 1	CALL		COMPUTES SINES AND COSINES, ORDER Y Z X
1730	REF	2	LAST 487	25,2377	47537 0		CDUTKIG	
1731				25,2400	45175 0	VLOAD	CALL	LOAD VECTOR AND CALL TRANSFORMATION
1732	REF	4	LAST 518	25,2401	01102 0		RRTARGET	
1733	REF	2	LAST 487	25,2402	47671 1		*SMNB*	
1734				25,2403	77624 1	CALL		GET RR GIMBAL ANGLES IN PRESENT AND
1735	REF	1		25,2404	26133 1		RRANGLES	ALTERNATE MODE.
1736				25,2405	77776 1	EXIT		
1737				25,2406	0 0004 0	INHINT		
1738	REF	3	LAST 513	25,2407	0 4523 1	TC	RRLEIMCHK	
1739	REF	4	LAST 323	25,2410	01107 0	ADRES	MODEA	CONFIGURATION FOR CURRENT MODE.
1740				25,2411	0 2414 1	TC	+3	NOT IN CURRENT MODE
1741	REF	5	LAST 538	25,2412	25 113 0	OKDESSM	INCR	INCREMENT SAYS NO VEHICLE MANEUVER REQ.
1742	REF	1		25,2413	0 2432 0	TC	STARTDES	SHOW DESIGNATE REQUIRED
1743	REF	5	LAST 507	25,2414	4 0104 0	CS	FLAGWRD8	
1744	REF	4	LAST 507	25,2415	7 4744 0	MASK	SURFFBIT	CHECK IF ON LUNAR SURFACE (SURFFLAG=P22F
1745				25,2416	0 0006 1	EXTEND		
1746	REF	1		25,2417	1 2456 0	BZF	NORDSTAL	BRANCH-YES-CANNOT DESIGNATE IN MODE 2
1747	REF	1		25,2420	0 2461 0	TC	TRYSWS	
1748	REF	6	LAST 539	25,2421	4 0104 0	LUNDESCH	CS	OVERFLOW RETURN FROM RRANGLES
1749	REF	5	LAST 539	25,2422	7 4744 0		MASK	CHECK IF ON LUNAR SURFACE
1750				25,2423	0 0006 1		EXTEND	
1751	REF	2	LAST 539	25,2424	1 2456 0		BZF	BRANCH-YES-RETURN TO CALLER - ALARM 527
1752	REF	37	LAST 519	25,2425	3 0074 1		CA	STATE
1753	REF	9	LAST 504	25,2426	7 4745 1		MASK	RNDVZBIT
1754	REF	180	LAST 537	25,2427	10 000 0		CCS	A
1755	REF	1		25,2430	0 2471 1		TC	NODESSM
1756	REF	87	LAST 519	25,2431	1 5155 1		TCF	ENDOFJOB
								TEST RNDVZFLG.
								NOT ON MOON-CALL FOR ATTITUDE MANEUVER
								...BUT NOT IN R29.

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P1757 PROGRAM NAME_ STARTDES

STORED AS A HALF-UNIT VECTOR IN RRIARGET

R1759 FUNCTIONAL DESCRIPTION_

CKON IS DESIRED. BIT14 OF RADMODES IS
OR REPOSITION OPERATION. IN THIS
THE REPOSITION WILL BE INTERRUPTED.
GINS.

R1761 STARTDES IS ENTERED WHEN WE ARE READY TO BEGIN DESIGNATION.

R1763 BIT 14 OF RADMODES IS ALREADY SET IF A REMODE IS REQUIRED.

R1765 AT THIS TIME, THE RR ANTENNA MAY BE IN A REPOSITION

R1767 OPERATION. IN THIS CASE, IF A REMODE IS REQUIRED IT MAY HAVE

R1768 ALREADY BEGUN BUT IN ANY CASE THE REPOSITION WILL BE INTERRUPTED.

R1769 OTHERWISE, THE REPOSITION WILL BE COMPLETED BEFORE 2-AXIS

R1770 DESIGNATION BEGINS. INITIALLY DESCOUNT IS SET = 60 TO INDICATE

R1771 THAT 30 SECONDS WILL BE ALLOWED FOR THE RR DATA GOOD INBIT

R1772 (CHAN 33 BIT 4) IF LOCK-ON IS DESIRED (STATE BIT 5). BIT 10

R1773 OF RADMODES IS SET TO SHOW THAT A DESIGNATE IS REQUIRED.

R1774 THE REPOSITION FLAG (RADMODES BIT 11) IS CHECKED. IF SET,

R1775 THE PROGRAM EXITS TO L+3 OF THE CALLING PROGRAM (SEE RRDESSM

R1776 AND RRDESNB). THE PROGRAM WILL BEGIN DESIGNATING TO THE DESIRED

R1777 ANGLES FOLLOWING THE REPOSITION OR REMODE IF ONE WAS

R1778 REQUESTED. IF THE REPOSITION FLAG IS NOT SET, SETRPECR IS CALLED

R1779 WHICH SETS THE RR ERROR COUNTER ENABLE BIT (CHAN 12 BIT 2)

R1780 AND SETS LASTYCMD AND LASTXCMD = 0 TO INDICATE THE

R1781 DIFFERENCE BETWEEN THE PRESENT AND DESIRED STATE OF THE ERROR

R1782 COUNTERS. A 20 MILLISECOND WAITLIST CALL IS SET FOR BEGDES

R1783 AFTER WHICH THE PROGRAM EXITS TO L+3 OF THE CALLING PROGRAM.

R1784 CALLING SEQUENCE:

R1785 FROM RRDESSM AND RRDESNB WHEN ANGLES WITHIN LIMITS.

R1786 ERASABLE INITIALIZATION REQUIRED:

R1787 RADMODES, (SEE DODES)

R1788 SUBROUTINES CALLED_

R1789 SETRPECR, WAITLIST

R1790 JOBS OR TASKS INITIATED_

R1791 BEGDES

R1792 ALARMS_ NONE

R1793 EXIT_ L+3 OF CALLING PROGRAM (SEE RRDESSM)

R1794 L+2 OF CALLING PROGRAM (SEE RRDESNB)

1795 REF 6 LAST 539 25,2432 25,113 0 STARTDES INCR DESRET

1796 REF 64 LAST 537 25,2433 4 0110 0 CS RADMODES

1797 REF 3 LAST 532 25,2434 7 4742 0 MASK DESIGBIT

1798 REF 65 LAST 540 25,2435 26 110 0 ADS RADMODES

1799 REF 3 LAST 530 25,2436 7 4741 0 MASK REPOSBIT

1800 REF 181 LAST 539 25,2437 10 000 0 CCS A

1801 REF 1 25,2440 1 2446 1 TCF DESRETRN

SEE IF REPOSITIONING IN PROGRESS.

ECTR ALREADY SET UP.

1802 REF 2 LAST 529 25,2441 0 2156 1 TC SETRPECR

SET UP ERROR COUNTERS.

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1803 REF 34 LAST 506 25,2442 3 4752 0
 1804 REF 21 LAST 537 25,2443 0 5203 0
 1805 REF 23 LAST 537 E7,1456
 1806 REF 3 LAST 530 25,2444 02573 1
 1806 25,2445 52067 1

CAF TWO
 TC WAITLIST
 EBANK= LOSCOUNT
 2CADR BEGDES

1807 REF 3 LAST 516 25,2446 3 1306 0
 1808 25,2447 0 0006 1
 1809 REF 1 25,2450 1 2452 1
 1810 REF 88 LAST 539 25,2451 0 5155 0
 1811 25,2452 0 0003 1
 1812 REF 7 LAST 540 25,2453 25 113 0
 1813 REF 8 LAST 541 25,2454 3 1113 0
 1814 REF 9 LAST 519 25,2455 1 4640 0

DESRETRN CA RADCADR
 EXTEND
 BZF DESRTRN
 TC ENDOFJOB
 RELINT
 INCR DESRET
 CA DESRET
 TCF BANKJUMP

FIRST PASS THRU DESIGNATE

YES SET EXIT
 NO

1815 REF 116 LAST 533 25,2456 3 4755 1
 1816 REF 4 LAST 541 25,2457 55 306 1
 1817 REF 2 LAST 541 25,2460 1 2452 1

NORDSTAL CAF ZERO
 TS RADCADR
 TCF DESRTRN

ZERO RADCADR TO WIPE OUT ANYONE
 WAITING IN RADSTALL SINCE WE ARE NOW
 RETURNING TO P20 AND MAY DO NEW RADSTALL

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P1818 SEE IF RRDESSM CAN BE ACCOMPLISHED AFTER A REMODE.

1819	REF	2	LAST	532	25,2461	0 2233 1	TRYSWS	TC	RMODINV	(NOTE- RUPT INHIBIT)
1820	REF	4	LAST	539	25,2462	0 4523 1		TC	RRLIMCHK	TRY DIFFERENT MODE.
1821	REF	4	LAST	323	25,2463	01111 1		ADRES	MODEB	
1822	REF	2	LAST	539	25,2464	1 2471 0		TCF	NODESSM	VEHICLE MANEUVER REQUIRED.
1823	REF	3	LAST	542	25,2465	0 2233 1		TC	RMODINV	RESET BIT12
1824	REF	2	LAST	532	25,2466	3 4736 1		CAF	REMOBBIT	SET FLAG FOR REMODE.
1825	REF	66	LAST	540	25,2467	26 110 0		ADS	RADMODES	
1826	REF	1			25,2470	1 2412 0		TCF	OKDESSM	
1827	REF	4	LAST	542	25,2471	0 2233 1	NODESSM	TC	RMODINV	RE-INVERT MODE AND RETURN
1828	REF	9	LAST	541	25,2472	25 113 0		INCR	DESKET	TO CALLER +2
1829	REF	3	LAST	539	25,2473	1 2456 0		TCF	NORDSTAL	
1830					25,2474	00074 1	MAXTRYS	DEC	60	

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P1831 DESIGNATE TO SPECIFIC RR GIMBAL ANGLES (INDEPENDENT OF VEHICLE MOTION). ENTER WITH DESIRED ANGLES IN
 R1833 TANG AND TANG +1.

1834	REF	6	LAST	517	25,2475	0 4645 1	RRDES NB	TC	MAKECADR	
1835	REF	10	LAST	542	25,2476	55 113 1		TS	DESRET	
1836	REF	49	LAST	519	25,2477	0 5516 0		TC	DOWNFLAG	RESET FLAG TO PREVENT DODES FROM GOING
1837	REF	6	LAST	515	25,2500	00041 1		ADRES	LOSCMFLG	BACK TO R21
1838	REF	1			25,2501	3 2474 1		CA	MAXTRYS	SET TIME LIMIT COUNTER
1839	REF	2	LAST	509	25,2502	55 114 0		TS	DESCOUNT	FOR DESIGNATE
1840					25,2503	0 0004 0		INHINT		SEE IF CURRENT MODE OK.
1841	REF	1			25,2504	0 2540 1		TC	RRLIMNB	DO SPECIAL V41 LIMIT CHECK
1842	REF	10	LAST	535	25,2505	01107 0		ADRES	TANG	
1843	REF	1			25,2506	1 2523 0		TCF	TRYSWN	SEE IF IN OTHER MODE.
1844					25,2507	0 0003 1	OKDES NB	RELINT		
1845					25,2510	0 0006 1		EXTEND		
1846	REF	11	LAST	543	25,2511	3 1110 0		DCA	TANG	
1847	REF	6	LAST	324	25,2512	53 753 0		DXCH	TANGNB	
1848	REF	44	LAST	518	25,2513	0 6037 0		TC	INTPRET	
1849					25,2514	77624 1		CALL		GET LOS IN NB COORDS.
1850	REF	1			25,2515	46041 0			RRNB	
1851	REF	5	LAST	539	25,2516	01102 0		STORE	RRTARGET	
1852					25,2517	77414 0		SET	EXIT	
1853	REF	2	LAST	539	25,2520	00071 1			RRNBSW	
1854					25,2521	0 0004 0		INHINT		
1855	REF	2	LAST	539	25,2522	1 2433 0		TCF	STARTDES +1	
1856	REF	5	LAST	542	25,2523	0 2233 1	TRYSWN	TC	RMODINV	SEE IF OTHER MODE WILL DO.
1857	REF	2	LAST	543	25,2524	0 2540 1		TC	RRLIMNB	DO SPECIAL V41 LIMIT CHECK
1858	REF	12	LAST	543	25,2525	01107 0		ADRES	TANG	
1859	REF	1			25,2526	1 2533 1		TCF	NODES NB	NOT POSSIBLE.
1860	REF	6	LAST	543	25,2527	0 2233 1		TC	RMODINV	
1861	REF	3	LAST	542	25,2530	3 4736 1		CAF	REMOBIT	CALL FOR REMODE.
1862	REF	67	LAST	542	25,2531	26 110 0		ADS	RADMODES	
1863	REF	1			25,2532	1 2507 0		TCF	OKDES NB	
1864	REF	7	LAST	543	25,2533	0 2233 1	NODES NB	TC	RMODINV	REINVERT MODE BIT.
1865	REF	22	LAST	537	25,2534	0 5567 0		TC	ALARM	BAD INPUT ANGLES.
1866					25,2535	00502 0		OCT	502	
1867	REF	9	LAST	516	25,2536	0 6011 1		TC	CLRADMOD	
1868	REF	89	LAST	541	25,2537	0 5155 0		TC	ENDOFJOB	AVOID 503 ALARM.
1869	REF	160	LAST	535	25,2540	50 002 0	RRLIMNB	INDEX	Q	THIS ROUTINE IS IDENTICAL TO RRLIMCHK
1870					25,2541	3 0000 1		CAF	0	EXCEPT THAT THE MODE 1 SHAFT LOWER
1871	REF	161	LAST	543	25,2542	24 002 0		INCR	Q	LIMIT IS -85 INSTEAD OF -70 DEGREES
1872					25,2543	0 0006 1		EXTEND		

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1873	REF 182	LAST 540	25,2544	5 0000 1	INDEX A	READ GIMBAL ANGLES INTO ITEMP STORAGE
1874			25,2545	3 0001 0	DCA 0	
1875	REF 17	LAST 536	25,2546	52 062 1	DXCH ITEMP1	
1876	REF 162	LAST 543	25,2547	22 002 0	LXCH Q	L(CALLER +2) TO L
1877	REF 11	LAST 532	25,2550	3 4740 0	CAF ANTENBIT	SEE WHICH MODE RR IS IN.
1878	REF 68	LAST 543	25,2551	7 0110 0	MASK RADMODES	
1879	REF 183	LAST 544	25,2552	10 000 0	CCS A	
1880	REF 2	LAST 522	25,2553	1 4550 1	TCF MODE2CHK	MODE 2 CAN USE RRLIMCHK CODING
1881	REF 18	LAST 544	25,2554	3 0061 0	CA ITEMP1	
1882	REF 8	LAST 535	25,2555	0 4512 0	TC MAGSUB	MODE 1 IS DEFINED AS
1883			25,2556	66161 1	DEC -.30555	1. ABS(T) L 55 DEGS
1884	REF 74	LAST 536	25,2557	0 0001 0	TC L	2 SHAFT LIMITS AT +59, -85 DEGS
1885	REF 9	LAST 536	25,2560	3 0062 0	CA ITEMP2	LOAD SHAFT ANGLE
1886			25,2561	0 0006 1	EXTEND	
1887	REF 1		25,2562	6 2570 1	BZMF NEGSHAFT	IF NEGATIVE SHAFT ANGLE, ADD 20.5 DEGS
1888	REF 2	LAST 523	25,2563	6 4562 1	AD 5.5DEGS	
1889	REF 9	LAST 544	25,2564	0 4512 0	SHAFTLIM TC MAGSUB	
1890			25,2565	64420 0	DEC -.35833	64.5 DEGREES
1891	REF 75	LAST 544	25,2566	0 0001 0	TC L	NOT IN LIMITS
1892	REF 2	LAST 523	25,2567	0 4560 0	TC RRLIMOK	IN LIMITS
1893	REF 1		25,2570	6 2572 0	NEGSHAFT AD 20.5DEGS	MAKE NEGATIVE SHAFT LIMIT -85 DEGREES
1894	REF 1		25,2571	1 2564 0	TCF SHAFTLIM	

1895 25,2572 03512 1 20.5DEGS DEC .11389

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P1896 PROGRAM NAME_ BEGDES

R1897 FUNCTIONAL DESCRIPTION_

R1898 BEGDES CHECKS VARIOUS DESIGNATE REQUESTS AND REQUESTS THE
 R1899 ACTUAL RR DESIGNATION. INITIALLY A CHECK IS MADE TO SEE IF A
 R1900 REMODE (RADMODES BIT 14) IS REQUESTED OR IN PROGRESS. IF SO,
 R1901 CONTROL IS TRANSFERRED TO STDESIG AFTER ROUTINE REMODE IS
 R1902 EXECUTED. IF NO REMODE, STDESIG IS IMMEDIATELY CALLED WHERE
 R1903 FIRST THE REPOSITION FLAG (RADMODES BIT 11) IS CHECKED. IF
 R1904 PRESENT, THE DESIGNATE FLAG (RADMODES BIT 10) IS REMOVED
 R1905 AFTER WHICH THE PROGRAM EXITS TO RDBADEND. IF THE REPOSITION
 R1906 FLAG IS NOT PRESENT, THE CONTINUOUS DESIGNATE FLAG (RADMODES
 R1907 BIT 15) IS CHECKED. IF PRESENT, ON EXECUTIVE CALL IS IMMEDIATELY
 R1908 MADE FOR DODES AFTER WHICH A .5 SECOND WAIT IS INITIATED BEFORE
 R1909 REPEATING AT STDESIG. IF THE RR SEARCH ROUTINE (LRS24.1) IS DESIGNATING
 R1910 TO A NEW POINT (NEWPTFLG SET) THE CURRENT DESIGNATE TASK IS TERMINATED.
 R1911 IF CONTINUOUS DESIGNATE IS NOT WANTED, THE DESIGNATE FLAG (RADMODES
 R1912 BIT 10) IS CHECKED. IF NOT PRESENT, THE PROGRAM EXITS TO ENDRADAR TO
 R1913 CHECK RR CDU FAIL BEFORE RETURNING TO THE CALLING PROGRAM. IF DESIGNATE
 R1914 IS STILL REQUIRED, DESCOUNT IS CHECKED TO SEE IF THE 30 SECONDS HAS
 R1915 EXPIRED BEFORE RECEIVING THE RR DATA GOOD (CHAN 33 BIT 4)
 R1916 SIGNAL. IF OUT OF TIME, PROGRAM ALARM 00503 IS REQUESTED, THE
 R1917 RR AUTO TRACKER ENABLE AND RR ERROR COUNTER ENABLE
 R1918 (CHAN 12 BITS 14,2) BITS REMOVED, AND THE DESIGNATE FLAG
 R1919 (RADMODES BIT 10) REMOVED BEFORE EXITING TO RDBADEND. IF
 R1920 TIME HAS NOT EXPIRED, DESCOUNT IS DECREMENTED. THE
 R1921 EXECUTIVE CALL MADE FOR DODES, AND A .5 SECOND WAIT INITIATED
 R1922 BEFORE REPEATING THIS PROCEDURE AT STDESIG.

R1923 CALLING SEQUENCE:

R1924 WAITLIST CALL FROM STARTDES

R1925 TCF BEGDES FROM DORREPOS

R1926 TC STDESIG RETURNING. FROM REMODE

R1927 ERASABLE INITIALIZATION REQUIRED:

R1928 DESCOUNT, RADMODES

R1929 SUBROUTINES CALLED_

R1930 ENDRADAR, FINDVAC

R1931 JOBS OR TASKS INITIATED_ DODES

R1932 ALARMS_ PROGRAM ALARM 00503 (30 SECONDS HAVE EXPIRED) WITH NO RR DATA
 R1933 GOOD (CHAN 33 BIT 4) RECEIVED WHEN LOCK-ON (STATE BIT 5) WAS REQUESTED.

R1934 EXIT_ TASKOVER (SEARCH PATTERN DESIGNATING TO NEW POINT)

R1935 ENDRADAR (NO DESIGNATE - RADMODES BIT 10)

R1936 RDBADEND (REPOSITION OR 30 SECONDS EXPIRED)

1937 REF 69 LAST 544 25,2573 4 0110 0 BEGDES CS RADMODES

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1938	REF 4	LAST 543	25,2574	7 4736 0	MASK	REMODBIT	
1939	REF 184	LAST 544	25,2575	10 000 0	CCS	A	
1940	REF 3	LAST 532	25,2576	0 2602 1	TC	STDESIG	
1941	REF 1		25,2577	0 2171 1	TC	REMODE	
1942	REF 8	LAST 534	25,2600	0 5221 0	TC	FIXDELAY	2 SAMPLES PER SECOND.
1943			25,2601	00062 0	DEC	50	
1944	REF 4	LAST 540	25,2602	3 4741 1	STDESIG	CAF	REPOSBIT
1945	REF 70	LAST 545	25,2603	7 0110 0	MASK	RADMODES	SEE IF GIMBAL LIMIT MONITOR HAS FOUND US
1946	REF 185	LAST 546	25,2604	10 000 0	CCS	A	OUT OF BOUNDS. IF SO, THIS BIT SHOWS A
1947	REF 1		25,2605	1 2623 0	TCF	BADDES	REPOSITION TO BE IN PROGRESS.
1948	REF 71	LAST 546	25,2606	10 110 0	CCS	RADMODES	SEE IF CONTINUOUS DESIGNATE WANTED.
1949			25,2607	1 2612 1	TCF	+3	IF SO, DONT CHECK BIT 10 TO SEE IF IN
1950			25,2610	1 2612 1	TCF	+2	LIMITS BUT GO RIGHT TO FINDVAC ENTRY.
1951	REF 1		25,2611	1 2630 1	TCF	MOREDES +1	
1952	REF 72	LAST 546	25,2612	4 0110 0	CS	RADMODES	IF NON-CONTINUOUS, SEE IF END OF
1953	REF 4	LAST 540	25,2613	7 4742 0	MASK	DESIGBIT	PROBLEM (DATA GOOD IF LOCK-ON WANTED OR
1954	REF 186	LAST 546	25,2614	10 000 0	CCS	A	WITHIN LIMITS IF NOT). IF SO, EXIT AFTER
1955	REF 2	LAST 537	25,2615	1 3546 1	TCF	ENDRADAR	CHECKING RR CDU FAIL.
1956	REF 3	LAST 543	25,2616	11 114 0	STDESIG1	CCS	DESCOUNT
1957	REF 2	LAST 546	25,2617	1 2627 1	TCF	MOREDES	SEE IF THE TIME LIMIT HAS EXPIRED
1958	REF 1		25,2620	4 2635 1	CS	B14+B2	IF OUT OF TIME, REMOVE ECR ENABLE + TRKR
1959			25,2621	0 0006 1	EXTEND		
1960	REF 32	LAST 530	25,2622	03 012 1	WAND	CHAN12	
1961	REF 5	LAST 546	25,2623	4 4742 0	BADDES	CS	DESIGBIT
1962	REF 73	LAST 546	25,2624	7 0110 0	MASK	RADMODES	REMOVE DESIGNATE FLAG
1963	REF 74	LAST 546	25,2625	54 110 0	TS	RADMODES	
1964	REF 1		25,2626	1 3562 1	TCF	RDBADEND	
1965	REF 4	LAST 546	25,2627	55 114 0	MOREDES	TS	DESCOUNT
1966	REF 9	LAST 519	25,2630	3 7714 1	CAF	PRIG26	UPDATE GYRO TORQUE COMMANDS.
1967	REF 22	LAST 519	25,2631	0 5105 0	TC	FINDVAC	
1968	REF 24	LAST 541	E7,1456		EBANK=	LOSCOUNT	
1969	REF 1		25,2632	02636 0	2CADR	DODES	
1969	REF 1		25,2633	52067 1			
1970	REF 1		25,2634	1 2600 1	TCF	DESLOOP	
1971			25,2635	20002 1	B14+B2	OCT	20002

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P1972 PROGRAM NAME_ DODES

R1973 FUNCTIONAL DESCRIPTION_

R1974 DODES CALCULATES AND REQUESTS ISSUANCE OF RR GYRO TORQUE
R1975 COMMANDS. INITIALLY THE CURRENT RR CDJ ANGLES ARE STORED AND
R1976 THE LOS HALF-UNIT VECTOR TRANSFORMED FROM STABLE MEMBER TO
R1977 NAVIGATION BASE COORDINATES VIA SMNB IF NECESSARY. THE
R1978 SHAFT AND TRUNNION COMMANDS ARE THEN CALCULATED AS FOLLOWS_
R1979 $+ \text{SHAFT} = \text{LOS} \cdot (\cos(S), 0, -\sin(S))$ (DOT PRODUCT)
R1980 $-\text{TRUNNION} = \text{LOS} \cdot (\sin(T) \sin(S), \cos(T), \sin(T) \cos(S))$
R1981 THE SIGN OF THE SHAFT COMMAND IS THEN REVERSED IF IN MODE 2
R1982 (RADMODES BIT 12) BECAUSE A RELAY IN THE RR REVERSES THE
R1983 POLARITY OF THE COMMAND. AT RRSCALUP EACH COMMAND IS
R1984 SCALED AND IF EITHER, OR BOTH, OF THE COMMANDS IS GREATER THAN
R1985 .5 DEGREES, MPAC +1 IS SET POSITIVE. IF A CONTINUOUS DESIGNATE
R1986 (RADMODES BIT 15) IS DESIRED AND THE SEARCH ROUTINE IS NOT OPERATING,
R1987 THE RR AUTO TRACKER ENABLE BIT (CHAN 12 BIT 14) IS CLEARED AND RRROUT
R1988 CALLED TO PUT OUT THE COMMANDS PROVIDED NO REPOSITION (RADMODES BIT 11)
R1989 IS IN PROGRESS. IF A CONTINUOUS DESIGNATE AND THE SEARCH ROUTINE IS
R1990 OPERATING (SRCHOPT FLAG SET) THE TRACK ENABLE IS NOT CLEARED. IF NO
R1991 CONTINUOUS DESIGNATE AND BOTH COMMANDS ARE NOT LESS THAN .5 DEGREES AS
R1992 INDICATED BY MPAC +1, THE RR AUTO TRACKER ENABLE BIT (CHAN 12 BIT 14) IS
R1993 CLEARED AND RRROUT CALLED TO PUT OUT THE COMMANDS PROVIDED NO REPOSITION
R1994 (RADMODES BIT 11) IS IN PROGRESS. IF BOTH COMMANDS ARE LESS THAN .5
R1995 DEGREES AS INDICATED BY MPAC+1, THE RR AUTO TRACKER ENABLE BIT
R1996 (CHAN 12 BIT 14) IS CLEARED AND RRROUT CALLED TO PUT OUT THE
R1997 COMMANDS PROVIDED NO REPOSITION (RADMODES BIT 11) IS IN
R1998 PROGRESS. IF BOTH COMMANDS ARE LESS THAN .5 DEGREES, THE
R1999 LOCK-ON FLAG (STATE BIT 5) IS CHECKED. IF NOT PRESENT, THE
R2000 DESIGNATE FLAG (RADMODES BIT 10) IS CLEARED, THE RR ERROR
R2001 COUNTER ENABLE BIT (CHAN 12 BIT 2) IS CLEARED, AND ENDOFJOB
R2002 CALLED. IF LOCK-ON IS DESIRED, THE RR AUTO TRACKER (CHAN 12
R2003 BIT 14) IS ENABLED FOLLOWED BY A CHECK OF THE RECEIPT OF THE
R2004 RR DATA GOOD (CHAN 33 BIT 4) SIGNAL. IF RR DATA GOOD
R2005 PRESENT, THE DESIGNATE FLAG (RADMODES BIT 10) IS CLEARED,
R2006 THE RR ERROR COUNTER ENABLE BIT (CHAN 12 BIT 2) IS CLEARED,
R2007 AND ENDOFJOB CALLED. IF RR DATA GOOD IS NOT PRESENT, RRROUT
R2008 IS CALLED TO PUT OUT THE COMMANDS PROVIDED NO REPOSITION
R2009 (RADMODES BIT 11) IS IN PROGRESS AFTER WHICH THE JOB IS TERMINATED
R2010 VIA ENDOFJOB.

R2011 CALLING SEQUENCE:

R2012 EXECUTIVE CALL EVERY .5 SECONDS FROM BEGDES.

R2013 ERASABLE INITIALIZATION REQUIRED:

R2014 RRTARGET (HALF-UNIT LOS VECTOR IN EITHER SM OR NB COORDINATES),
R2015 LOKONSW (STATE BIT 5), RPNBSW (STATE BIT 6), RADMODES

R2016 SUBROUTINES CALLED_

R2017 READCDUS, SMNB, CDULOGIC, MAGSUB, RRJT

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R2018 JOBS OR TASKS INITIATED_
R2019 NONE

R2020 ALARMS_ NONE

R2021 EXIT_ ENDOFJOB (ALWAYS)

2022				25,2636	0 0006 1	DODES	EXTEND	
2023	REF	8	LAST	534	25,2637	3 0036 1	DCA	CDUT
2024	REF	13	LAST	543	25,2640	53 110 1	DXCH	TANG
2025	REF	45	LAST	543	25,2641	0 6037 0	TC	INTPRET
2026				25,2642	77201 1		SETPD	VLOAD
2027				25,2643	00001 0			0
2028	REF	6	LAST	543	25,2644	01102 0		RRTARGET
2029				25,2645	74214 0		BON	VXSC
2030	REF	3	LAST	543	25,2646	00311 1		RRJBSW
2031	REF	1		25,2647	52661 1			DONBRD
2032	REF	1		25,2650	01767 0			MLOSV
2033				25,2651	63372 1		VSL1	PQVL
2034	REF	2	LAST	112	25,2652	01761 0		LOSVEL
2035				25,2653	53361 0		VXSC	VAD
2036	REF	1		25,2654	13072 0			MCTOMS
2037				25,2655	45056 0		UNIT	CALL
2038	REF	3	LAST	539	25,2656	47537 0		CDUTRIG
2039				25,2657	77624 1		CALL	
2040	REF	3	LAST	539	25,2660	47671 1		*SMNB*
2041				25,2661	14041 1	DONBRD	STODL	32D
2042	REF	14	LAST	548	25,2662	01111 1		TANG +1
2043				25,2663	41434 1		RTB	PUSH
2044	REF	11	LAST	374	25,2664	21576 0		CDJLOGIC
2045				25,2665	65356 1		SIN	PDDL
2046				25,2666	41546 0		COS	PUSH
2047				25,2667	65205 0		DMP	PDDL
2048				25,2670	00041 1			32D
2049				25,2671	00045 0			36D
2050				25,2672	44205 0		DMP	BDSU
2051				25,2673	00001 0			0
2052				25,2674	77626 0		STADR	
2053	REF	15	LAST	548	25,2675	76666 0	STORE	TANG +1
								SHAFT COMMAND
2054				25,2676	47135 0		SLOAD	RTB
2055	REF	16	LAST	548	25,2677	01110 0		TANG
2056	REF	12	LAST	548	25,2700	21576 0		CDJLOGIC
2057				25,2701	71406 0		PUSH	COS
								COS(T) TO 4.
2058				25,2702	73525 1		PDDL	SIN
2059				25,2703	41206 0		PUSH	DMP
								SIN(T) TO 6.
2060				25,2704	00003 1			2

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2061	25,2705	65352 0	SL1	PDDL	DEFINE VECTOR U = (SIN(T)SIN(S))
2062	25,2706	00005 1		4	(COS(T))
2063	25,2707	41325 0	PDDL	DMP	(SIN(T)COS(S))
2064	25,2710	00007 0		6	
2065	25,2711	00001 0		0	
2066	25,2712	55552 0	SL1	VDEF	
2067	25,2713	77441 0	DOT	EXIT	DOT J WITH LOS TO GET TRUNNION COMMAND.
2068	25,2714	00041 1		320	

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P2069 AT THIS POINT WE HAVE A ROTATION VECTOR IN DISH AXES LYING IN THE TS PLANE. CONVERT THIS TO A
 R2071 COMMANDED RATE AND ENABLE THE TRACKER IF WE ARE WITHIN .5 DEGREES OF THE TARGET.

2073	REF 235	LAST 520	25,2715	4 0154 0	CS	MPAC	DOT WAS NEGATIVE OF DESIRED ANGLE.
2074			25,2716	0 0006 1	EXTEND		
2075	REF 1		25,2717	7 3066 0	MP	RDESGAIN	SCALING ON INPUT ANGLE WAS 4 RADIANS.
2076	REF 17	LAST 548	25,2720	55 107 1	TS	TANG	TRUNNION COMMAND.
2077	REF 75	LAST 546	25,2721	4 0110 0	CS	RADMODES	A RELAY IN THE RR REVERSES POLARITY OF
2078	REF 23	LAST 508	25,2722	7 4740 1	MASK	BIT12	THE SHAFT COMMANDS IN MODE 2 SO THAT A
2079			25,2723	0 0006 1	EXTEND		POSITIVE TORQUE APPLIED TO THE SHAFT
2080			25,2724	1 2727 0	BZF	+3	GYRO CAUSES A POSITIVE CHANGE IN THE
2081	REF 18	LAST 550	25,2725	3 1110 0	CA	TANG +1	SHAFT ANGLE. COMPENSATE FOR THIS SWITCH
2082			25,2726	1 2730 0	TCF	+2	BY CHANGING THE POLARITY OF OUR COMMAND.
2083	REF 19	LAST 550	25,2727	4 1110 1	CS	TANG +1	
2084			25,2730	0 0006 1	EXTEND		
2085	REF 2	LAST 550	25,2731	7 3066 0	MP	RDESGAIN	SCALING ON INPUT ANGLE WAS 4 RADIANS.
2086	REF 20	LAST 550	25,2732	55 110 1	TS	TANG +1	SHAFT COMMAND.
2087	REF 46	LAST 548	25,2733	0 6037 0	TC	INTPRET	
2088			25,2734	41345 0	DLOAD	DMP	
2089			25,2735	00003 1		2	COS(S).
2090			25,2736	00005 1		4	COS(T).
2091			25,2737	65352 0	SL1	PDDL	Z COMPONENT OF URR.
2092			25,2740	65276 1	DCOMP	PDDL	Y COMPONENT = -SIN(T).
2093			25,2741	00001 0		0	SIN(S).
2094			25,2742	72405 0	DMP	SL1	
2095			25,2743	00005 1		4	COS(T).
2096			25,2744	43066 0	VDEF	BON	FORM URR IN NB AXES.
2097	REF 4	LAST 548	25,2745	00311 1		RRNBSW	BYPASS NBSM CONVERSION IN VERB 41.
2098			25,2746	52751 0		+3	
2099			25,2747	77624 1	CALL		
2100	REF 1		25,2750	47673 0		*NBSH*	GET URR IN SM AXES.
2101			25,2751	77441 0	DOT	EXIT	
2102	REF 7	LAST 548	25,2752	01102 0		RRTARGET	GET COSINE OF ANGLE BETWEEN RR AND LOS.
2103			25,2753	0 0006 1	EXTEND		
2104	REF 1		25,2754	4 3070 1	DCS	COS1/2DG	
2105	REF 236	LAST 550	25,2755	20 155 1	DAS	MPAC	DIFFERENCE OF COSINES, SCALED B-2.
2106	REF 237	LAST 550	25,2756	10 154 0	CCS	MPAC	
2107	REF 117	LAST 541	25,2757	3 4755 1	CA	ZERO	IF COS ERROR BIGGER, ERROR IS SMALLER.
2108			25,2760	1 2762 1	TCF	+2	
2109	REF 67	LAST 537	25,2761	3 4753 1	CA	ONE	
2110	REF 238	LAST 550	25,2762	54 155 1	TS	MPAC +1	ZERO IF RR IS POINTED OK, ONE IF NOT.

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P2111 SEE IF TRACKER SHOULD BE ENABLED OR DISABLED.

2112	REF	76	LAST	550	25,2763	10 110 0	CCS	RADMODES	IF CONTINUOUS DESIGNATE WANTED, PUT OUT
2113	REF	1			25,2764	1 2767 1	TCF	SIGNLCHK	COMMANDS WITHOUT CHECKING MAGNITUDE OF
2114	REF	2	LAST	551	25,2765	1 2767 1	TCF	SIGNLCHK	ERROR SIGNALS
2115	REF	1			25,2766	1 3017 0	TCF	DORROUT	
2116	REF	239	LAST	550	25,2767	10 155 1	SIGNLCHK	CCS	MPAC +1
2117	REF	1			25,2770	1 3000 0	TCF	DGOODCHK	SEE IF BOTH AXES WERE WITHIN .5 DEGS.
2118	REF	38	LAST	539	25,2771	4 0074 0	CS	STATE	IF WITHIN LIMITS AND NO LOCK-ON WANTED,
2119	REF	1			25,2772	7 4747 0	MASK	LOKONBIT	PROBLEM IS FINISHED.
2120	REF	187	LAST	546	25,2773	10 000 0	CCS	A	
2121	REF	1			25,2774	1 3005 0	TCF	RRDESUN	
2122	REF	51	LAST	513	25,2775	3 4736 1	CAF	BIT14	ENABLE THE TRACKER.
2123					25,2776	0 0006 1	EXTEND		
2124	REF	33	LAST	546	25,2777	05 012 1	WOR	CHAN12	
2125	REF	23	LAST	468	25,3000	3 4750 1	DGOODCHK	CAF	BIT4
2126					25,3001	0 0006 1	EXTEND		SEE IF DATA GOOD RECEIVED YET
2127	REF	9	LAST	504	25,3002	02 033 0	RAND	CHAN33	
2128	REF	188	LAST	551	25,3003	10 000 0	CCS	A	
2129	REF	2	LAST	551	25,3004	1 3017 0	TCF	DORROUT	
2130	REF	28	LAST	475	25,3005	4 4742 0	RRDESUN	CS	BIT10
2131	REF	77	LAST	551	25,3006	7 0110 0	MASK	RADMODES	WHEN PROBLEM DONE, REMOVE BIT 10 SO NEXT
2132					25,3007	0 0004 0	INHINT		WAITLIST TASK WE WILL GO TO RGOODEND.
2133	REF	78	LAST	551	25,3010	54 110 0	TS	RADMODES	
2134	REF	50	LAST	543	25,3011	0 5516 0	TC	DOWNFLAG	RESET LOSCMFLG TO PREVENT A
2135	REF	7	LAST	543	25,3012	00041 1	ADRES	LOSCMFLG	RECOMPUTATION OF LOS AFTER DATA GOOD
2136	REF	32	LAST	530	25,3013	4 4752 1	CS	BIT2	TURN OFF ENABLE RR ERROR COUNTER
2137					25,3014	0 0006 1	EXTEND		
2138	REF	34	LAST	551	25,3015	03 012 1	WAND	CHAN12	
2139	REF	90	LAST	543	25,3016	1 5155 1	TCF	ENDOFJOB	WITH ECTR DISABLED.
2140	REF	8	LAST	497	25,3017	3 0076 0	DORROUT	CA	FLAGWRD2
2141	REF	1			25,3020	7 7712 0	MASK	BIT12,14	IF BOTH LOSCMFLAG AND SEARCH FLAG ARE
2142					25,3021	0 0006 1	EXTEND		ZERO, BYPASS VELOCITY ADJUSTMENT TO LOS
2143	REF	1			25,3022	1 3041 0	BZF	NOTP20	
2144	REF	47	LAST	550	25,3023	0 6027 0	TC	INTPRET	
2145					25,3024	74375 0	VLOAD	VXSC	MULTIPLY UNIT LOS BY MAGNITUDE
2146	REF	8	LAST	550	25,3025	01102 0		RRTARGET	
2147	REF	2	LAST	548	25,3026	01767 0		MLOS V	
2148					25,3027	41572 1	VSL1	PUSH	
2149					25,3030	74375 0	VLOAD	VXSC	ADD .5 SEC. OF VELOCITY
2150	REF	3	LAST	548	25,3031	01761 0		LOSVEL	TO LOS VECTOR
2151	REF	2	LAST	548	25,3032	13072 0		MUTOMS	
2152					25,3033	53362 0	VSRI	VAD	
2153					25,3034	77656 1	UNIT		
2154	REF	9	LAST	551	25,3035	15102 0	STOOL	RRTARGET	STORE VELOCITY-CORRECTED LOS (UNIT)

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2155				25,3036	00045-0		36D	
2156	REF	3	LAST	551	25,3037	01767-0	STORE	MLOSV AND STORE MAGNITUDE
2157					25,3040	77776-1	EXIT	
2158					25,3041	0 0004-0	NOTP20	INHINT
2159	REF	79	LAST	551	25,3042	4-0110-0	CS	RADMODES PUT OUT COMMAND UNLESS MONITOR
2160	REF	5	LAST	546	25,3043	7 4741-0	MASK	REPOSBIT REPOSITION HAS TAKEN OVER.
2161	REF	189	LAST	551	25,3044	10-000-0	CCS	A
2162	REF	2	LAST	534	25,3045	0-2306-0	TC	RRQUT
2163	REF	9	LAST	551	25,3046	3-0076-0	CA	FLAGWRD2
2164	REF	1			25,3047	7-4740-1	MASK	LOSCMBIT IF LOSCMFLG NOT SET, DON'T TEST
2165					25,3050	0 0006-1	EXTEND	LOS COUNTER
2166	REF	91	LAST	551	25,3051	1-5155-1	BZF	ENDOFJOB
2167	REF	25	LAST	546	25,3052	11-456-0	CCS	LOSCOUNT TEST LOS COUNTER TO SEE IF TIME TO GET
2168	REF	1			25,3053	0-3064-0	TC	DODESEND A NEW LOS
2169					25,3054	0-0004-0	INHINT	
2170	REF	5	LAST	516	25,3055	0-6027-1	TC	KILLTASK YES - KILL TASK WHICH SCHEDULES DODES
2171	REF	2	LAST	546	25,3056	52602-1	CADR	DESLOOP +2
2172					25,3057	0 0003-1	RELINT	
2173	REF	3	LAST	378	25,3060	10 067-1	CCS	NEWJOB
2174	REF	2	LAST	378	25,3061	0-5122-0	TC	CHANG1
2175	REF	141	LAST	519	25,3062	0-4616-1	TC	BANKCALL
2176	REF	1			25,3063	50731-1	CADR	R21LEM2
2177	REF	26	LAST	552	25,3064	55-456-0	DODESEND TS	LOSCOUNT
2178	REF	92	LAST	552	25,3065	0-5155-0	TC	ENDOFJOB
2179					25,3066	21122-0	RDESGAIN DEC	.53624 TRIES TO NULL .5 ERROR IN .5 SEC.
21795	REF	1			7712		BIT12,14 EQUALS	PRI024 OCT-24000
2180					25,3067	07777-1	COS1/2DG-2DEC	.999961923-B-2 COSINE OF 0.5 DEGREES.
2180					25,3070	33005-1		
2181					25,3071	00310-0	MCTOMS-2DEC	100-B-13
2181					25,3072	00000-1		

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P2182 RADAR READ INITIALIZATION

R2183 RADAR DATA ARE READ BY A BANKCALL FOR THE APPROPRIATE LEAD-IN BELOW.

2184	REF	1		25,3073	0 3113 1	LRALT	TC	INITREAD -1	ONE SAMPLE PER READING.
2185				25,3074	00017 1	ALLREAD	OCT	17	

2186	REF	2	LAST 553	25,3075	0 3114 0	LRVELZ	TC	INITREAD	
2187				25,3076	00016 0		OCT	16	

2188	REF	3	LAST 553	25,3077	0 3114 0	LRVELY	TC	INITREAD	
2189				25,3100	00015 0		OCT	15	

2190	REF	4	LAST 553	25,3101	0 3114 0	LRVELX	TC	INITREAD	
2191				25,3102	00014 1		OCT	14	

2192	REF	5	LAST 553	25,3103	0 3113 1	RRRDOT	TC	INITREAD -1	
2193				25,3104	00012 1		OCT	12	

2194	REF	6	LAST 553	25,3105	0 3113 1	RRRRANGE	TC	INITREAD -1	
2195				25,3106	00011 1		OCT	11	

R2196 LRVEL IS THE ENTRY TO THE LR VELOCITY READ ROUTINE WHEN 5 SAMPLES ARE
R2197 WANTED. ENTER WITH C(A)= 0,2,4 FOR LRVELZ,LRVELY,LRVELX RESP.

2198	REF	1		25,3107	55'105 0	LRVEL	TS	TIMEHOLD	STORE VBEAM INDEX HERE MOMENTARILY
2199	REF	11	LAST 506	25,3110	3 4756 1		CAF	FIVE	SPECIFY FIVE SAMPLES
2200	REF	2	LAST 553	25,3111	51'105 1		INDEX	TIMEHOLD	
2201	REF	2	LAST 491	25,3112	1 3075 1		TCF	LRVELZ	

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2202	REF 68	LAST 550	25,3113	3 4753 1	-1	CAF	ONE	ENTRY TO TAKE ONLY 1 SAMPLE.
2203			25,3114	0 0004 0		INITREAD	INHINT	
2204	REF 3	LAST 553	25,3115	55 105 0		TS	TIMEHOLD	GET DT OF MIDPOINT OF NOMINAL SAMPLING
2205			25,3116	0 0006 1		EXTEND		INTERVAL (ASSUMES NO BAD SAMPLES WILL BE
2206	REF 24	LAST 489	25,3117	7 4751 1		MP	BIT3	ENCOUNTERED).
2207	REF 4	LAST 554	25,3120	53 106 0		DXCH	TIMEHOLD	
2208	REF 190	LAST 552	25,3121	10 000 0		CCS	A	
2209	REF 1		25,3122	55 111 0		TS	NSAMP	
2210	REF 69	LAST 554	25,3123	6 4753 1		AD	ONE	
2211		INSERT FOLLOWING INSTRUCTION TO GET 2N TRIES FOR N SAMPLES.						
A2212						DOUBLE		
2213	REF 2	LAST 222	25,3124	55 100 0		TS	SAMPLIM	
2214	REF 1		25,3125	3 3147 0		CAF	DGBITS	READ CURRENT VALUE OF DATA GOOD BITS.
2215			25,3126	0 0006 1		EXTEND		
2216	REF 10	LAST 551	25,3127	02 033 0		RAND	CHAN33	
2217	REF 1		25,3130	55 113 1		TS	ULDATAQD	
2218	REF 1		25,3131	4 3074 0		CS	ALLREAD	
2219			25,3132	0 0006 1		EXTEND		
2220	REF 8	LAST 470	25,3133	03 013 0		WAND	CHAN13	REMOVE ALL RADAR BITS
2221	REF 163	LAST 544	25,3134	50 002 0		INDEX	Q	
2222			25,3135	3 0000 1		CAF	0	
2223			25,3136	0 0006 1		EXTEND		
2224	REF 9	LAST 554	25,3137	05 013 0		WOR	CHAN13	SET NEW RADAR BITS
2225			25,3140	0 0006 1		EXTEND		
2226	REF 14	LAST 462	25,3141	3 0025 0		DCA	TIME2	
2227	REF 5	LAST 554	25,3142	21 106 0		DAS	TIMEHOLD	TIME OF NOMINAL MIDPOINT.
2228	REF 118	LAST 550	25,3143	3 4755 1		CAF	ZERO	
2229	REF 76	LAST 544	25,3144	54 001 1		TS	L	
2230	REF 3	LAST 490	25,3145	53 102 1		DXCH	SAMPLSUM	
2231	REF 2	LAST 537	25,3146	1 2366 1		TCF	ROADBACK	
2232			25,3147	00230 0		DGBITS	BGT 230	

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P2233 RADAR RUPT READER

R2234 THIS ROUTINE STARTS FROM A RADARUPT. IT READS THE DATA \$ LOTS MORE.

2235	REF	2	LAST	41	25,2000		SETLOC RADARUPT		
2236					25,3150		BANK		
2237	REF	2	LAST	41 TO	41:	3	3*	COUNT* \$1/PRUPT	
2238					25,3150	0 0006 1	RADAREAD	EXTEND	MUST SAVE SBANK BECAUSE OF RUPT EXITS
2239	REF	10	LAST	456	25,3151	04 007 1	ROR	SUPERBNK	VIA TASKOVER (BADEND OR GOODEND).
2240	REF	3	LAST	254	25,3152	54 016 1	TS	BANKRUPT	
2241					25,3153	0 0006 1	EXTEND		
2242	REF	3	LAST	254	25,3154	22 012 1	QXCH	QRUPT	
2243	REF	8	LAST	503	25,3155	3 4757 0	CAF	SEVEN	
2244					25,3156	0 0006 1	EXTEND		
2245	REF	10	LAST	554	25,3157	02 013 1	RAND	CHAN13	
2246	REF	2	LAST	107	25,3160	55 335 1	TS	DNINDEX	
2247					25,3161	0 0006 1	EXTEND		IF RADAR SELECT BITS ZERO, DO NOT STORE
2248	REF	1			25,3162	1 3166 1	BZF	TRYCOUNT	DATA FOR DOWNLIST (ERASABLE PROBLEMS)
2249	REF	1			25,3163	3 0046 0	CA	RNRAD	
2250	REF	3	LAST	555	25,3164	51 335 0	INDEX	DNINDEX	
2251	REF	4	LAST	196	25,3165	55 332 0	TS	DNRRANGE -1	
2252	REF	3	LAST	554	25,3166	11 100 0	TRYCOUNT	CCS	SAMPLIM
2253	REF	1			25,3167	1 3211 1	TCF	PLENTY	
2254	REF	1			25,3170	1 3174 1	TCF	NOMORE	
2255	REF	23	LAST	543	25,3171	0 5567 0	TC	ALARM	
2256					25,3172	00520 0	OCT	520	
2257	REF	16	LAST	260	25,3173	0 5270 1	TC	RESUME	
2258	REF	3	LAST	280	25,3174	3 0107 1	NOMORE	CA	FLGWRD11
2259	REF	3	LAST	280	25,3175	7 4735 0		MASK	LRBYBIT
2260					25,3176	0 0006 1	EXTEND		IS LRBYPASS SET?
2261	REF	1			25,3177	1 3206 1	BZF	BADRAD	NO. R12 IS ON -- BYPASS 521 ALARM.
2262	REF	10	LAST	374	25,3200	4 0077 0	CS	FLAGWRD3	CHECK R04FLAG.
2263	REF	4	LAST	277	25,3201	7 4742 1	MASK	R04FLBIT	IF 1, R04 IS RUNNING. DO NOT ALARM-
2264					25,3202	0 0006 1	EXTEND		
2265	REF	2	LAST	555	25,3203	1 3206 1	BZF	BADRAD	
2266	REF	24	LAST	555	25,3204	0 5567 0	TC	ALARM	P20 WANTS THE ALARM.
2267					25,3205	00521 1	OCT	521	
2268	REF	70	LAST	554	25,3206	4 4753 0	BADRAD	CS	ONE
2269	REF	4	LAST	555	25,3207	55 100 0		TS	SAMPLIM
2270	REF	2	LAST	546	25,3210	0 3560 1		TC	RDBADEND -2
2271	REF	5	LAST	555	25,3211	55 100 0	PLENTY	TS	SAMPLIM
2272	REF	25	LAST	554	25,3212	3 4751 0		CAF	BIT3
2273					25,3213	0 0006 1	EXTEND		
2274	REF	11	LAST	555	25,3214	02 013 1		RAND	CHAN13
2275					25,3215	0 0006 1	EXTEND		TO FIND OUT WHICH RADAR

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2276	REF	1		25,3216	1 3276 0	BZF	RENDRAD			
2277	REF	1		25,3217	0 3364 0	TC	R77CHECK	R77 QUILTS HERE.		
2278	REF	80	LAST	552	25,3220	3 0110 1	CA	RADMODES	SEE IF LR IN DESIRED POSITION.	
2279					25,3221	0 0006 1	EXTEND			
2280	REF	11	LAST	554	25,3222	06 033 1	RXOR	CHAN33		
2281	REF	37	LAST	462	25,3223	7 4746 1	MASK	BIT6		
2282					25,3224	0 0006 1	EXTEND			
2283	REF	1			25,3225	1 3231 0	BZF	VELCHK		
2284	REF	25	LAST	555	25,3226	0 5567 0	TC	ALARM		
2285					25,3227	00522 1	OCT	522		
2286	REF	3	LAST	555	25,3230	0 3206 0	TC	BADRAD		
2287	REF	1			25,3231	3 6245 1	CAF	BIN3	= 00003 OCT	
2288					25,3232	0 0006 1	EXTEND			
2289	REF	12	LAST	555	25,3233	06 013 0	RXOR	CHAN13	RESET ACTIVITY BIT	
2290	REF	2	LAST	556	25,3234	7 6245 0	MASK	BIN3		
2291					25,3235	0 0006 1	EXTEND			
2292	REF	1			25,3236	1 3272 1	BZF	LRHEIGHT	TAKE A LR RANGE READING	
2293	REF	11	LAST	525	25,3237	3 4733 1	CAF	POSMAX		
2294	REF	2	LAST	555	25,3240	7 0046 1	MASK	RNRAD		
2295	REF	1			25,3241	6 2000 0	AD	LVELBIAS		
2296	REF	77	LAST	554	25,3242	54 001 1	TS	L		
2297	REF	3	LAST	556	25,3243	30 046 0	CAF	RNRAD		
2298					25,3244	6 0000 1	DOUBLE			
2299	REF	27	LAST	527	25,3245	7 4753 0	MASK	BIT1		
2300	REF	7	LAST	258	25,3246	52 064 1	DXCH	ITEMP3		
2301	REF	25	LAST	524	25,3247	3 4744 1	CAF	BIT8	DATA GOOD ISNT CHECKED UNTIL AFTER READ-	
2302	REF	1			25,3250	0 3442 0	TC	DGCHECK	ING DATA SO SOME RADAR TESTS WILL WORK	
2303									INDEPENDENT OF DATA GOOD.	
2304	REF	2	LAST	554	25,3251	11 111 0	CCS	NSAMP		
2305	REF	1			25,3252	0 3262 1	TC	NOEND		
2306	REF	71	LAST	555	25,3253	4 4753 0	GOODRAD	CS	ONE	
2307	REF	6	LAST	555	25,3254	55 100 0	TS	SAMPLIM		
2308	REF	19	LAST	544	25,3255	4 0061 1	CS	ITEMP1	WHEN ENOUGH GOOD DATA HAS BEEN GATHERED,	
2309	REF	81	LAST	556	25,3256	7 0110 0	MASK	RADMODES	RESET DATA FAIL FLAGS FOR SETTRKF.	
2310	REF	82	LAST	556	25,3257	54 110 0	TS	RADMODES		
2311	REF	1			25,3260	0 3616 0	TC	RADLITES	LAMPS MAY GO OFF IF DATA JUST GOOD.	
2312	REF	2	LAST	532	25,3261	0 3553 1	TC	RGOODEND -2		
2313	REF	3	LAST	556	25,3262	55 111 0	NOEND	TS	NSAMP	
2314	REF	7	LAST	556	25,3263	11 100 0	RESAMPLE	CCS	SAMPLIM	SEE IF ANY MORE TRIES SHOULD BE MADE.
2315					25,3264	1 3266 1	TCF	+2		
2316	REF	1			25,3265	1 3461 0	TCF	DATAFAIL	N SAMPLES NOT AVAILABLE.	
2317	REF	24	LAST	551	25,3266	3 4750 1	CAF	BIT4	RESET ACTIVITY BIT.	
2318					25,3267	0 0006 1	EXTEND			

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2319	REF	13	LAST	556	25,3270	05 013 0	WOR	CHAN13	RESET ACTIVITY BIT
2320	REF	17	LAST	555	25,3271	0 5270 1	TC	RESUME	
2321	REF	25	LAST	488	25,3272	3 4747 1	LRHEIGHT	CAF	BIT5
2322	REF	20	LAST	556	25,3273	54 061 1	TS	ITEMP1	(POSITION OF DATA GOOD BIT IN CHAN 33)
2323	REF	19	LAST	331	25,3274	3 4743 0	CAF	BIT9	
2324	REF	1			25,3275	0 3320 0	TC	SCALECHK -1	
2325	REF	6	LAST	552	25,3276	3 4741 1	RENDRAD	CAF	REPOSBIT
2326	REF	83	LAST	556	25,3277	7 0110 0	MASK	RADMODES	MAKE SURE ANTENNA HAS NOT GONE OUT OF LIMITS.
2327	REF	191	LAST	554	25,3300	10 000 0	CCS	A	
2328	REF	4	LAST	556	25,3301	1 3206 1	TCF	BADRAD	
2329	REF	84	LAST	557	25,3302	4 0110 0	CS	RADMODES	BE SURE RR CDU HASNT FAILED.
2330	REF	6	LAST	470	25,3303	7 4745 1	MASK	RCDUFBIT	
2331	REF	192	LAST	557	25,3304	10 000 0	CCS	A	
2332	REF	5	LAST	557	25,3305	1 3206 1	TCF	BADRAD	
2333	REF	25	LAST	556	25,3306	3 4750 1	CAF	BIT4	SEE IF DATA HAS BEEN GOOD.
2334	REF	21	LAST	557	25,3307	54 061 1	TS	ITEMP1	(POSITION OF DATA GOOD BIT IN CHAN 33)
2335	REF	28	LAST	556	25,3310	3 4753 1	CAF	BIT1	SEE IF RR ROOT.
2336					25,3311	0 0006 1	EXTEND		
2337	REF	14	LAST	557	25,3312	02 013 1	RAND	CHAN13	
2338	REF	164	LAST	554	25,3313	54 002 1	TS	Q	FOR LATER TESTING.
2339	REF	193	LAST	557	25,3314	10 000 0	CCS	A	
2340					25,3315	1 3317 0	TCF	+2	
2341	REF	1			25,3316	1 3331 1	TCF	RADIN	NO SCALE CHECK FOR RR ROOT.
2342	REF	26	LAST	555	25,3317	3 4751 0	CAF	BIT3	
2343	REF	78	LAST	556	25,3320	54 001 1	TS	L	
2344					25,3321	0 0006 1	SCALECHK	EXTEND	
2345	REF	12	LAST	556	25,3322	02 033 0	RAND	CHAN33	SCALE STATUS NOW
2346	REF	79	LAST	557	25,3323	56 001 0	XCH	L	
2347	REF	85	LAST	557	25,3324	7 0110 0	MASK	RADMODES	SCALE STATUS BEFORE
2348					25,3325	0 0006 1	EXTEND		
2349	REF	12	LAST	532	25,3326	06 001 0	RXOR	LCHAN	SEE IF THEY DIFFER
2350	REF	194	LAST	557	25,3327	10 000 0	CCS	A	
2351	REF	1			25,3330	0 3250 1	TC	SCALECHNG	THEY DIFFER
2352	REF	12	LAST	556	25,3331	3 4733 1	RADIN	CAF	POSMAX
2353	REF	4	LAST	556	25,3332	7 0046 1	MASK	RNRAD	
2354	REF	5	LAST	258	25,3333	54 064 1	TS	ITEMP4	
2355	REF	5	LAST	557	25,3334	30 046 0	CAE	RNRAD	
2356					25,3335	6 0000 1	DOUBLE		
2357	REF	29	LAST	557	25,3336	7 4753 0	MASK	BIT1	
2358	REF	8	LAST	556	25,3337	54 063 0	TS	ITEMP3	

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2359 REF 165 LAST 557 25,3340 10 002 1 CCS 0 SEE IF RR RDOT.
 2360 REF 1 25,3341 1 3402 0 TCF SCALADJ NO. BUT SCALE CHANGING MAY BE NEEDED.

2361 25,3342 0 0006 1 EXTEND IF RR RANGE RATE, THROW OUT BIAS.

2362 REF 1 25,3343 4 2002 0 DCS RDOTBIAS

2363 REF 9 LAST 557 25,3344 20 064 1 DASAMPL DAS ITEMP3

2364 REF 22 LAST 557 25,3345 3 0061 0 DGCHECK2 CA ITEMP1 SEE THAT DATA HAS BEEN GOOD BEFORE AND

2365 REF 2 LAST 556 25,3346 0 3443 1 TC DGCHECK +1 AFTER TAKING SAMPLE.

2366 REF 1 25,3347 0 3253 0 TC GOODRAD

2367 REF 86 LAST 557 25,3350 22 110 1 SCALCHNG LXCH RADMODES

2368 REF 30 LAST 557 25,3351 6 4753 1 AD BIT1

2369 25,3352 0 0006 1 EXTEND

2370 REF 13 LAST 557 25,3353 06 001 0 RXOR LCHAN

2371 REF 87 LAST 558 25,3354 54 110 0 TS RADMODES

2372 REF 2 LAST 554 25,3355 3 3147 0 CAF DGBITS

UPDATE LAST VALUE OF DATA GOOD BITS.

2373 25,3356 0 0006 1 EXTEND

2374 REF 13 LAST 557 25,3357 02 033 0 RAND CHAN33

2375 REF 2 LAST 554 25,3360 55 113 1 TS ULDATAGD

2376 REF 30 LAST 519 25,3361 0 5504 0 TC UPFLAG

SET RNGSCFLG

2377 REF 1 25,3362 00120 1 ADPES RNGSCFLG

FOR LRS24.1

2378 REF 6 LAST 557 25,3363 1 3206 1 TCF BADRAD

2379 R77 MUST IGNORE DATA FAILS SO AS NOT TO DISTURB THE ASTRONAUT.

2380 REF 16 LAST 490 25,3364 4 0101 0 R77CHECK CS FLAGWRD5

2381 REF 4 LAST 490 25,3365 7 4741 0 MASK R77FLBIT

2382 REF 195 LAST 557 25,3366 10 000 0 CCS A

2383 REF 166 LAST 558 25,3367 0 0002 0 TC 0

NOT R77

2384 REF 1 25,3370 4 3401 0 CS BITS5,8

UPDATE LR DATA GOOD BITS IN RADMODES

2385 REF 88 LAST 558 25,3371 7 0110 0 MASK RADMODES

2386 REF 80 LAST 557 25,3372 54 001 1 TS L

2387 REF 2 LAST 558 25,3373 3 3401 1 CA BITS5,8

2388 25,3374 0 0006 1 EXTEND

2389 REF 14 LAST 558 25,3375 02 033 0 RAND CHAN33

2390 REF 81 LAST 558 25,3376 6 0001 0 AD L

2391 REF 89 LAST 558 25,3377 54 110 0 TS RADMODES

2392 REF 3 LAST 556 25,3400 0 3553 1 TC RGJDEND -2

2393 25,3401 00220 1 BITS5,8 OCT 220

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P2394 THE FOLLOWING ROUTINE INCORPORATES RR RANGE AND LR ALT SCALE INFORMATION AND LEAVES DATA AT LO SCALE.

2396	REF	82	LAST	558	25,3402	10 001 1	SCALADJ	CCS	L	L HAS SCALE INBIT FOR THIS RADAR.
2397					25,3403	1 3405 1		TCF	+2	ON HIGH SCALE.
2398	REF	1			25,3404	1 3345 1		TCF	DGCHECK2	
2399	REF	4	LAST	555	25,3405	3 1335 0		CA	DNINDEX	
2400	REF	27	LAST	557	25,3406	7 4751 1		MASK	BIT3	
2401	REF	196	LAST	558	25,3407	10 000 0		CCS	A	
2402	REF	1			25,3410	1 3417 1		TCF	LRCK	
2403	REF	10	LAST	558	25,3411	52 064 1		DXCH	ITEMP3	
2404					25,3412	20 001 1		DDOUBL		
2405					25,3413	20 001 1		DDOUBL		
2406					25,3414	20 001 1		DDOUBL		
2407	REF	11	LAST	559	25,3415	52 064 1		DXCH	ITEMP3	
2408	REF	2	LAST	559	25,3416	1 3345 1		TCF	DGCHECK2	
2409	REF	12	LAST	559	25,3417	10 063 0	LRCK	CCS	ITEMP3	
2410					25,3420	1 3431 0		TCF	+11	
2411	REF	6	LAST	557	25,3421	4 0064 1		CS	ITEMP4	
2412	REF	1			25,3422	6 3441 0		AD	HISCALIM	
2413					25,3423	0 0006 1		EXTEND		
2414					25,3424	6 3431 1		BZMF	+5	
2415	REF	4	LAST	555	25,3425	4 0107 0		CS	FLGWRD11	
2416	REF	1			25,3426	7 4751 1		MASK	SCABBIT	
2417	REF	5	LAST	559	25,3427	26 107 0		ADS	FLGWRD11	
2418					25,3430	1 3434 0		TCF	+4	
2419	REF	2	LAST	559	25,3431	4 4751 1		CS	SCABBIT	
2420	REF	6	LAST	559	25,3432	7 0107 0		MASK	FLGWRD11	
2421	REF	7	LAST	559	25,3433	54 107 0		TS	FLGWRD11	
2422					25,3434	0 0006 1		EXTEND		
2423	REF	13	LAST	559	25,3435	3 0064 0		DCA	ITEMP3	
2424					25,3436	20 001 1		DDOUBL		
2425					25,3437	20 001 1		DDOUBL		
2426	REF	1			25,3440	1 3344 0		TCF	DASAMPL	

2427 25,3441 00714 0 HISCALIM DEC 460 2481.7 FT *****

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2428	REF	23	LAST	558	25,3442	54 061 1	DGCHECK	TS	ITEMP1	UPDATE DATA GOOD BIT IN OLDDATAGD AND
2429					25,3443	0 0006 1		EXTEND		MAKE SURE IT WAS ON BEFORE AND AFTER THE
2430	REF	15	LAST	558	25,3444	02 033 0		RAND	CHAN33	SAMPLE WAS TAKEN BEFORE RETURNING. IF
2431	REF	83	LAST	559	25,3445	54 001 1		TS	L	NOT, GOES TO RESAMPLE TO TRY AGAIN. IF
2432	REF	24	LAST	560	25,3446	4 0061 1		CS	ITEMP1	MAX NUMBER OF TRIES HAS BEEN REACHED,
2433	REF	3	LAST	558	25,3447	7 1113 1		MASK	OLDDATAGD	THE BIT CORRESPONDING TO THE DATA GOOD
2434	REF	84	LAST	560	25,3450	6 0001 0		AD	L	WHICH FAILED TO APPEAR IS IN ITEMPL AND
2435	REF	4	LAST	560	25,3451	57 113 0		XCH	OLDDATAGD	CAN BE USED TO SET RADMODES WHICH VIA
2436	REF	25	LAST	560	25,3452	7 0061 1		MASK	ITEMP1	SETTRKF SETS THE TRACKER FAIL LAMP.
2437	REF	85	LAST	560	25,3453	6 0001 0		AD	L	
2438	REF	197	LAST	559	25,3454	10 000 0		CCS	A	SHOULD BOTH BE ZERO.
2439	REF	1			25,3455	0 3263 0		TC	RESAMPLE	
2440	REF	14	LAST	559	25,3456	52 064 1		DXCH	ITEMP3	IF DATA GOOD BEFORE AND AFTER, ADD TO
2441	REF	4	LAST	554	25,3457	21 102 1		DAS	SAMPLSUM	ACCUMULATION.
2442	REF	167	LAST	558	25,3460	0 0002 0		TC	Q	
2443	REF	26	LAST	560	25,3461	4 0061 1	DATAFAIL	CS	ITEMP1	IN THE ABOVE CASE, SET RADMODES BIT
2444	REF	90	LAST	558	25,3462	7 0110 0		MASK	RADMODES	SHOWING SOME RADAR DATA FAILED.
2445	REF	27	LAST	560	25,3463	6 0061 0		AD	ITEMP1	
2446	REF	91	LAST	560	25,3464	54 110 0		TS	RADMODES	
2447	REF	15	LAST	560	25,3465	52 064 1		DXCH	ITEMP3	IF WE HAVE BEEN UNABLE TO GATHER N
2448	REF	5	LAST	560	25,3466	53 102 1		DXCH	SAMPLSUM	SAMPLES, USE LAST ONE ONLY.
2449	REF	2	LAST	556	25,3467	0 3616 0		TC	RADLITES	
2450	REF	2	LAST	555	25,3470	1 3174 1		TCF	NOMORE	

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P2451 THIS ROUTINE CHANGES THE LR POSITION, AND CHECKS THAT IT GOT THERE.

2452	REF	2	LAST	526	25,2000		SETLOC P20S1	
2453					25,3471		BANK	
2454	PEF	2	LAST	526	TO 555:	566 565*	COUNT* \$\$/RSUB	
2455					25,3471	0 0004 0	LRPOS2	INHINT
2456	REF	92	LAST	560	25,3472	4 0110 0	CS	RADMODES
2457	REF	1			25,3473	7 4746 1	MASK	LRPOSBIT
2458	REF	93	LAST	561	25,3474	26 110 0	ADS	RADMODES
								SHOW DESIRED LR POSITION IS 2
2459	REF	24	LAST	511	25,3475	3 4745 0	CAF	BIT7
2460					25,3476	0 0006 1	EXTEND	
2461	REF	16	LAST	560	25,3477	02 033 0	RAND	CHAN33
2462					25,3500	0 0006 1	EXTEND	
2463	REF	2	LAST	537	25,3501	1 3530 0	BZF	RADNOOP
								SEE IF ALREADY THERE.
2464	REF	23	LAST	424	25,3502	3 4737 0	CAF	BIT13
2465					25,3503	0 0006 1	EXTEND	
2466	REF	35	LAST	551	25,3504	05 012 1	WOR	CHAN12
2467	REF	1			25,3505	3 3545 0	CAF	6SECS
2468	REF	22	LAST	541	25,3506	0 5203 0	TC	WAITLIST
2469	REF	27	LAST	552	E7,1456		EBANK=	LOSCOUNT
2470	REF	1			25,3507	03543 0	2CADR	LRPOSCAN
2470	REF	1			25,3510	52067 1		
2471	REF	3	LAST	554	25,3511	0 2366 0	TC	ROADBACK
2472	REF	8	LAST	556	25,3512	55*100 0	LRPOS NXT	TS
2473	REF	9	LAST	546	25,3513	0 5221 0	TC	SAMPLIM
2474					25,3514	00144 0	DEC	FIXDELAY
								SCAN ONCE PER SECOND 15 TIMES MAX AFTER INITIAL DELAY OF 7 SECONDS.
2475	REF	25	LAST	561	25,3515	3 4745 0	CAF	BIT7
2476					25,3516	0 0006 1	EXTEND	
2477	REF	17	LAST	561	25,3517	02 033 0	RAND	CHAN33
2478					25,3520	0 0006 1	EXTEND	
2479	REF	1			25,3521	1 3535 0	BZF	LASTLRDT
								IF THERE, WAIT FINAL SECOND FOR BOUNCE.
2480	REF	9	LAST	561	25,3522	11*100 0	CCS	SAMPLIM
2481	REF	1			25,3523	1 3512 0	TCF	LRPOSVXT
								SEE IF MAX TIME UP.
2482	REF	24	LAST	561	25,3524	4 4737 1	CS	BIT13
2483					25,3525	0 0006 1	EXTEND	
2484	REF	36	LAST	561	25,3526	03 012 1	WAND	CHAN12
2485	REF	3	LAST	555	25,3527	1 3562 1	TCF	RDBADEND
								IF TIME UP, DISABLE COMMAND AND ALARM.
2486	REF	72	LAST	556	25,3530	3 4753 1	CAF	ONE
2487	REF	23	LAST	561	25,3531	0 5203 0	TC	WAITLIST
2488	REF	28	LAST	561	E7,1456		EBANK=	LOSCOUNT
2489	REF	4	LAST	558	25,3532	03555 1	2CADR	RGOODEND
2489					25,3533	52067 1		
								NO FURTHER ACTION REQUESTED.

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2490	REF	4	LAST	561	25,3534	0 2366 0	TC	ROADBACK	
2491	REF	3	LAST	507	25,3535	3 5000 1	LASTLRDT	CA	2SECS
2492	REF	3	LAST	165	25,3536	0 5224 0	TC	VARDELAY	WAIT TWO SECONDS AFTER RECEIPT OF INBIT TO WAIT FOR ANTENNA BOUNCE TO DIE OUT.
2493	REF	25	LAST	561	25,3537	4 4737 1	CS	BIT13	REMOVE COMMAND
2494					25,3540	0 0006 1	EXTEND		
2495	REF	37	LAST	561	25,3541	03 012 1	WAND	CHAN12	
2496	REF	5	LAST	561	25,3542	1 3555 0	TCF	RGOODEND	
2497	REF	1			25,3543	3 4317 0	LRPOSCAN	CAF	FOURTEEN
2498	REF	2	LAST	561	25,3544	1 3512 0	TCF	LRPOSNXT	SET UP FOR 15 SAMPLES.
2499					25,3545	01130 1	6SECS	DEC	600

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P2500 SEQUENCES TO TERMINATE RR OPERATIONS.

2501	REF	7	LAST	557	25,3546	3 4745 0	ENDRADAR	CAF	RCDFBIT	PROLOG TO CHECK RR CDU FAIL BEFORE END.
2502	REF	94	LAST	561	25,3547	7 0110 0		MASK	RADMODES	
2503	REF	198	LAST	560	25,3550	10 000 0		CCS	A	
2504	REF	6	LAST	562	25,3551	1 3555 0		TCF	RGOODEND	
2505	REF	4	LAST	561	25,3552	1 3562 1		TCF	RDBADEND	
2506	REF	119	LAST	554	25,3553	4 4755 0	-2	CS	ZERO	RGOODEND WHEN NOT UNDER WAITLIST CONTROL
2507	REF	2	LAST	100	25,3554	54 734 0		TS	RUPTAGN	
2508	REF	35	LAST	541	25,3555	3 4752 0	RGOODEND	CAF	TWO	
2509	REF	37	LAST	519	25,3556	0 4635 0		TC	POSTJUMP	
2510	REF	2	LAST	245	25,3557	17665 1		CADR	GOODEND	
2511	REF	120	LAST	563	25,3560	4 4755 0	-2	CS	ZERO	RDBADEND WHEN NOT UNDER WAITLIST.
2512	REF	3	LAST	563	25,3561	54 734 0		TS	RUPTAGN	
2513	REF	36	LAST	563	25,3562	3 4752 0	RDBADEND	CAF	TWO	
2514	REF	38	LAST	563	25,3563	0 4635 0		TC	POSTJUMP	
2515	REF	1			25,3564	17662 0		CADR	BADEND	
2516	REF	18	LAST	509	6245		BIN3	EQUALS	THREE	

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R2517 PROGRAM NAME_ LPS20.1 VECTOR EXTRAPOLATION AND LOS COMPUTATION

R2518 MOD. NO. 2 BY J.D. COYNE SDC DATE 12-7-66

R2519 FUNCTIONAL DESCRIPTION_

R2520 1) EXTRAPOLATE THE LEM AND CSM VECTORS IN ACCORDANCE WITH THE TIME REFERED TO IN CALLER + 1.

R2522 2) COMPUTES THE LOS VECTOR TO THE CSM. CONVERTS IT TO STABLE MEMBER COORDINATES AND STORES IT IN RRTARGET.

R2524 3) COMPUTES THE MAGNITUDE OF THE LOS VECTOR AND STORES IT IN MLOSV

R2525 CALLING SEQUENCE CALL

R2526 LPS20.1

R2527 SUBROUTINES CALLED_

R2528 LEMPREC, CSMPREC

R2529 NORMAL EXIT_ RETURN TO CALLER + 2

R2530 ERROR EXITS_ NONE

R2531 ALARMS_ NONE

R2532 OUTPUT_

R2533 LOS VECTOR (HALF UNIT) IN SM COORDINATES STORED IN RRTARGET

R2534 MAGNITUDE OF THE LOS VECTOR (METERS SCALED B-29) STORED IN MSLOV

R2535 RRNBSW CLEARED

R2536 INITIALIZED ERASEABLE

R2537 TDEC1 MUST CONTAIN THE TIME FOR EXTRAPOLATION

R2538 SEE ORBITAL INTEGRATION ROUTINE

R2539 DEBRIS_

R2540 MPAC DESTROYED BY THIS ROUTINE

2541 23,2314

2542 REF 4 LAST 516 24,2000

2543 24,3255

BANK 23

SETLOC P20S

BANK

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					COUNT* \$\$\$/LPS20				
2544	REF	1							
2545				24,3255	43020 1	LPS20.1	STQ	B0FF	
2546	REF	3	LAST	500	24,3256			LS21X	
2547	REF	8	LAST	551	24,3257			LOSCMFLG	LOSCMFLG = 0 MEANS NOT CALLED BY R21
2548	REF	1			24,3260			LMINT	SO CALL LEMCONIC TO GET LM STATE
2549					24,3261		BOV		IF IN R21 AND ON LUNAR SURFACE
2550	REF	6	LAST	500	24,3262			SURFFLAG	DDN'T CALL LEMCONIC
2551	REF	1			24,3263			CSMINT	
2552					24,3264		LMINT	CALL	
2553	REF	3	LAST	487	24,3265			LEMCONIC	EXTRAPOLATE LEM
2554					24,3266		VLOAD		
2555	REF	5	LAST	487	24,3267			RATT	
2556	REF	3	LAST	500	24,3270		STOVL	LMPOS	SAVE LM POSITION B-29
2557	REF	1			24,3271			VATT	
2558	REF	3	LAST	500	24,3272		STOVL	LMVEL	SAVE LM VELOCITY B-7
2559	REF	5	LAST	493	24,3273			TAT	
2560	REF	16	LAST	518	24,3274		CSMINT	STCALL	TDECI
2561	REF	2	LAST	339	24,3275			CSMCONIC	EXTRAPOLATE CSM
2562					24,3276		VLOAD	VSU	COMPUTE RELATIVE VELOCITY V(CS*) - V(LM)
2563	REF	2	LAST	565	24,3277			VATT	
2564	REF	4	LAST	565	24,3300			LMVEL	
2565					24,3301		MXV	VSL1	
2566	REF	8	LAST	487	24,3302			REFSMMAT	
2567					24,3303		EXIT		
2569	REF	6	LAST	552	24,3304		TC	KILLTASK	KILL THE TASK WHICH CALLS DODES SINCE
2570	REF	3	LAST	552	24,3305		CADR	DESLOOP +2	STORING INTO ERASEABLES DODES USES
2571	REF	48	LAST	551	24,3306		TC	INTPRET	
2572	REF	4	LAST	551	24,3307		STOVL	LOSVEL	
2573	REF	6	LAST	565	24,3310			RATT	
2574					24,3311		VSU	B0FF	
2575	REF	4	LAST	565	24,3312			LMPOS	
2576	REF	3	LAST	495	24,3313			RNDVZFLG	
2577	REF	1			24,3314			NOTSHIFT	
2578					24,3315		BOVB		
2579	REF	1			24,3316			TCDANZIG	
2580					24,3317		VSL		
2581					24,3320			9D	
2583					24,3321		NOTSHIFT UNIT	BOVB	IF OVERFLOW, RANGE MUST BE GREATER
25835	REF	1			24,3322			526ALARM	THAN 400 N. M.
2584					24,3323		MXV	VSL1	
2585	REF	9	LAST	565	24,3324			REFSMMAT	CONVERT TO STABLE MEMBER
2586	REF	10	LAST	551	24,3325		STOVL	RRTARGET	
2587					24,3326			36D	SAVE MAGNITUDE OF LOS VECTOR FOR
2588	REF	4	LAST	552	24,3327		STORE	MLOSV	VELOCITY CORRECTION IN DESIGNATE
2589					24,3330		CLRGO		
2590	REF	5	LAST	550	24,3331			RRNBSW	
2591	REF	4	LAST	565	24,3332			LS21X	

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P2592 PROGRAM NAME_ LPS20.2 400 NM RANGE CHECK
 R2593 MOD. NO. 2 BY J.D. COYNE SDC DATE 12-7-66

R2594 FUNCTIONAL DESCRIPTION_

R2595 COMPARES THE MAGNITUDE OF THE LOS VECTOR TO 400 NM

R2596 CALLING SEQUENCE CALL
 R2597 LPS20.2

R2598 SUBROUTINES CALLED_ NONE

R2599 NORMAL EXIT _ RETURN TO CALLER +1, MPAC EQ 0 (RANGE 400NM OR LESS.)

R2600 ERROR EXITS _ RETURN TO CALLER +1, MPAC EQ 1 (RANGE GREATER THAN 400NM)

R2601 ALARMS_ NONE

R2602 OUTPUT_ NONE

R2603 INITIALIZED ERASEABLE_

R2604 PDL 360 MUST CONTAIN THE MAGNITUDE OF THE VECTOR
 R2605 DEBRIS

R2606 MPAC DESTROYED BY THIS ROUTINE

2607	REF	3	LAST	561	25,2000		SETLOC P20S1	
2608					25,3565		BANK	
2609	REF	1					CGUNT* \$\$/LPS20	
2610					25,3565	45345 1	LPS20.2	DLOAD DSU
2611	REF	5	LAST	565	25,3566	01767 0		MLOSV MAGNITUDE OF LOS
2612	REF	1			25,3567	13600 0		FHN OVER 400NM
2613					25,3570	77644 1		BPL
2614	REF	1			25,3571	53574 1		TOFAR
2615					25,3572	43535 0		SLOAD RVQ
2616	REF	1			25,3573	06522 1		ZERO/SP
2617					25,3574	43535 0	TOFAR	SLOAD RVQ
2618	REF	1			25,3575	13577 0		ONE/SP
2619					25,3576	00001 0	ONE/SP	DEC 1

GAP: ASSEMBLE REVISION 001 OF AGC PROGRAM LMY99 BY NASA 2021112=061

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2620	25.3577	26467 0	FHNM	2DEC	740800 B-20	400 NAUTICAL MILES IN METERS B-20
2620	25.3600	00000 1				

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P2621 PROGRAM NAME: LRS22.1 (DATA READ SUBROUTINE 1)
 R2622 MOD. NO.: 1 BY: P. VOLANTE SDC DATE: 11-15-66

R2623 FUNCTIONAL DESCRIPTION

R2624 1) READS RENDEZVOUS RADAR RANGE AND RANGE-RATE, TRUNION AND SHAFT ANGLES, THREE CDU VALUES AND TIME. CONVERTS THIS
 R2626 DATA AND LEAVES IT FOR THE MEASUREMENT INCORPORATION ROUTINE (LSR22.3). CHECKS FOR THE RR DATA GOOD DISCRETE, FOR
 R2628 RR REPOSITION AND RR CDU FAIL

R2629 2) COMPARES RADAR LOS WITH LOS COMPUTED FROM STATE VECTORS TO SEE IF THEY ARE WITHIN THREE DEGREES

R2631 CALLING SEQUENCE: BANKCALL FOR LRS22.1

R2632 SUBROUTINES CALLED:

R2633 RRRDOT LPS20.1
 R2634 RRRANGE BANKCALL
 R2635 RADSTALL CDULOGIC
 R2636 RRNB SMNB
 R2637 NORMAL EXIT: RETURN TO CALLER+1 WITH MPAC SET TO +0

R2638 ERROR EXITS: RETURN TO CALLER+1 WITH ERROR CODE STORED IN MPAC AS FOLLOWS:

R2640 00001-ERROR EXIT 1-RR DATA NO GOOD (NO RR DATA GOOD DISCRETE OR RR CDU FAIL OR RR REPOSITION)
 R2642 00002-ERROR EXIT 2-RR LOS NOT WITHIN THREE DEGREES OF LOS COMPUTED FROM STATE VECTORS

R2644 ALARMS: 521-COULD NOT READ RADAR DATA (RR DATA GOOD DISCRETE NOT PRESENT BEFORE AND AFTER READING THE RADAR)
 R2646 (THIS ALARM IS ISSUED BY THE RADAREAD SUBROUTINE WHICH IS ENTERED FROM A RADARUPT)

R2648 OUTPUT: RRLOSVEC- THE RR LINE-OF-SIGHT VECTOR (USED BY LRS22.2)-A HALF-UNIT VECTOR
 R2650 RM- THE RR RANGE READING (TO THE CSM) DP, IN METERS SCALED 8-29 (USED BY LRS22.2 AND LRS22.3)

R2652 ALL OF THE FOLLOWING OUTPUTS ARE USED BY LRS22.3:

R2653 RDOTM- THE RR RANGE-RATE READING, DP, IN METERS PER CENTISECOND, SCALED 8-7
 R2655 RKTRUN-RR TRUNION ANGLE, DP, IN REVOLUTIONS, SCALED 80
 R2656 RRSHAFT-RR SHAFT ANGLE, DP, IN REVOLUTIONS, SCALED 80
 R2657 AIG, AMG, ADG- THE CDU ANGLES, THREE SP WORDS
 R2658 MKTIME- THE TIME OF THE RR READING, DP, IN CENTISECONDS

R2659 ERASABLE INITIALIZATION REQUIRED:

R2660 RNRAD, THE RADAR READ COUNTER FROM WHICH IS OBTAINED:

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R2661 1)RR RANGE SCALED 9.38 FT. PER BIT ON THE LOW SCALE AND 75.04 FT. PER BIT ON THE HIGH SCALE
 R2663 2)RR RANGE RATE, SCALED .6278 FT./SEC. PER BIT

R2664 THE CDU ANGLES FROM CDUX, CDUY, CDUZ AND TIME1 AND TIME2

R2665 DEBRIS: LRS22.1X, A, L, Q, PUSHLIST

2666					32,2366				BANK 32	
2667	REF	2	LAST	41	32,2000				SETLOC LRS22	
2668					32,2366				BANK	
2669	REF	2	LAST	41 TO	41:	4	4*		COUNT* \$\$/LRS22	
2670	REF	7	LAST	543	32,2366	0 4645	1	LRS22.1	TC	MAKECADR
2671	REF	3	LAST	504	32,2367	55'737	1		TS	LRS22.1X
2672	REF	51	LAST	551	32,2370	0 5516	0		TC	DOWNFLAG
2673	REF	2	LAST	558	32,2371	00120	1		ADRES	RNGSCFLG
2674					32,2372	0 0004	0		INHINT	
2675	REF	28	LAST	559	32,2373	3 4751	0		CAF	BIT3
2676					32,2374	0 0006	1		EXTEND	GET RR RANGE SCALE
2677	REF	18	LAST	561	32,2375	02 033	0		RAND	CHAN33 FROM CHANNEL 33 BIT 3
2678	REF	86	LAST	560	32,2376	54 001	1		TS	L
2679	REF	1			32,2377	4 4751	1		CS	RRASBIT
2680	REF	95	LAST	563	32,2400	7 0110	0		MASK	RADMODES
2681	REF	87	LAST	569	32,2401	6 0001	0		AD	L
2682	REF	96	LAST	569	32,2402	54 110	0		TS	RADMODES
2683					32,2403	0 0003	1		RELINT	
2684	REF	142	LAST	552	32,2404	0 4616	1	READRDOT	TC	BANKCALL
2685	REF	3	LAST	507	32,2405	53103	0		CADR	RRXDJT READ RANGE-RATE (ONE SAMPLE)
2686	REF	143	LAST	569	32,2406	0 4616	1		TC	BANKCALL
2687	REF	8	LAST	509	32,2407	17714	0		CADR	RADSTALL WAIT FOR DATA READ COMPLETION
2688	REF	1			32,2410	1 2542	1		TCF	EREXIT1 COULD NOT READ RADAR-ERROR EXIT 1
2689					32,2411	0 0004	0		INHINT	NO INTERRUPTS WHILE READING TIME AND CDU
2690	REF	6	LAST	554	32,2412	53'106	0		DXCH	TIMEHOLD SET MARK TIME EQUAL TO THE MID-POINT
2691	REF	240	LAST	551	32,2413	52 162	0		DXCH	MPAC +5 TEMP BUFFER FOR DOWNLINK
2692	REF	6	LAST	560	32,2414	53'102	1		DXCH	SAMPLESUM SAVE RANGE-RATE READING
2693	REF	3	LAST	146	32,2415	53'747	0		DXCH	RDOTMSAV
2694					32,2416	0 0006	1		EXTEND	
2695	REF	2	LAST	254	32,2417	3 0034	0		DCA	CDUY SAVE ICPU ANGLES
2696	REF	241	LAST	569	32,2420	52 160	1		DXCH	MPAC +3 TEMP BUFFER FOR DOWNLINK
2697	REF	10	LAST	387	32,2421	3 0032	0		CA	CDUX
2698	REF	242	LAST	569	32,2422	54 156	1		TS	MPAC +2 TEMP BUFFER FOR DOWNLINK
2699					32,2423	0 0006	1		EXTEND	
2700	REF	15	LAST	554	32,2424	3 0025	0		DCA	TIME2 SAVE TIME
2701	REF	243	LAST	569	32,2425	52 155	1		DXCH	MPAC SAVE TIME OF CDY READINGS IN MPAC
2702					32,2426	0 0006	1		EXTEND	
2703	REF	9	LAST	548	32,2427	3 0036	1		DCA	CDUT SAVE TRUNION AND SHAFT ANGLES FOR RRNB
2704	REF	21	LAST	550	32,2430	53'110	1		DXCH	TANG

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2705      32,2431  0 0003 1
2706 REF 144 LAST 569 32,2432 0 4616 1
2707 REF 2 LAST 491 32,2433 53105 0
2708 REF 145 LAST 570 32,2434 0 4616 1
2709 REF 9 LAST 569 32,2435 17714 0
2710 REF 1 32,2436 0 2536 0
271005 32,2437 0 0004 0
27101 REF 5 LAST 555 32,2440 53'334 0
27102 REF 3 LAST 199 32,2441 53'761 1
27103 REF 244 LAST 569 32,2442 52 162 0
27104 REF 5 LAST 201 32,2443 53'755 0
27105 REF 245 LAST 570 32,2444 52 160 1
27106 REF 3 LAST 201 32,2445 53'460 0
271062 32,2446 0 0006 1
27107 REF 22 LAST 569 32,2447 3 1110 0
27108 REF 7 LAST 543 32,2450 53'753 0
27109 REF 246 LAST 570 32,2451 3 0156 0
271095 REF 3 LAST 201 32,2452 55'461 1
2711 REF 49 LAST 565 32,2453 0 6037 0
2712 32,2454 14025 0
2713 REF 4 LAST 569 32,2455 03747 0
2714 32,2456 57261 0
2715 32,2457 20217 1
2716 REF 1 32,2460 24002 0
2717 REF 2 LAST 146 32,2461 03751 1
2720 32,2462 47135 0
2721 REF 23 LAST 570 32,2463 01110 0
2722 REF 13 LAST 548 32,2464 21576 0
2723 REF 2 LAST 146 32,2465 03734 1
2724 32,2466 47135 0
2725 REF 24 LAST 570 32,2467 01111 1
2726 REF 14 LAST 570 32,2470 21576 0
2727 REF 2 LAST 146 32,2471 17736 0
2728 REF 7 LAST 569 32,2472 01102 0
2729 32,2473 66405 0
2730 REF 1 32,2474 24004 0
2732 REF 4 LAST 201 32,2475 37757 0
2733 REF 2 LAST 543 32,2476 46041 0
2734 REF 3 LAST 146 32,2477 17741 0
2735 32,2500 00025 0
2736 REF 17 LAST 565 32,2501 34041 0
2737 REF 5 LAST 518 32,2502 51255 1
2738 32,2503 77776 1
2739 REF 4 LAST 570 32,2504 3 1457 0
2740 REF 10 LAST 478 32,2505 54 766 1
2741 REF 1 32,2506 3 1460 1
2742 REF 11 LAST 570 32,2507 54 770 0
2743 REF 4 LAST 570 32,2510 3 1461 0
2744 REF 12 LAST 570 32,2511 54 772 1
2745 REF 50 LAST 570 32,2512 0 6037 0

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RELINT
TC BANKCALL
CADR RRRANGE READ RR RANGE (ONE SAMPLE)
TC BANKCALL
CADR RADSTALL WAIT FOR READ COMPLETE
TC CHEXERR CHECK FOR ERRORS DURING READ
INHINT COPY CYCLE FOR MARK DATA ON DOWNLINK
DXCH DNRRANGE RANGE,RANGE RATE (RAW DATA)
DXCH RANGRDOT
DXCH MPAC +5
DXCH MKTIME MARK TIME
DXCH MPAC +3
DXCH AIG CDUY, CDUZ
EXTEND
DCA TANG PRESERVE TANG
DXCH TANGNB TRUNION AND SHAFT ANGLES
CA MPAC +2
TS AIG CDUX
TC INTPRET
STOBL 20D SAVE TIME OF CDU READINGS IN 20D
RDOT4SAV CONVERT RDOT UNITS AND SCALING
SL D*PR START WITH READING SCALED B-28, -.6278
14D FT./SECOND PER BIT
RDOTCONV END WITH METERS/CENTISECOND, B-7
STORE RDOTM
SLOAD RTB
TANG GET TRUNION ANGLE
CDU LOGIC CONVERT TO DP ONES COMP. IN REVOLUTIONS
STORE RRTRUN AND SAVE FOR TMI ROUTINE (LSR22.3)
SLOAD RTB
TANG +1 DITTO FOR SHAFT ANGLE
CDU LOGIC
STOBL RRSHAFT
SAMPLSUM
DMP SL2R CONVERT UNITS AND SCALING OF RANGE
RANGCONV PER BIT, END WITH METERS, SCALED -29
STCALL RM
RRNB COMPUTE RADAR LOS USING RRNB-
STOBL RRBORSIT AND SAVE
20D
STCALL TDEC1 GET STATE VECTOR LOS AT TIME OF CDU READ
LPS20.1
EXIT
CA AIG STORE IMU CDU ANGLES AT MARKTIME
TS CDUSPOT IN CDUSPOT FOR TRG*SMNB
CA AMG
TS CDUSPOT +2
CA AIG
TS CDUSPOT +4
TC INTPRET

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2746				32,2513	45175 0	VLOAD	CALL	LOAD VECTOR AND CALL TRANSFORMATION
2747	REF	11	LAST	565	32,2514	01102 0	RRTARGET	
2748	REF	1			32,2515	47651 0	TRG*SMNB	ROTATE LOS AT MARKTIME FROM SM TO NB.
2749					32,2516	77641 1	DOT	DOT WITH RADAR LOS TO GET ANGLE
2750	REF	4	LAST	570	32,2517	03741 0	RRBORSIT	
2751					32,2520	65552 0	SL1	BETWEEN THEM
2752	REF	22	LAST	448	32,2521	01046 1	STORE	STORE FOR POSSIBLE DISPLAY
2753					32,2522	50025 0	DSU	IS IT LESS THAN 3 DEGREES
2754	REF	1			32,2523	24546 0	THREEDEG	
2755	REF	1			32,2524	64531 1	NORMEXIT	YES-NORMAL EXIT
2756					32,2525	77776 1	EXIT	ERROR EXIT 2
2757	REF	33	LAST	551	32,2526	3 4752 0	CAF	SET ERROR CODE
2758	REF	247	LAST	570	32,2527	54 154 0	TS	
2759	REF	1			32,2530	1 2534 0	TCF	OUT22.1
2760					32,2531	77776 1	NORMEXIT EXIT	NORMAL EXIT-SET MPAC EQUAL ZERO
2761	REF	121	LAST	563	32,2532	3 4755 1	CAF	ZERO
2762	REF	248	LAST	571	32,2533	54 154 0	TS	MPAC
2763	REF	4	LAST	569	32,2534	31 737 0	OUT22.1 CAE	EXIT FROM LRS22.1
2764	REF	10	LAST	541	32,2535	0 4640 1	TC	BANKJUMP
2765	REF	17	LAST	558	32,2536	30 101 1	CHEXERR CAE	FLAGWRD5
2766	REF	1			32,2537	7 4742 0	MASK	RNGSCBIT
2767	REF	199	LAST	563	32,2540	10 000 0	CCS	A
2768	REF	1			32,2541	1 2404 1	TCF	READRDOT
								CHECK IF RANGE SCALE CHANGED
								YES-TAKE ANOTHER READING
2769	REF	31	LAST	558	32,2542	3 4753 1	EREXIT1 CA	BIT1
2770	REF	249	LAST	571	32,2543	54 154 0	TS	MPAC
2771	REF	2	LAST	571	32,2544	0 2534 1	TC	OUT22.1
2772					32,2545	00210 1	THREEDEG 2DEC	.003333333
2772					32,2546	21042 1		THREE DEGREES, SCALED REVS.80
2773	REF	12	LAST	571	1101		RRLOSVEC	EQUALS RRTARGET

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P2774 PROGRAM NAME - LRS22.2 (DATA READ SUBROUTINE 2)

R2775 MOD. NO. : 1 BY: P VOLANTE SDC DATE 4-11-67

R2776 FUNCTIONAL DESCRIPTION-

R2777 2) CHECKS IF THE RR LOS (I.E. THE RADAR BORESIGHT VECTOR) IS WITHIN 30 DEGREES OF THE LM +Z AXIS

R2779 CALLING SEQUENCE- BANKCALL FOR LPS22.2

R2780 SUBROUTINES CALLED: G+N, AUTO SETMAXDB

R2781 NORMAL EXIT - RETURN TO CALLER WITH MPAC SET TO +0 (VIA SWRETURN)

R2782 ERROR EXIT - RETURN TO CALLER WITH MPAC SET TO C0C01 -RADAR LOS NOT WITHIN 30 DEGREES OF LM +Z AXIS

R2784 ALARMS - NONE

IN THE AUTO MODE

R2786 ERASABLE INITIALIZATION REQUIRED -

R2787 RRLOSVEC - THE RR LINE-OF-SIGHT VECTOR-A HALF UNIT VECTOR COMPUTED BY LRS22.1

R2789 RM - RR RANGE, METERS B-29, FROM LRS22.1

R2790 BIT 14 CHANNEL 31 -INDICATES AUTOPILOT IS IN AUTO MODE

R2791 DEBRIS - A.L.Q MPAC -PUSHLIST AND PUSHLOC ARE NOT CHANGED BY THIS ROUTINE

2793	REF	5	LAST	564	24,2000		SETLOC P20S	
2794					24,3333		BANK	
2795	REF	8	LAST	569	24,3333	0 4645 1	LRS22.2	TC MAKECADR
2796	REF	5	LAST	571	24,3334	55 737 1		TS LRS22.1X
2797	REF	51	LAST	570	24,3335	0 6037 0		TC INTPRET
A2798								
2799					24,3336	65545 0	30DEGCHK DLOAD	ACUS
2800	REF	5	LAST	571	24,3337	03745 1		RRBORESIT +4
A2801								
A2802								
2803					24,3340	50025 0	DSU	BMN
2804	REF	1			24,3341	11355 1		30DEG
2805	REF	1			24,3342	51347 0		OKEXIT
2806					24,3343	77776 1	EXIT	
2807	REF	32	LAST	571	24,3344	3 4753 1	CAF	BIT1
2808	REF	250	LAST	571	24,3345	54 154 0	TS	MPAC
2809	REF	1			24,3346	1 3352 1	TCF	OUT22.2
2810					24,3347	77776 1	OKEXIT	EXIT

CHECK IF RR LOS IS WITHIN 30 DEG OF
THE SPACECRAFT +Z AXIS
BY TAKING ARCCOS OF Z-COMP. OF THE RR
LOS VECTOR, A HALF UNIT VECTOR
IN NAV-BASE AXES)

NORMAL EXIT-WITHIN 30 DEG.
ERROR EXIT-NOT WITHIN 30 DEG.
SET ERROR CODE IN MPAC

NORMAL EXIT-SET MPAC = ZERO

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2811	REF 122	LAST 571	24.3350	3 4755 1	CAF	ZERO
2812	REF 251	LAST 572	24.3351	54 154 0	TS	MPAC
2813	REF 6	LAST 572	24.3352	31 737 0	CAE	ERS22.1X
2814	REF 11	LAST 571	24.3353	0 4640 1	TC	BANKJUMP

2815			24.3354	02525 1	30DEG	2DEC	.083333333	THIRTY DEGREES, SCALED REVS, B0
2815			24.3355	12525 0				

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P2816 PROGRAM NAME - LSR22.3

DATE - 29 MAY 1967

R2818 MOD. NO 3

LOG SECTION - P20-25

R2820 MOD. BY - DANFORTH

ASSEMBLY LEMP20S REV-10

R2822

R2823 FUNCTIONAL DESCRIPTION

R2824 THIS ROUTINE COMPUTES THE B-VECTORS AND DELTA Q FOR EACH OF THE QUANTITIES MEASURED BY THE RENDEZVOUS
R2826 RADAR. (RANGE, RANGE RATE, SHAFT AND TRUNNION ANGLES). THE ROUTINE CALLS THE INCORP1 AND INCORP2 ROUTINES
R2828 WHICH COMPUTE THE DEVIATIONS AND CORRECT THE STATE VECTOR.

R2829 CALLING SEQUENCE

R2830 THIS ROUTINE IS PART OF P20 RENDEZVOUS NAVIGATION FOR THE LM COMPUTER ONLY. THE ROUTINE IS ENTERED FROM
R2832 R22LEM ONLY AND RETURNS DIRECTLY TO R22LEM FOLLOWING SUCCESSFUL INCORPORATION OF MEASURED DATA. IF THE
R2834 COMPUTED STATE VECTOR DEVIATIONS EXCEED THE MAXIMUM PERMITTED. THE ROUTINE RETURNS TO R22LEM TO DISPLAY
R2836 THE DEVIATIONS. IF THE ASTRONAUT ACCEPTS THE DATA R22LEM RETURNS TO LSR22.3 TO INCORPORATE THE
R2838 DEVIATIONS INTO THE STATE VECTOR. IF THE ASTRONAUT REJECTS THE DEVIATIONS, NO MORE MEASUREMENTS ARE
R2840 PROCESSED FOR THIS MARK, I.E., R22LEM GETS THE NEXT MARK.

R2841

R2842 SUBROUTINES CALLED

R2843	WLIMIT	LGCUPDTE	INTEGRV	INCORP1	ARCTAN
R2844	GETULC	RARARANG	INCORP2	NBSM	INTSTALL

R2845

R2846 OUTPUT

R2847 CORRECTED LM OR CSM STATE VECTOR (PERMANENT)

R2848 NUMBER OF MARKS INCORPORATED IN MARKCTR

R2849 MAGNITUDE OF POSITION DEVIATION (FOR DISPLAY) IN R22DISP METERS B-29

R2850 MAGNITUDE OF VELOCITY DEVIATION (FOR DISPLAY) IN R22DISP +2 M/CSEC B-7

R2851 UPDATED W-MATRIX

R2852

R2853 ERASABLE INITIALIZATION REQUIRED

R2854 LM AND CSM STATE VECTORS

R2855 W-MATRIX

R2856 MARK TIME IN MKTIME

R2857 RADAR RANGE IN RM METERS B-29

R2858 RANGE RATE IN RDOTM METERS/CSES B-7

R2859 SHAFT ANGLE IN RSHAFT REVS. B0

R2860 TRUNNION ANGLE IN RRTRUN REVS. B0

R2861 GIMBAL ANGLES INNER IN AIG

R2862 MIDDLE IN AMG

R2863 OUTER IN AOG

R2864 REFSMMAT

R2865 RENDWFLG

R2866 NOANGFLG

R2867 VEHUPFLG

R2868 DEBRIS

R2869 PUSHLIST--ALL

R2870 MX, MY, MZ (VECTORS)

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2871 ULC,RXZ,SINTheta,LGRET,RDRET,BVECTOR,W.IND.X78T

2872				13,2207		BANK 13	
2873	REF	1		26,2000		SETLOC P20S3	
2874				26,2412		BANK	
2875	REF	29	LAST	561	E7,1456	EBANK= LOSCOUNT	
2876	REF	1				COUNT* \$\$/LSR22	
2877				26,2412	77624 1	CALL	LSR22.3
2878	REF	7	LAST	506	26,2413	11244 0	GRP2PC
2879				26,2414	43014 0	BON SET	
2880	REF	7	LAST	565	26,2415	04307 1	SURFFLAG ARE WE ON LUNAR SURFACE
2881	REF	1			26,2416	55200 0	LSR22.4 YES
2882	REF	1			26,2417	02466 1	DMENFLG
2883				26,2420	45014 0	BOFF CALL	
2884	REF	6	LAST	500	26,2421	00747 0	VEHUPFLG
2885	REF	1			26,2422	54454 0	DOLEM
2886	REF	11	LAST	500	26,2423	27414 0	INTSTALL
2887				26,2424	45014 0	CLEAR CALL	LM PRECISION INTEGRATION
2888	REF	10	LAST	500	26,2425	01674 0	VINTFLAG
2889	REF	4	LAST	500	26,2426	26644 0	SETIFLGS
2890				26,2427	77624 1	CALL	
2891	REF	1			26,2430	55242 0	INTGRCAL
2892				26,2431	77624 1	CALL	
2893	REF	8	LAST	575	26,2432	11244 0	GRP2PC
2894				26,2433	77624 1	CALL	
2895	REF	12	LAST	575	26,2434	27414 0	INTSTALL
2896				26,2435	43014 0	CLEAR BOFF	
2897	REF	7	LAST	500	26,2436	01676 1	DIMOFFLAG
2898	REF	5	LAST	500	26,2437	02756 1	RENDWFLG
2899	REF	1			26,2440	54444 1	NOTWCSM
2900				26,2441	43014 0	SET SET	CSM WITH W-MATRIX INTEGRATION
2901	REF	8	LAST	575	26,2442	01476 0	DIMOFFLAG
2902	REF	5	LAST	500	26,2443	01475 0	D6OR9FLG
2903				26,2444	43014 0	NOTWCSM SET	CLEAR
2904	REF	11	LAST	575	26,2445	01474 1	VINTFLAG
2905	REF	3	LAST	494	26,2446	01673 1	INTYPFLG
2906				26,2447	45014 0	SET CALL	
2907	REF	1			26,2450	01472 1	STATEFLG
2908	REF	2	LAST	575	26,2451	55242 0	INTGRCAL
2909				26,2452	77650 1	GOTO	
2910	REF	1			26,2453	54504 1	MARKTEST
2911				26,2454	77624 1	DOLEM CALL	
2912	REF	13	LAST	575	26,2455	27414 0	INTSTALL
2913				26,2456	45014 0	SET CALL	
2914	REF	12	LAST	575	26,2457	01474 1	VINTFLAG
2915	REF	5	LAST	575	26,2460	26644 0	SETIFLGS
2916				26,2461	77624 1	CALL	
2917	REF	3	LAST	575	26,2462	55242 0	INTGRCAL

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2918				26,2463	77624-1	CALL		
2919	REF	9	LAST	575	26,2464	11244-0	GRP2PC	
2920				26,2465	77624-1	CALL		
2921	REF	14	LAST	575	26,2466	27414-0	INTSTALL	
2922				26,2467	43014-0	CLEAR	BOFF	
2923	REF	9	LAST	575	26,2470	01676-1	DIMOFLLG	
2924	REF	6	LAST	575	26,2471	02756-1	PENDWFLG	
2925	REF	1			26,2472	54476-0	NOTWLEM	
2926				26,2473	43014-0	SET	SET	LM WITH W-MATRIX-TEGRATION
2927	REF	10	LAST	576	26,2474	01476-0	DIMOFLLG	
2928	REF	6	LAST	575	26,2475	01475-0	D6OR9FLG	
2929				26,2476	43014-0	NOTWLEM	CLEAR	
2930	REF	4	LAST	575	26,2477	01673-1	INTYPFLG	
2931	REF	13	LAST	575	26,2500	01674-0	VINTFLAG	
2932				26,2501	45014-0	SET	CALL	
2933	REF	2	LAST	575	26,2502	01472-1	STATEFLG	
2934	REF	4	LAST	575	26,2503	55242-0	INTGRCAL	
2935				26,2504	45014-0	MARKTEST	BON	HAS W-MATRIX BEEN INVALIDATED
2936	REF	7	LAST	576	26,2505	02716-0	RENDWFLG	HAS W-MATRIX BEEN INVALIDATED
2937	REF	1			26,2506	54510-1	RANGEBQ	
2938	REF	1			26,2507	55251-1	WLINIT	YES-REINITIALIZE
2939				26,2510	77414-0	RANGEBQ	BON	DON'T CALL R65 IF ON SURFACE
29393	REF	8	LAST	575	26,2511	04307-1	SURFFLAG	
29396	REF	1			26,2512	54520-1	RANGEBQ1	
2940	REF	123	LAST	573	26,2513	3-4755-1	CA	ZERO
2941	REF	6	LAST	519	26,2514	55-745-1	TS	R65CNTR
2942	REF	146	LAST	570	26,2515	0-4616-1	TC	BANKCALL
2943	REF	3	LAST	507	26,2516	46123-0	CADR	P65LEM
2944	REF	52	LAST	572	26,2517	0-6037-0	TC	INTPRET
2945				26,2520	43174-1	RANGEBQ1	AXT,2	BON
2946				26,2521	00000-1			CLEAR X2
2947	REF	2	LAST	37	26,2522	04304-1	LMOONFLG	IS MOON SPHERE OF INFLUENCE
2948	REF	1			26,2523	54526-1	SETX2	YES. STORE ZERO IN SCALSHFT REGISTER
2949				26,2524	77714-0		INCR,2	
2950				26,2525	00002-0			2
2951				26,2526	45134-0	SETX2	SXA,2	CALL
2952	REF	2	LAST	145	26,2527	03720-1	SCALSHFT	0-MOON. 2-EARTH
2953	REF	10	LAST	576	26,2530	11244-0	GRP2PC	
29533				26,2531	66170-1	AXT,1	SXA,1	STORE RANGE CODE (1) FOR R3 IN NOUN 49
29536				26,2532	00001-0			1
29539	REF	2	LAST	314	26,2533	03745-1	WHCHHEAD	
2954				26,2534	54335-0	SLOAD	SR	GET SINGLE PRECISION RVARMIN (B-12)
2955	REF	1			26,2535	01775-0	RVARMIN	SHIFT TO TRIPLE PRECISION (B-40)
2956				26,2536	20635-0			280
2957				26,2537	77634-0	RTB		
2958	REF	1			26,2540	21633-1	TPMODE	AND SAVE IN 200
2959				26,2541	00025-0	STORE	200	
2960				26,2542	77624-1	CALL		BEGIN COMPUTING THE B-VECTORS, DELTAQ
2961	REF	1			26,2543	55333-1	GETULC	B-VECTORS FOR RANGE
2962				26,2544	57414-1	BON	VCOMP	B0, COMP. IF LM BEING CORRECTED

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2963	REF	7	LAST	575	26,2545	00707 1		VEHUPFLG	
2964					26,2546	54547 0		+1	
2965	REF	2	LAST	145	26,2547	27525 0	STOVL	BVECTOR	
2966	REF	2	LAST	37	26,2550	06522 1		ZEROVECS	
2967	REF	3	LAST	577	26,2551	03533 1	STORE	BVECTOR +6	B1
2968	REF	4	LAST	577	26,2552	17541 1	STODL	BVECTOR +12D	B2
2969					26,2553	00045 0		36D	
2970					26,2554	44257 1	SRR*	BDSU	
2971					26,2555	56174 0		2,2	SHIFT FROM EARTH/MOON SPHERE TO B-29
2972	REF	5	LAST	570	26,2556	03757 1		RM	RM - (MAGNITUDE RCSM-RLM)
2973					26,2557	77657 0	SLR*		
2974					26,2560	56574 1		2,2	SHIFT TO EARTH/MOON SPHERE
2975	REF	2	LAST	145	26,2561	17547 1	STODL	DELTAQ	EARTH B-29. MOON B-27
2976					26,2562	00045 0		36D	RLC B-29/B-27
2977					26,2563	63501 0	NORM	DSQ	NORMALIZE AND SQUARE
2978	REF	3	LAST	387	26,2564	00047 1		X1	
2979					26,2565	53605 1	DMP	SR*	
2980	REF	1			26,2566	01771 1		RANGEVAR	MULTIPLY BY RANGEVAR(B12) THEN
2981					26,2567	20577 0		C -2,1	UNNORMALIZE
2982					26,2570	53657 0	SR*	SR*	
2983					26,2571	20601 1		0,1	
2984					26,2572	57176 0		0,2	
2985					26,2573	47057 0	SR*	RTB	
2986					26,2574	57176 0		0,2	
2987	REF	2	LAST	576	26,2575	21633 1		TPMODE	
2988	REF	2	LAST	126	26,2576	02707 0	STORE	VARIANCE	B-40
2989					26,2577	76276 0	DCOMP	TAD	
2990					26,2600	00025 0		20D	B-40
2991					26,2601	72240 1	BMN	TLOAD	
2992	REF	1			26,2602	54605 0		QOK	
2993					26,2603	00025 0		20D	B-40
2994	REF	3	LAST	577	26,2604	02707 0	STORE	VARIANCE	
2995					26,2605	77624 1	CALL		
2996	REF	1			26,2606	55401 1		LGCUPDTE	
2997					26,2607	45131 0	SSP	CALL	
2998	REF	3	LAST	576	26,2610	03746 1		WHCHREAD	
29983					26,2611	00002 0	DEC	2	STORE R-RATE CODE (2) FOR R3 IN NOUN-49
29986	REF	11	LAST	576	26,2612	11244 0		GRP2PC	
2999					26,2613	77624 1	CALL		B-VECTOR, DELTAQ FOR RANGE RATE
3000	REF	2	LAST	576	26,2614	55333 1		GETULC	
3001					26,2615	53725 1	PDDL	SR*	GET RLC SCALED B-29/B-27
3002					26,2616	00045 0		36D	AND SHIFT TO B-23
3003					26,2617	57202 0		0 -4,2	
3004					26,2620	24045 0	STOVL	36D	THEN STORE BACK IN 36D
3005					26,2621	57414 1	BON	VCOMP	B1, COMP. IF LM BEING CORRECTED
3006	REF	8	LAST	577	26,2622	00707 1		VEHUPFLG	
3007					26,2623	54624 0		+1	
3008					26,2624	77761 1	VXSC		
3009					26,2625	00045 0		36D	B1 = RLC (B-24/B-22)

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3010	REF	5	LAST	577	26,2626	27533 1	STOVL	BVECTOR +6	
3011	REF	1			26,2627	01653 0		NUVLEM	
3012					26,2630	53257 1	VSR*	VAD	
3013					26,2631	57170 0		6,2	SHIFT FOR EARTH/MOON SPHERE
3014	REF	2	LAST	500	26,2632	01667 1		VCVLEM	EARTH B-7. MOON B-5
3015					26,2633	53715 1	PDVL	VSR*	VL TO PD6
3016	REF	1			26,2634	01601 1		HUVCSM	
3017					26,2635	57170 0		6,2	SHIFT FOR EARTH/MOON SPHERE
3018					26,2636	52255 1	VAD	VSU	
3019	REF	1			26,2637	01615 1		VCVCSM	
3020					26,2640	50315 0	PDVL	DOT	VC - VL = VLC TO PD6
3021					26,2641	00001 0		0	
3022					26,2642	00007 0		6	
3023					26,2643	53606 1	PUSH	SRR*	RDOT B-8/B-6 TO PD12
3024					26,2644	56174 0		2,2	SHIFT FROM EARTH/MOON SPHERE TO B-9
3025					26,2645	57316 1	DSQ	DMPR	RDOT**2 B-16 X RATEVAR B12
3026	REF	1			26,2646	01773 0		RATEVAR	
3027	REF	4	LAST	577	26,2647	02707 0	STORE	VARIANCE	
3028					26,2650	54335 0	SLOAD	SR	
3029	REF	1			26,2651	01776 0		VVARMIN	GET SINGLE PRECISION VVARMIN (B+12)
3030					26,2652	20621 0		160	SHIFT TO DP (B-4)
3031					26,2653	00031 0	STORE	240	AND SAVE IN 240
3032					26,2654	50025 0	DSU	BMM	IS MIN. VARIANCE > COMPUTED VARIANCE
3033	REF	5	LAST	578	26,2655	02707 0		VARIANCE	
3034	REF	1			26,2656	54662 1		VOK	BRANCH - NO
3035					26,2657	77745 1	DLOAD		YES - USE MINIMUM VARIANCE
3036					26,2660	00031 0		240	
3037	REF	6	LAST	578	26,2661	02707 0	STORE	VARIANCE	
3038					26,2662	60545 0	DLOAD	SR2	RDOT(PD12) FROM B-8/B-6
3039					26,2663	53725 1	PDDL	SLR*	TO B-10/B-8
3040	REF	3	LAST	570	26,2664	03751 1		RDOTH	SHIFT TO EARTH/MOON SPHERE
3041					26,2665	56577 1		0 -1,2	B-7 TO B-10/B-8
3042					26,2666	77625 0	DSU		
3043					26,2667	77675 0	DMPR		
3044					26,2670	00045 0		360	
3045	REF	3	LAST	577	26,2671	27547 1	STOVL	DELTAQ	B-33
3046					26,2672	00001 0		0	NOW GET B0
3047					26,2673	47235 0	VXV	VXV	(ULC X VLC) X ULC
3048					26,2674	57414 1	BON	VCOMP	B0, COMP. IF LM BEING CORRECTED
3049	REF	9	LAST	577	26,2675	00707 1		VEHUPFLG	
3050					26,2676	54677 0		+1	
3051					26,2677	77657 0	VSR*		
3052					26,2700	57200 1		0 -2,2	SCALED B-5
3053	REF	6	LAST	578	26,2701	27525 0	STOVL	BVECTOR	
3054	REF	3	LAST	577	26,2702	06522 1		ZEROVECS	
3055					26,2703	00025 0	STORE	200	ZERO OUT 20 TO 25 IN PUSHLIST
3056	REF	7	LAST	578	26,2704	27541 1	STOVL	BVECTOR +120	
3057	REF	8	LAST	578	26,2705	03525 0		BVECTOR	
3058					26,2706	60246 1	ABVAL	NORM	LOAD B0, GET MAGNITUDE AND NORMALIZE
3059					26,2707	00025 0		200	SHIFT COUNT IN 200

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3060				26,2710	51575 1	VLOAD	ABVAL	
3061	REF	9	LAST	578	26,2711	03533 1	BVECTOR +6D	LOAD B1, GET MAGNITUDE AND NORMALIZE
3062				26,2712	71301 0	NORM	DLOAD	
3063				26,2713	00027 1		22D	SHIFT COUNT IN 22D
3064				26,2714	00027 1		22D	FIND WHICH SHIFT IS SMALLER
3065				26,2715	50025 0	DSU	BMN	BRANCH- B0 HAS SMALLER SHIFT COUNT
3066				26,2716	00025 0		20D	
3067	REF	1			26,2717	54723 0	VOK1	
3068				26,2720	52150 1	LXA,1	GOTO	
3069				26,2721	00026 0		22D	LOAD X2 WITH THE SMALLER SHIFT COUNT
3070	REF	1			26,2722	54725 0	VOK2	
3071				26,2723	77750 0	VOK1	LXA,1	
3072				26,2724	00024 1		20D	
3073				26,2725	53775 1	VOK2	VLOAD	THEN ADJUST B0,B1,DELTAQ AND VARIANCE
3074	REF	10	LAST	579	26,2726	03525 0	BVECTOR	WITH THIS SHIFT COUNT
3075				26,2727	20201 0		0,1	
3076	REF	11	LAST	579	26,2730	27525 0	STOVL	BVECTOR
3077	REF	12	LAST	579	26,2731	03533 1	BVECTOR +6	
3078				26,2732	77657 0	VSL*		
3079				26,2733	20201 0		0,1	
3080	REF	13	LAST	579	26,2734	17533 1	STODL	BVECTOR +6
3081	REF	4	LAST	578	26,2735	03547 1	DELTAQ	
3082				26,2736	77657 0	SL*		
3083				26,2737	20201 0		0,1	
3084	REF	5	LAST	579	26,2740	03547 1	STORE	DELTAQ
3085				26,2741	53745 1	DLOAD	SL*	GET RLC AND ADJUST FOR SCALE SHIFT
3086				26,2742	00045 0		36D	
3087				26,2743	20200 1		0 -1.1	
3088				26,2744	41316 0	DSQ	DMP	MULTIPLY RLC**2 BY VARIANCE
3089	REF	7	LAST	578	26,2745	02707 0	VARIANCE	
3090				26,2746	47012 1	SL4	RTB	SHIFT TO CONFORM TO BVECTORS AND DELTAQ
3091	REF	3	LAST	577	26,2747	21633 1	TPMODE	
3092	REF	8	LAST	579	26,2750	36707 1	STCALL	VARIANCE
3093	REF	2	LAST	577	26,2751	55401 1	LGCUPDTE	AND STORE TP VARIANCE
3094				26,2752	77624 1	CALL		
3095	REF	12	LAST	577	26,2753	11244 0	GRP2PC	
3096				26,2754	77414 0	BON	EXIT	ARE ANGLES TO BE DONE
3097	REF	9	LAST	576	26,2755	04307 1	SURFLAG	
3098	REF	1			26,2756	55176 1	RENDEND	NO
3099	REF	5	LAST	570	E7,1457		EBANK=	AIG
3100	REF	1			26,2757	3-3332 0	CAF	AIGBANK
3101	REF	13	LAST	456	26,2760	54-006 0	TS	BBANK
3102	REF	6	LAST	579	26,2761	3-1457 0	CA	AIG
3103	REF	13	LAST	570	26,2762	54-766 1	TS	CDUSPJT
3104	REF	2	LAST	570	26,2763	3-1460 1	CA	AMG
3105	REF	14	LAST	579	26,2764	54-770 0	TS	CDUSPOT +2
3106	REF	5	LAST	570	26,2765	3-1461 0	CA	AOG
3107	REF	15	LAST	579	26,2766	54-772 1	TS	CDUSPOT +4
3108	REF	53	LAST	576	26,2767	0-6037 0	TC	INTPRET

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3109				26,2770	45175 0	VLOAD	CALL	
3110	REF	5	LAST	339	26,2771	06520 0	UNITX	
3111	REF	4	LAST	253	26,2772	47664 0	TRG*NBSM	
3112				26,2773	76505 0	VXM	VSL1	
3113	REF	10	LAST	565	26,2774	01734 0	REFSMMAT	
3114	REF	5	LAST	145	26,2775	27677 1	STOVL	MX
3115	REF	3	LAST	300	26,2776	06516 0	UNITY	
3116				26,2777	77624 1	CALL		
3117	REF	2	LAST	550	26,3000	47673 0	*NBSM*	
3118				26,3001	76505 0	VXM	VSL1	
3119	REF	11	LAST	580	26,3002	01734 0	REFSMMAT	
3120	REF	2	LAST	145	26,3003	27705 0	STOVL	MY
3121	REF	5	LAST	340	26,3004	06514 1	UNITZ	
3122				26,3005	77624 1	CALL		
3123	REF	3	LAST	580	26,3006	47673 0	*NBSM*	
3124				26,3007	76505 0	VXM	VSL1	
3125	REF	12	LAST	580	26,3010	01734 0	REFSMMAT	
3126	REF	2	LAST	145	26,3011	37713 0	SHAFTBQ STCALL	MZ
3127	REF	1		26,3012	55361 0		RADARANG	
3128				26,3013	45131 0	SSP	CALL	STORE SHAFT CODE (3) FOR R3 IN NOUN 49
3129	REF	4	LAST	577	26,3014	03746 1	WHCHREAD	
31293				26,3015	00003 1	DEC	3	
31296	REF	13	LAST	579	26,3016	11244 0	GRP2PC	
3130				26,3017	50375 0	VLOAD	DOT	COMPUTE DELTAQ,B VECTORS FOR SHAFT ANG.
3131	REF	2	LAST	145	26,3020	03724 0	ULC	
3132	REF	6	LAST	580	26,3021	03677 1	MX	
3133				26,3022	77752 1	SL1		
3134	REF	6	LAST	478	26,3023	24023 0	STOVL	SINTH 180
3135	REF	3	LAST	580	26,3024	03724 0	ULC	
3136				26,3025	72441 0	DOT	SL1	
3137	REF	3	LAST	580	26,3026	03713 1	MZ	
3138	REF	6	LAST	478	26,3027	34021 0	STCALL	COSTH 160
3139	REF	3	LAST	478	26,3030	26510 1	ARCTAN	
3140				26,3031	41221 0	BDSU	DMP	
3141	REF	3	LAST	570	26,3032	03736 0	RRSHAFT	
3142	REF	1		26,3033	15441 1		2PI/8	
3143				26,3034	41472 0	SL3R	PUSH	
3144				26,3035	52545 1	DLOAD	SL3	
3145	REF	2	LAST	196	26,3036	01701 0	X789	
3146				26,3037	44257 1	SRP*	BDSU	SHIFT FROM -5/-3 TO B0
3147				26,3040	56176 1		0.2	
3148				26,3041	53605 1	DMP	SRR*	
3149	REF	2	LAST	145	26,3042	03722 0	RXZ	
3150				26,3043	21601 0		0.1	SHIFT TO EARTH/MOON SPHERE
3151	REF	6	LAST	579	26,3044	27547 1	STOVL	DELTAQ EARTH B-29. MOON B-27
3152	REF	4	LAST	580	26,3045	03724 0	ULC	
3153				26,3046	76435 1	VXV	VSL1	
3154	REF	3	LAST	580	26,3047	03705 0	MY	
3155				26,3050	77656 1	UNIT		
3156				26,3051	57414 1	BOFF	VCOMP	B0, GOMP. IF CSM BEING CORRECTED

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3157	REF	10	LAST	578	26,3052	00747 0	VEHUPFLG	
3158					26,3053	55054 0	+1	
3159	REF	14	LAST	579	26,3054	27525 0	STOVL BVECTOR	
3160	REF	4	LAST	578	26,3055	06522 1	ZEROVECS	
3161	REF	15	LAST	581	26,3056	03533 1	STORE BVECTOR +6	
3162	REF	16	LAST	581	26,3057	17541 1	STODL BVECTOR +120	
3163	REF	3	LAST	580	26,3060	03722 0	RXZ	
3164					26,3061	53657 0	SR* SKR*	SHIFT FROM EARTH/MOON SPHERE TO B-25
3165					26,3062	20577 0	0 -2,1	
3166					26,3063	56176 1	0,2	
3167	REF	17	LAST	581	26,3064	03541 1	STORE BVECTOR +120	
3168					26,3065	77735 0	SLUAD	
3169	REF	1			26,3066	02011 0	SHAFTVAR	
3170					26,3067	41215 1	DAD DMP	
3171	REF	1			26,3070	15436 1	IMUVAR	RAD**2 B12
3172	REF	4	LAST	581	26,3071	03722 0	RXZ	
3173					26,3072	41257 1	SRK* DMP	
3174					26,3073	21601 0	0,1	SHIFT TO EARTH/MOON SPHERE
3175	REF	5	LAST	581	26,3074	03722 0	RXZ	
3176					26,3075	53657 0	SR* SR*	
3177					26,3076	20577 0	0 -2,1	
3178					26,3077	57176 0	0,2	
3179					26,3100	47057 0	SR* RTB	
3180					26,3101	57176 0	0,2	
3181	REF	4	LAST	579	26,3102	21633 1	TPMODE	STORE VARIANCE TRIPLE PRECISION
3182	REF	9	LAST	579	26,3103	36707 1	STCALL VARIANCE	B-40
3183	REF	3	LAST	579	26,3104	55401 1	LGCUPDTE	
3184					26,3105	77624 1	CALL	
3185	REF	14	LAST	580	26,3106	11244 0	GRP2PC	
3186					26,3107	77624 1	TRUNBQ CALL	
3187	REF	2	LAST	580	26,3110	55361 0	RADARANG	
3188					26,3111	45131 0	SSP CALL	STORE TRUNNION CODE (4) FOR R3 IN 149
3189	REF	5	LAST	580	26,3112	03746 1	WHCHREAD	
31893					26,3113	00004 0	DEC 4	
31896	REF	15	LAST	581	26,3114	11244 0	GRP2PC	
3190					26,3115	47375 0	VLOAD VXV	
3191	REF	5	LAST	580	26,3116	03724 0	ULC	
3192	REF	4	LAST	580	26,3117	03705 0	MY	
3193					26,3120	47372 1	VSL1 VXV	
3194	REF	6	LAST	581	26,3121	03724 0	ULC	
3195					26,3122	77772 0	VSL1	(ULC X MY) X ULC
3196					26,3123	57414 1	BOFF VCOMP	BO. COMP. IF CSM BEING CORRECTED
3197	REF	11	LAST	581	26,3124	00747 0	VEHUPFLG	
3198					26,3125	55126 1	+1	
3199	REF	18	LAST	581	26,3126	27525 0	STOVL BVECTOR	
3200	REF	5	LAST	581	26,3127	06522 1	ZEROVECS	
3201	REF	19	LAST	581	26,3130	03533 1	STORE BVECTOR +6	
3202	REF	20	LAST	581	26,3131	17541 1	STODL BVECTOR +120	
3203	REF	6	LAST	581	26,3132	03722 0	RXZ	

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3204				26,3133	53657 0	SR*	SRR*	SHIFT FROM EARTH/MOON SPHERE TO B-25
3205				26,3134	20577 0		0 -2,1	
3206				26,3135	56176 1		0,2	
3207	REF	21	LAST	581	26,3136	03543 0	STORE	BVECTOR +140
3208					26,3137	77735 0	SLOAD	
3209	REF	1			26,3140	02012 0		TRUNVAR
3210					26,3141	41215 1	DAD	DMP
3211	REF	2	LAST	581	26,3142	15436 1		IMUVAR
3212	REF	7	LAST	581	26,3143	03722 0		RXZ
3213					26,3144	41257 1	SRR*	DMP
3214					26,3145	21601 0		0,1
3215	REF	8	LAST	582	26,3146	03722 0		SHIFT TO EARTH/MOON SPHERE
3216					26,3147	53657 0	SR*	SR*
3217					26,3150	20577 0		0 -2,1
3218					26,3151	57176 0		0,2
3219					26,3152	47057 0	SR*	RTB
3220					26,3153	57176 0		0,2
3221	REF	5	LAST	581	26,3154	21633 1		TPMODE
3222	REF	10	LAST	581	26,3155	16707 0	STOOL	VARIANCE
3223	REF	2	LAST	146	26,3156	03732 1		SINTHETA
3224					26,3157	44336 1	ASIN	BDSU
3225	REF	3	LAST	570	26,3160	03734 1		SIN THETA IN PD6
3226					26,3161	56405 0		RRTRUN
3227	REF	2	LAST	580	26,3162	15441 1	DMP	SL3R
3228					26,3163	52525 1		2PI/8
3229	REF	3	LAST	580	26,3164	01703 1	PDDL	SL3
3230					26,3165	44257 1		X789 +2
3231					26,3166	56176 1	SRR*	BDSU
3232					26,3167	53605 1		SHIFT FROM -5/-3 TO 80
3233	REF	9	LAST	582	26,3170	03722 0	DMP	SRR*
3234					26,3171	21601 0		0,2
3235	REF	7	LAST	580	26,3172	37547 0		0,1
3236	REF	4	LAST	581	26,3173	55401 1	STCALL	DELTAQ
3237					26,3174	77624 1		EARTH B-29. MOON B-27
3238	REF	16	LAST	581	26,3175	11244 0	LGCUPDTE	
3239					26,3176	77650 1	CALL	
3240	REF	1			26,3177	50566 1	GRP2PC	
							RENDEND	GOTO
								R22LEM93

R3241 FUNCTIONAL DESCRIPTION

R3242 LSR22.4 IS THE ENTRY TO PERFORM LUNAR SURFACE NAVIGATION FOR THE LM
R3243 COMPUTER ONLY. THIS ROUTINE COMPUTES THE B-VECTORS AND DELTA Q FOR RANGE
R3244 AND RANGE RATE MEASURED BY THE RENDEZVOUS RADAR

R3245 SUBROUTINES CALLED

R3246 INSTALL LGCUPDTE INCORP1 RP-TO-R
R3247 INTEGRV GETULC INCORP2

R3248 OUTPUT

R3249 CORRECTED CSM STATE VECTOR (PERMANENT)
R3250 NUMBER OF MARKS INCORPORATED IN MARKCTR

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R3251 MAGNITUDE OF POSITION DEVIATION (FOR DISPLAY) IN R22DISP METERS B-29
 R3252 MAGNITUDE OF VELOCITY DEVIATION (FOR DISPLAY) IN R22DISP +2 M/CSEC B-7
 R3253 UPDATED W-MATRIX

R3254 ERASABLE INITIALIZATION REQUIRED
 R3255 LM AND CSM STATE VECTORS
 R3256 W-MATRIX
 R3257 MARK TIME IN MKTIME
 R3258 RADAR RANGE IN RM METERS B-29
 R3259 RANGE RATE IN RDOTM METERS/CSEC B-7
 R3260 VEHUPFLG

3261				26,3200	77624 1	LSR22.4	CALL		
3262	REF	15	LAST	576	26,3201	27414 0		INTSTALL	
3263					26,3202	43014 0	SET	CLEAR	
3264	REF	3	LAST	576	26,3203	01472 1		STATEFLG	
3265	REF	14	LAST	576	26,3204	01674 0		VINTFLAG	CALL TO GET LM POS + VEL IN REF COORD.
3266					26,3205	77624 1	CALL		
3267	REF	5	LAST	576	26,3206	55242 0		INTGRCAL	
3268					26,3207	77624 1	CALL		
3269	REF	17	LAST	582	26,3210	11244 0		GRP2PC	
3270					26,3211	45014 0	CLEAR	CALL	
3271	REF	2	LAST	575	26,3212	02666 0		DMENFLG	SET MATRIX SIZE TO 6X6 FOR INCORP
3272	REF	16	LAST	583	26,3213	27414 0		INTSTALL	
3273					26,3214	46145 0	DLOAD	BHIZ	IS THIS FIRST TIME THROUGH
3274	REF	3	LAST	506	26,3215	03463 0		MARKCTR	
3275	REF	1			26,3216	55231 1		INITWMX6	YES. INITIALIZE 6X6 W-MATRIX
3276					26,3217	43014 0	CLEAR	SET	
3277	REF	7	LAST	576	26,3220	01675 1		D6OR9FLG	
3278	REF	11	LAST	576	26,3221	01476 0		DIMDFLAG	
3279					26,3222	43014 0	SET	CLEAR	
3280	REF	15	LAST	583	26,3223	01474 1		VINTFLAG	
3281	REF	5	LAST	576	26,3224	01673 1		INTYPFLG	
3282					26,3225	77624 1	CALL		
3283	REF	6	LAST	583	26,3226	55242 0		INTGRCAL	
3284					26,3227	77650 1	GOTO		
3285	REF	2	LAST	576	26,3230	54510 1		RANGEBQ	
3286					26,3231	77624 1	INITWMX6	CALL	
3287	REF	2	LAST	576	26,3232	55251 1		WLINIT	INITIALIZE W-MATRIX
3288					26,3233	45014 0	SET	CALL	
3289	REF	16	LAST	583	26,3234	01474 1		VINTFLAG	
3290	REF	6	LAST	575	26,3235	26644 0		SETIFLG5	
3291					26,3236	77624 1	CALL		
3292	REF	7	LAST	583	26,3237	55242 0		INTGRCAL	
3293					26,3240	77650 1	GOTO		
3294	REF	3	LAST	583	26,3241	54510 1		RANGEBQ	

R3295 THIS ROUTINE CLEARS RFINAL (DP) AND CALLS INTEGRV

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3296				26,3242	71220 1	INTGRCAL STQ	DLOAD
3297	REF	1		26,3243	03675 0		IGRET
3298	REF	6	LAST 570	26,3244	03755 0		MKTIME
3299	REF	18	LAST 570	26,3245	34041 0	STCALL	TDEC1
3300	REF	8	LAST 500	26,3246	27134 1		INTEGRV
3301				26,3247	77650 1	GOTO	
3302	REF	2	LAST 584	26,3250	03675 0		IGRET

R3303 THIS ROUTINE INITIALIZES THE W-MATRIX BY ZEROING ALL W THEN SETTING
 R3304 DIAGONAL ELEMENTS TO INITIAL STORED VALUES.

3305	REF	4	LAST 127	E5,1400		EBANK= W	
3306				26,3251	77776 1	WLINIT	EXIT
3307	REF	1		26,3252	3 3331 0	CAF	WBANK
3308	REF	14	LAST 579	26,3253	54 006 0	TS	BBANK
3309	REF	1		26,3254	3 3437 1	CAF	WSIZE
3310	REF	2	LAST 107	26,3255	55 257 1	TS	W.IND
3311	REF	124	LAST 576	26,3256	3 4755 1	CAF	ZERO
3312	REF	3	LAST 584	26,3257	51 257 0	INDEX	W.IND
3313	REF	5	LAST 584	26,3260	55 400 0	TS	W
3314	REF	4	LAST 584	26,3261	11 257 1	CCS	W.IND
3315				26,3262	0 3255 0	TC	-5
3316	REF	2	LAST 579	26,3263	3 3332 0	CAF	AIGBANK
3317	REF	15	LAST 584	26,3264	54 006 0	TS	BBANK
3318	REF	54	LAST 579	26,3265	0 6037 0	TC	INTPRET
3319				26,3266	67214 1	BON	SLOAD
3320	REF	10	LAST 579	26,3267	04307 1		SURFFLAG
3321	REF	1		26,3270	55274 0		WLSRFPOS
3322	REF	2	LAST 117	26,3271	02001 1		WRENDPOS
3323				26,3272	77650 1	GOTO	
3324	REF	1		26,3273	55276 1		WPOSTORE
3325				26,3274	77735 0	WLSRFPOS	SLOAD
3326	REF	1		26,3275	02007 1		WSURFPOS
3327				26,3276	77661 0	WPOSTORE	SR
3328				26,3277	20606 0		5
3329	REF	6	LAST 584	26,3300	02401 0	STORE	W
3330	REF	7	LAST 584	26,3301	02411 1	STORE	W +80
3331	REF	8	LAST 584	26,3302	02421 1	STORE	W +160
3332				26,3303	67214 1	BON	SLOAD
3333	REF	11	LAST 584	26,3304	04307 1		SURFFLAG
3334	REF	1		26,3305	55311 1		WLSRFVEL
3335	REF	1		26,3306	02002 1		WRENDVEL
3336				26,3307	77650 1	GOTO	
3337	REF	1		26,3310	55313 0		WVELSTOR
3338				26,3311	77735 0	WLSRFVEL	SLOAD
3339	REF	1		26,3312	02010 1		WSUPFVEL
3340	REF	9	LAST 584	26,3313	02511 0	WVELSTOR	STORE
3341	REF	10	LAST 584	26,3314	02521 0		W +720
3342	REF	11	LAST 584	26,3315	02531 1		W +800
3343				26,3316	77735 0		SLOAD

RESTORE EBANK 7

IF ON LUNAR SURFACE, INITIALIZE WITH
 WSURFPOS AND WSURFVEL INSTEAD OF
 WRENDPOS AND WRENDVEL

SHIFT TO B-19 SCALE

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3344	REF	1		26,3317	02003 0	WSHAFT	
3345	REF	12	LAST 584	26,3320	02621 0	STORE	W +144D
3346				26,3321	77735 0	SLOAD	
3347	REF	1		26,3322	02004 1	WTRUN	
3348	REF	13	LAST 585	26,3323	02631 1	STORE	W +152D
3349				26,3324	66214 0	SET	SSP SET RENDWFLG - W-MATRIX VALID
3350	REF	8	LAST 576	26,3325	02476 0	RENDWFLG	
3351	REF	4	LAST 583	26,3326	03463 0	MARKCTR	SET MARK COUNTER EQUAL ZERO
3352				26,3327	00000 1	0	
3353				26,3330	77616 0	RVQ	

3354	REF	14	LAST 585	E5.1400		EBANK= W	
3355	REF	3	LAST 583	26,3331	54065 0	WBANK	BBCON WLINIT
3356	REF	7	LAST 579	E7.1457		EBANK= AIG	
3357	REF	2	LAST 506	26,3332	54067 1	AIGBANK	BBCON LSR22.3

R3358 GETULC

R3359 THIS SUBROUTINE COMPUTES THE RELATIVE POSITION VECTOR BETWEEN THE CSM
R3360 AND THE LM, LEAVING THE UNIT VECTOR IN THE PUSHLIST AND MPAC AND THE
R3361 MAGNITUDE IN 36D.

3362				26,3333	77201 1	GETULC	SETPD	VLOAD	
3363				26,3334	00001 0			0	
3364	REF	1		26,3335	01645 1			DELTALEM	
3365				26,3336	77754 1		LXA,2		
3366	REF	3	LAST 576	26,3337	03720 1			SCALSHFT	LOAD X2 WITH SCALE SHIFT
3367				26,3340	53257 1		VSR*	VAD	
3368				26,3341	57165 1			9D,2	SHIFT FOR EARTH/MOON SPHERE
3369	REF	2	LAST 500	26,3342	01661 1			RCVLEM	
3370				26,3343	53715 1		PDVL	VSR*	
3371	REF	1		26,3344	01573 1			DELTACSM	
3372				26,3345	57165 1			9D,2	SHIFT FOR EARTH/MOON SPHERE
3373				26,3346	52255 1		VAD	VSU	
3374	REF	1		26,3347	01607 1			RCVCSM	
3375				26,3350	41434 1		RTB	PUSH	USE NORMUNIT TO PRESERVE ACCURACY
3376	REF	1		26,3351	21724 0			NORMUNX1	
3377	REF	7	LAST 581	26,3352	17724 0		STODL	ULC	
3378				26,3353	00045 0			36D	
3379				26,3354	77657 0		SL*		ADJUST MAGNITUDE FROM NORMUNIT
3380				26,3355	20201 0			0,1	
3381				26,3356	24045 0		STOVL	36D	ULC IN PDO AND MPAC, RLC IN 36D
3382	REF	8	LAST 585	26,3357	03724 0			ULC	
3383				26,3360	77616 0		RVQ		

R3384 RADARANG

R3385 THIS SUBROUTINE COMPUTES SINTHETA = -ULC DOT MY
R3386 RXZ = (SQRT (1-SINTHETA**2))RLC
R3387 OUTPUT
R3388 ULC IN ULC, PDO

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R3389	RLC	IN PD360									
R3390	SIN THETA	IN SIN THETA AND PD6									
R3391	RXZ NORM	IN RXZ (N IN X1)									
3392			26,3361	45020 1	RADARANG STQ	CALL					
3393	REF	2 LAST 145	26,3362	03675 0		RDRET					
3394	REF	3 LAST 577	26,3363	55333 1		GETULC					
3395			26,3364	50276 1	VCOMP	DOT					
3396	REF	5 LAST 581	26,3365	03705 0		MY					
3397			26,3366	41572 1	SLIR	PUSH	SIN THETA TO PD6				
3398	REF	3 LAST 582	26,3367	03732 1	STORE	SIN THETA					
3399			26,3370	44316 0	DSQ	BDSU					
3400	REF	3 LAST 352	26,3371	06512 1		DP1/4TH	1 - (SIN THETA)**2				
3401			26,3372	41366 1	SQRT	DMP					
3402			26,3373	00045 0		36D					
3403			26,3374	60352 0	SLI	NORM					
3404	REF	4 LAST 577	26,3375	00047 1		X1	SET SHIFT COUNTER IN X1				
3405	REF	10 LAST 582	26,3376	03722 0	STORE	RXZ					
3406			26,3377	77650 1	GOTO		EXIT				
3407	REF	3 LAST 586	26,3400	03675 0		RDRET					
3408			26,3401	45020 1	LGCUPDTE STQ	CALL					
3409	REF	3 LAST 145	26,3402	03675 0		LGRET					
3410	REF	1	26,3403	46531 1		INCORP1					
3411			26,3404	51575 1	VLOAD	ABVAL					
3412	REF	3 LAST 126	26,3405	02673 1		DELTAX +6					
3413			26,3406	53754 1	LXA,2	SRR*					
3414	REF	4 LAST 585	26,3407	03720 1		SCALSHFT	0-MOON. 2-EARTH				
3415			26,3410	56174 0		2,2	SET VEL DISPLAY TO B-7				
3416	REF	3 LAST 314	26,3411	24317 1	STGVL	R22DISP +2					
3417	REF	4 LAST 586	26,3412	02665 0		DELTAX					
3418			26,3413	53646 0	ABVAL	SRR*					
3419			26,3414	56174 0		2,2	SET POS DISPLAY TO B-29				
3420	REF	4 LAST 586	26,3415	00315 0	STORE	R22DISP					
3421			26,3416	54335 0	SLOAD	SR					
3422	REF	1	26,3417	02005 0		RMAX					
3423			26,3420	20613 1		10D					
3424			26,3421	50025 0	DSU	BMN					
3425	REF	5 LAST 586	26,3422	00315 0		R22DISP					
3426	REF	1	26,3423	50572 1		R22LEM96	GO DISPLAY				
3427			26,3424	45335 0	SLOAD	DSU					
3428	REF	1	26,3425	02006 0		VMAX					
3429	REF	6 LAST 586	26,3426	00317 1		P22DISP +2	VMAX MINUS VEL. DEVIATION				
3430			26,3427	77640 0	BMN						
3431	REF	2 LAST 586	26,3430	50572 1		R22LEM96	GO DISPLAY				
3432			26,3431	77624 1	ASTOK	CALL					
3433	REF	1	26,3432	46743 0		INCORP2					
3434			26,3433	77650 1	GOTO						
3435	REF	4 LAST 586	26,3434	03675 0		LGRET					
3436			26,3435	00103 0	IMUVAR	2DEC	E-6 B12	RAD**2			
3436			26,3436	03370 0							
3437			26,3437	00241 0	WSIZE	DEC	16				

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3438		26.3440	31103 1	2PI/8	2DEC	3.141592653 B-2
3438		26.3441	36652 0			
3439	REF 30 LAST 575	E7.1456			EBANK= LOSCOUNT	

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P3440 PROGRAM NAME LRS24.1 RR SEARCH ROUTINE
R3441 MOD NO 0 BY P VOLANTE SDC DATE 1-15-67

R3442 FUNCTIONAL DESCRIPTION

R3443 DRIVES THE RENDEZVOUS RADAR IN A HEXAGONAL SEARCH PATTERN ABOUT THE LOS TO THE CSM (COMPUTED FROM THE CSM AND LM
R3445 STATE VECTORS) CHECKING FOR THE DATA GOOD DISCRETE AND MONITORING THE ANGLE BETWEEN THE RADAR BORESIGHT AND THE
R3447 LM +Z AXIS. IF THIS ANGLE EXCEEDS 30 DEGREES THE PREFERRED TRACKING ATTITUDE ROUTINE IS CALLED TO PERFORM AN
R3449 ATTITUDE MANEUVER.

R3450 CALLING SEQUENCE - BANKCALL FOR LRS24.1

R3451 SUBROUTINES CALLED

R3452	LEMCONIC	R61LEM
R3453	CSMCONIC	RRDESSM
R3454	JOBDELAY	FLAGDOWN
R3455	WAITLIST	FLAGUP
R3456	RRNB	BANKCALL

R3457 EXIT - TO ENDOFJOB WHEN THE SEARCH FLAG (SRCHOPT) IS NOT SET

R3458 OUTPUT

R3459 DATAGOOD (SP)-FOR DISPLAY IN R1- 00000 INDICATES NO LOCKON
R3460 11111 INDICATES LOCKON ACHIEVED
R3461 OMEGAD (SP)-FOR DISPLAY IN R2- ANGLE BETWEEN RK BORESIGHT VECTOR AND THE SPACECRAFT +Z AXIS

R3463 ERASABLE INITIALIZATION REQUIRED
R3464 SEARCH FLAG MUST BE SET
R3465 LM AND CSM STATE VECTORS AND REFSMMAT MATRIX
R3466 DEBRIS

R3467	RLMSRCH	UXVECT
R3468	VXRLM	UYVECT
R3469	LOSDESRO	NSRCHPNT
R3470	DATAGOOD	OMEGAD
R3471	MPAC	PUSHLIST

3472	REF 1					COUNT#	\$/LRS24	
3473	REF 125	LAST	584	26,3442	3 4755-1	LRS24.1	CAF	ZERO
3474	REF 2	LAST	144	26,3443	55 736-0		TS	NSRCHPNT
3475	REF 52	LAST	551	26,3444	3 4736-1	CHKSRCH	CAF	BIF14
3476				26,3445	0 0006-1		EXTEND	

SET SEARCH PATTERN POINT COUNTER TO ZERO
ISSUE AUTO TRACK ENABLE TO RADAR

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3477	REF	38	LAST	562	26,3446	05 012 1	WOR	CHAN12	
3478	REF	1			26,3447	3 4736 1	CAF	SRCHOBIT	CHECK IF SEARCH STILL REQUESTED
3479	REF	10	LAST	552	26,3450	7 0076 1	MASK	FLAGWRD2	(SRCHOPT-FLAG SET)
3480					26,3451	0 0006 1	EXTEND		
3481	REF	93	LAST	552	26,3452	1 5155 1	BZF	ENDOFJOB	NO-TERMINATE JOB
3482	REF	1			26,3453	3 3713 1	CAF	6SECONDS	SCHEDULE TASK TO DRIVE RADAR TO NEXT PT.
3483					26,3454	0 0004 0	INHINT		
3484	REF	24	LAST	561	26,3455	0 5203 0	TC	WAITLIST	IN 6 SECONDS
3485	REF	31	LAST	587	E7.1456		EBANK=	LOSECOUNT	
3486	REF	3	LAST	516	26,3456	03643 0	2CADR	CALLDGCH	
3486					26,3457	54067 1			
3487					26,3460	0 0003 1	RELINT		
3488	REF	97	LAST	569	26,3461	4 0110 0	CS	RADMODES	IS REMODE IN PROGRESS
3489	REF	5	LAST	546	26,3462	7 4736 0	MASK	REMODBIT	
3490					26,3463	0 0006 1	EXTEND		
3491	REF	94	LAST	589	26,3464	1 5155 1	BZF	ENDOFJOB	YES- WAIT SIX SECONDS
3492	REF	55	LAST	584	26,3465	0 6037 0	TC	INTPRET	
3493					26,3466	43234 0	RTB	DAD	COMPUTE LOS AT PRESENT TIME + 1.5 SEC.
3494	REF	12	LAST	518	26,3467	21573 0		LOADTIME	
34945	REF	1			26,3470	15715 0		1.5SECS	
3495	REF	19	LAST	584	26,3471	34041 0	LRS24.11 STCALL	TDECI	
3496	REF	4	LAST	565	26,3472	27100 0		LEMCONIC	EXTRAPOLATE LM STATE VECTOR
3497					26,3473	77775 1	VLOAD		
3498	REF	7	LAST	565	26,3474	00001 0		RATT	
3499	REF	4	LAST	148	26,3475	27676 0	STOVL	RLMSRCH	SAVE LEM POSITION
3500	REF	3	LAST	565	26,3476	00007 0		VATT	
3501	REF	1			26,3477	17740 1	STOVL	SAVLEMV	SAVE LEM VELOCITY
3502	REF	6	LAST	565	26,3500	00015 0		TAT	
3503	REF	20	LAST	589	26,3501	34041 0	STCALL	TDECI	EXTRAPOLATE CSM STATE VECTOR
3504	REF	3	LAST	565	26,3502	27066 1		CSMCONIC	EXTRAPOLATE CSM STATE VECTOR
3505					26,3503	52375 1	VLOAD	VSU	LOS VECTOR = R(CSM)-R(LM)
3506	REF	8	LAST	589	26,3504	00001 0		RATT	
3507	REF	5	LAST	589	26,3505	03676 0		RLMSRCH	
3508					26,3506	77656 1	UNIT		
3509	REF	2	LAST	144	26,3507	27712 0	STOVL	LOSDESRD	STORE DESIRED LOS
3510	REF	4	LAST	589	26,3510	00007 0		VATT	COMPUTE UNIT(V(CM) CROSS R(CM))
3511					26,3511	47256 0	UNIT	VXV	
3512	REF	9	LAST	589	26,3512	00001 0		RATT	
3513					26,3513	77656 1	UNIT		
3514	REF	2	LAST	144	26,3514	03704 1	STORE	VXRCM	
3515					26,3515	52375 1	VLOAD	VSU	
3516	REF	5	LAST	589	26,3516	00007 0		VATT	
3517	REF	2	LAST	589	26,3517	03740 1		SAVLEMV	
3518					26,3520	76521 0	MXV	VSL1	CONVERT FROM REFERENCE TO STABLE MEMBER
3519	REF	13	LAST	580	26,3521	01734 0		REFSHMAT	
3520	REF	3	LAST	589	26,3522	03740 1	STORE	SAVLEMV	VLC = V(CSM) - V(LM)
3521					26,3523	53135 0	SLOAD	BZE	CHECK IF N=0

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3522	REF	3	LAST	588	26,3524	03737 1	NSRCHPNT		
3523	REF	1			26,3525	55636 1	DESGLOS	YES-DESIGNATE ALONG LOS	
3524					26,3526	53025 0	DSU	IS N=1	
3525	REF	1			26,3527	15711 1	ONEOCT	YES-CALCULATE X AND Y AXES OF	
3526	REF	1			26,3530	55623 0	CALCXY	SEARCH PATTERN COORDINATE SYSTEM	
3527					26,3531	77775 1	VLOAD	NO-ROTATE X-Y AXES TO NEXT SEARCH POINT	
3528	REF	2	LAST	144	26,3532	03720 1	UXVECT		
3529	REF	1			26,3533	24015 0	STOVL	UXVECTPR	SAVE ORIGINAL X AND Y VECTORS
3530	REF	2	LAST	144	26,3534	03726 1	UYVECT	UXPRIME = ORIGINAL UX	
3531	REF	1			26,3535	00023 0	STOPE	UYVECTPR	UYPRIME = ORIGINAL UY
3532					26,3536	77761 1	VXSC		
3533	REF	1			26,3537	15705 1	SIN60DEG	UX = (COS 60)UXPR + (SIN 60)UYPR	
3534	REF	3	LAST	590	26,3540	27720 1	STOVL	UXVECT	
3535	REF	2	LAST	590	26,3541	00015 0	UXVECTPR		
3536					26,3542	53361 0	VXSC	VAD	
3537	REF	1			26,3543	06520 0	COS60DEG		
3538	REF	4	LAST	590	26,3544	03720 1	UXVECT		
3539					26,3545	77656 1	UNIT		
3540	REF	5	LAST	590	26,3546	27720 1	STOVL	UXVECT	
3541	REF	3	LAST	590	26,3547	00015 0	UXVECTPR	UY = (-SIN 60)UXPR + (COS 60)UYPR	
3542					26,3550	77761 1	VXSC		
3543	REF	2	LAST	590	26,3551	15705 1	SIN60DEG		
3544	REF	3	LAST	590	26,3552	27726 1	STOVL	UYVECT	
3545	REF	2	LAST	590	26,3553	00023 0	UYVECTPR		
3546					26,3554	52361 1	VXSC	VSU	
3547	REF	2	LAST	590	26,3555	06520 0	COS60DEG		
3548	REF	4	LAST	590	26,3556	03726 1	UYVECT		
3549					26,3557	77656 1	UNIT		
3550	REF	5	LAST	590	26,3560	03726 1	STORE	UYVECT	
3551					26,3561	53361 0	OFFCALC	VXSC	VAD
3552	REF	1			26,3562	15707 0			OFFSET VECTOR = K(UY)
3553	REF	3	LAST	589	26,3563	03712 0			LOS VECTOR + OFFSET VECTOR DEFINES
3554					26,3564	64256 1	UNIT	MXV	DESIRED POINT IN SEARCH PATTERN
3555	REF	14	LAST	589	26,3565	01734 0		REFSMAT	CONVERT TO STABLE MEMBER COORDINATES
3556					26,3566	77772 0	VSL1		
3557	REF	13	LAST	571	26,3567	25102 0	CONTDGSG	STOVL	RETARGET
3558	REF	4	LAST	589	26,3570	03740 1			SAVLEMV
3559	REF	5	LAST	565	26,3571	01761 0	STORE	LOSVEL	
3560					26,3572	77776 1	EXIT		
3561					26,3573	0 0004 0	INHINT		
3562	REF	7	LAST	565	26,3574	0 6027 1	TC	KILLTASK	KILL ANY PRESENTLY WAITLISTED TASK
3563	REF	4	LAST	565	26,3575	52602 1	CADR	DESLOOP +2	WHICH WOULD DESIGNATE TO THE LAST
A3564									POINT IN THE PATTERN
3565	REF	1			26,3576	4 4735 0	CONTDGSG	CS	GDESBIT
3566	REF	98	LAST	589	26,3577	7 0110 0		MASK	RADMODES
3567	REF	2	LAST	590	26,3600	6 4735 1		AD	CDESBIT
3568	REF	99	LAST	590	26,3601	54 110 0		TS	RADMODES
3569	REF	56	LAST	589	26,3602	0 6037 0		TC	INTPRET
3570					26,3603	77624 1	CALL		

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3571	REF	3	LAST	510	26,3604	52373 1	RRDESSM	DESIGNATE RADAR TO RRTARGET VECTOR
3572					26,3605	77776 1	EXIT	
3573	REF	1			26,3606	0 3675 0	TC	LIMALARM
3574	REF	2	LAST	591	26,3607	0 3675 0	TC	LIMALARM
								LOS NOT IN MODE 2 COVERAGE (P22)
								VEHICLE MANEUVER REQUIRED (P20)
A3575								COMPUTE OMEGA, ANGLE BETWEEN RR LOS AND
A3576								SPACECRAFT +Z AXIS
3577					26,3610	0 0006 1	OMEGCALC	EXTEND
3578	REF	10	LAST	569	26,3611	3 0036 1	DCA	CDUT
3579	REF	8	LAST	570	26,3612	53 753 0	DXCH	TANGNB
3580	REF	57	LAST	590	26,3613	0 6037 0	TC	INTPRET
3581					26,3614	77624 1	CALL	
3582	REF	3	LAST	570	26,3615	46041 0		RRNB
3583					26,3616	65545 0	DLOAD	ACOS
3584					26,3617	00045 0		360
3585	REF	3	LAST	144	26,3620	03735 0	STORE	OMEGDISP
3586					26,3621	77776 1	EXIT	
3587	REF	95	LAST	589	26,3622	0 5155 0	TC	ENDOFJOB

OMEGA IS ARCCOSINE OF Z-COMPONENT OF
VECTOR COMPUTED BY RRNB (LEFT AT 320)
STORE FOR DISPLAY IN R2

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P3588 CALCULATE X AND Y VECTORS FOR SEARCH PATTERN COORDINATE SYSTEM

3589					26,3623	47375 0	CALCXY	VLOAD	VXV		
3590	REF	3	LAST	589	26,3624	03704 1			VXRCM		
3591	REF	4	LAST	590	26,3625	03712 0			LOSDESRO		
3592					26,3626	77656 1		UNIT			
3593	REF	6	LAST	590	26,3627	27720 1		STOVL	UXVECT	UX = (VLM X RLM)X LOS	
3594	REF	5	LAST	592	26,3630	03712 0			LOSDESRO		
3595					26,3631	53435 0		VXV	UNIT		
3596	REF	7	LAST	592	26,3632	03720 1			UXVECT		
3597	REF	6	LAST	590	26,3633	03726 1		STORE	UYVECT	UY = LOS X UX	
3598					26,3634	77650 1		GOTO			
3599	REF	1			26,3635	55561 0			OFFCALC		
3600					26,3636	54375 1	DESGLOS	VLOAD	MXV	WHEN N= 0, DESIGNATE ALONG LOS	
3601	REF	6	LAST	592	26,3637	03712 0			LOSDESRO		
3602	REF	15	LAST	590	26,3640	01734 0			REFSMAT	CONVERT LOS FROM REFERENCE TO SM COORDS	
3603					26,3641	52172 1		VSL1	GOTO		
3604	REF	1			26,3642	55567 0			CONTDESG		
3605	REF	24	LAST	498	26,3643	30 074 1	CALLOGCH	CAE	FLAGNRDO	IS RENDEZVOUS FLAG SET	
3606	REF	10	LAST	539	26,3644	7 4745 1		MASK	RNDVZBIT		
3607					26,3645	0 0006 1		EXTEND			
3608	REF	25	LAST	530	26,3646	1 5261 0		BZF	TASKOVER	NO-EXIT R24	
3609	REF	2	LAST	490	26,3647	3 7713 0		CAF	PRIQ25	YES - SCHEDULE JOB TO DRIVE RADAR TO NEXT	
3610	REF	23	LAST	546	26,3650	0 5105 0		TC	FINDVAC	POINT IN SEARCH PATTERN	
3611	REF	6	LAST	589	E7,1675			EBANK=	RLMSRCH		
3612	REF	1			26,3651	03654 0		2CADR	DATGDCHK		
3612	REF	1			26,3652	54067 1					
3613	REF	26	LAST	592	26,3653	0 5261 1		TC	TASKOVER		
3614	REF	26	LAST	557	26,3654	3 4750 1	DATGDCHK	CAF	BIT4		
3615					26,3655	0 0006 1		EXTEND		CHECK IF DATA GOOD DISCRETE PRESENT	
3616	REF	19	LAST	569	26,3656	02 033 0		RAND	CHAN33		
3617					26,3657	0 0006 1		EXTEND			
3618	REF	1			26,3660	1 3667 1		BZF	STORE1S	YES- GO TO STORE 11111 FOR DISPLAY IN R1	
3619	REF	14	LAST	433	26,3661	4 6242 1		CS	SIX		
3620	REF	4	LAST	590	26,3662	6 1736 1		AD	NSRCHPNT	IS N GREATER THAN 6	
3621					26,3663	0 0006 1		EXTEND			
3622	REF	2	LAST	516	26,3664	1 3442 1		BZF	LR524.1	YES - RESET N = 0 AND START AROUND AGAIN	
3623	REF	5	LAST	592	26,3665	25 736 1		INCR	NSRCHPNT	NO-SET N = N+1 AND GO TO	
3624	REF	1			26,3666	1 3444 1		TCF	CHKSCH	NEXT POINT IN PATTERN	
3625	REF	1			26,3667	3 3703 0	STORE1S	CAF	ALL1S	STORE 11111 FOR DISPLAY IN R1	
3626	REF	5	LAST	515	26,3670	55 733 0		TS	DATAGOOD		

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3627				26,3671	0 0004 0	INHINT		
3628	REF	8	LAST	590	26,3672	0 6027 1	TC	KILLTASK
3629	REF	5	LAST	590	26,3673	52602 1	CADR	DESTLOOP +2
3630	REF	96	LAST	591	26,3674	0 5155 0	TC	ENDOFJOB
3631	REF	26	LAST	556	26,3675	0 5567 0	LIMALARM	ALARM
3632					26,3676	00527 1	DCT	527
3633					26,3677	0 0004 0	INHINT	
3634	REF	9	LAST	593	26,3700	0 6027 1	TC	KILLTASK
3635	REF	4	LAST	589	26,3701	55643 0	CADR	CALDGCH
3636	REF	97	LAST	593	26,3702	0 5155 0	TC	ENDOFJOB
3637					26,3703	25547 0	ALLIS	DEC 11111
3638					26,3704	33555 1	SIN60DEG	2DEC .86603
3638					26,3705	01106 1		
3639	REF	7	LAST	362	23,2517		COS60DEG	= DPHALF (2DEC .50)
3640					0014		UXVECTPR	EQUALS 120
3641					0022		UYVECTPR	EQUALS 180
3642					0014		RLMUNIT	EQUALS 120
3643					26,3706	01642 0	OFFSTFAC	2DEC 0.05678
3643					26,3707	11045 0		
3644					26,3710	00001 0	ONEOCT	DCT 00001
3645					26,3711	00000 1	3SECONDS	2DEC 300
3645					26,3712	00454 1		
A3646								**** ONEOCT NEEDS A LOWER ORDER ****
A3647								**** WORD OF ZEROES ****
3648					26,3713	01130 1	6SECONDS	DEC 600
3649					26,3714	00000 1	1.5SECS	2DEC 150
3649					26,3715	00226 1		
3650	REF	3	LAST	487	23,2521		ZERO/SP	EQUALS HI6ZEROS
3651					4616		BLOCK	02
3652	REF	3	LAST	224	6000		SETLOC	FFTAG5
3653					6022		BANK	
3654	REF	1					COUNT*	\$\$/P20
3655					6022	0 0006 1	GOTOV56	EXTEND
3656	REF	1			6023	3 6026 0	DCA	VB56CADR
3657	REF	4	LAST	457	6024	1 5165 1	TCF	SUPDXCHZ
3658	REF	2	LAST	486	E7,1471		EBANK=	WHOCARES
3659	REF	2	LAST	262	6025	03024 1	VB56CADR	2CADR TRMTRACK
3659					6026	66107 1		

P20 TERMINATES BY GOTOV56 INSTEAD OF
GOTOPOOH

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P3660 PROGRAM NAME: R29 (RENDEZVOUS RADAR DESIGNATE DURING POWERED FLIGHT)
R3661 MOD-NO. 2 BY H. BLAIR-SMITH JULY-2, 1968.

R3662 FUNCTIONAL DESCRIPTION:

R3663 DESIGNATES THE RENDEZVOUS RADAR TOWARD THE COMPUTED LOS TO THE CSM, WITH THE CHIEF OBJECTIVE OF OBTAINING RANGE
R3665 AND RANGE RATE DATA AT 2-SECOND INTERVALS FOR TRANSMISSION TO THE GROUND. WHEN THE RR IS WITHIN .5 DEGREE OF
R3667 THE COMPUTED LOS, TRACKING IS ENABLED, AND DESIGNATION CONTINUES UNTIL THE DATA-GOOD DISCRETE IS RECEIVED. AT
R3669 THAT POINT, DESIGNATION CEASES AND A RADAR-READING ROUTINE TAKES OVER, PREPARING A CONSISTENT SET OF DATA FOR
R3671 DOWN-TELEMETRY. THE SET INCLUDES RANGE, RANGE RATE, MARK TIME, TWO RR CDU ANGLES, THREE IMUCDU ANGLES, AND AN
R3673 INDICATOR WHICH IS 1 WHEN THE SET IS CONSISTENT AND 0 OTHERWISE. THE INDICATOR IS IN TRKMKCNT.

R3676 CALLING SEQUENCE: BEGUN EVERY 2 SECONDS AS AN INTEGRAL PART OF SERVICER

R3677 SUBROUTINES CALLED:

R3678 REMODE RRONLY
R3679 UNIT MPACVBUF
R3680 QUICTRIG AX*SR*T
R3681 SPSIN SPCOS
R3682 SETRRECR RRROUT
R3683 RRRDOT RRRANGE

R3684 EXIT: TO NOR29NOW, IN SERVICER.

R3685 OUTPUT: (ALL FOR DOWNLINK)

R3686	RM	RDOTM	(RAW)
R3687	AIG	AMG	
R3688	AOG	TRKMKCNT	TRKMKCNT = 00001 IF SET IS CONSISTENT,
R3689	TANGNB	TANGNB+1	OTHERWISE TRKMKCNT = 00000.
R3690	MKTIME		

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P3691 ERASABLE INITIALIZATION-REQUIRED:

R3692 NOR29FLG READRFLG (TO 1 AND 0 BY FRESH-START) (RESET NOR29FLG TO LET-SERVICER-RUN R29)
 R3694 PIPTIME RADMODES (BIT 10) (BIT-SET-TO-0-BY-FRESH-START)
 R3695 R(CSM) V(CSM)
 R3696 R V (PIPTIME THRU V-BY-AVE-G-IN-SERVICER)

R3697 DEBRIS:

R3698 RADMODES (BIT 10)
 R3699 LOSSM LOSVDI/4 (= RRTARGET & LOSVEL)
 R3700 SAVECOUT OLDESFLG (SAVECOUT = MLOSV)
 R3701 LOSCMFLG READRFLG

R3702 ALARMS: NONE.

R3703 COMPONENT JOBS AND TASKS:

R3704 INITIALIZING. IF RR IS FOUND TO BE IN MODE 1: JOB R29REMOJ AND TASK REMODE; ALWAYS: TASK PREPOS29.
 R3706 DESIGNATING: TASK BEGDES29 & JOB R29DOODES.
 R3707 RADAR READING: TASK R29READ AND JOB R29RDJOB. ALL JOBS ARE NOVAC TYPE.

3708			33,2045	BANK 33
3709	REF	1	33,2000	SETLOC R29/SERV
3710			33,2045	BANK
3711	REF	1		COUNT* \$\$/R29
3712	REF	2	LAST 388 5014	NR29&RDR EQUALS EBANK5

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P3713 SERVICER COMES TO R29 FROM "R29?" IF NOR29FLG, READRFLG, RRREMODE, RRCDUZRO, RRREPOS, AND DISPLAY-INERTIAL-DATA
 R3715 ARE ALL RESET, AND THE RR IS IN LGC MODE (OFTEN CONFUSINGLY CALLED AUTO MODE).

3717	REF 100	LAST 590	33,2045	4 0110 0	R29	CS	RADMODES	
3718	REF 6	LAST 546	33,2046	7 4742 0		MASK	DESIGBIT	
3719			33,2047	0 0006 1		EXTEND		
3720	REF 1		33,2050	1 2123 1		BZF	R29.LOS	BRANCH IF DESIGNATION IS ALREADY ON.
3721			33,2051	0 0004 0		INHINT		
3722	REF 101	LAST 596	33,2052	26 110 0		ADS	RADMODES	SHOW THAT DESIGNATION IS NOW ON.
3723	REF 53	LAST 588	33,2053	4 4736 0		CS	BIT14	
3724			33,2054	0 0006 1		EXTEND		
3725	REF 39	LAST 589	33,2055	03 012 1		WAND	CHAN12	REMOVE RR TRACK ENABLE DISCRETE.
3726	REF 2	LAST 552	33,2056	4 4740 1		CS	LOSCMBIT	
3727	REF 11	LAST 589	33,2057	7 0076 1		MASK	FLAGWRD2	
3728	REF 12	LAST 596	33,2060	54 076 1		TS	FLAGWRD2	CLEAR LOSCMFLG TO SHOW DES. LOOP IS OFF.
3729	REF 1		33,2061	4 4753 0		CS	BLDESBIT	
3730	REF 39	LAST 551	33,2062	7 0074 0		MASK	STATE	
3731	REF 40	LAST 596	33,2063	54 074 0		TS	STATE	SHOW THAT DES. LOOP IS NOT REQUESTED.
3732	REF 147	LAST 576	33,2064	0 4616 1		TC	BANKCALL	
3733	REF 3	LAST 540	33,2065	52156 1		CADR	SETRRECR	ENABLE RR ERROR COUNTERS.
3734	REF 12	LAST 544	33,2066	3 4740 0		CA	ANTENBIT	
3735	REF 102	LAST 596	33,2067	7 0110 0		MASK	RADMODES	
3736	REF 200	LAST 571	33,2070	10 000 0		CCS	A	TEST RR MODE BIT.
3737	REF 1		33,2071	1 2104 1		TCF	SETPRPOS	MODE 2.
3738	REF 2	LAST 328	33,2072	3 5031 0		CA	PRI021	MODE 1; MUST REMODE.
3739	REF 11	LAST 506	33,2073	0 5072 1		TC	NOVAC	
3740	REF 32	LAST 589	E7,1456			EBANK=	LOSCOUNT	
3741	REF 1		33,2074	02113 0		2CADR	R29.EMOJ	NEEDS OWN JOB TO RADSTALL IN.
3741	REF 1		33,2075	66067 0				
3742	REF 7	LAST 596	33,2076	4 4742 0		CS	DESIGBIT	
3743	REF 103	LAST 596	33,2077	7 0110 0		MASK	RADMODES	CLEAR DESIGNATE FLAG IN RADMODES
3744	REF 104	LAST 596	33,2100	54 110 0		TS	RADMODES	BEFORE CALLING REMODE
3745	REF 6	LAST 589	33,2101	3 4736 1		CA	RE40DBIT	
3746	REF 105	LAST 596	33,2102	26 110 0		ADS	RADMODES	SHOW THAT REMODING IS ON.
3747	REF 1		33,2103	1 2570 0		TCF	NOR29NOW	CONTINUE SERVICER FUNCTIONS.
3748	REF 73	LAST 561	33,2104	3 4753 1	SETPRPOS	CA	ONE	
3749	REF 25	LAST 589	33,2105	0 5203 0		TC	WAITLIST	
3750	REF 33	LAST 596	E7,1456			EBANK=	LOSCOUNT	
3751	REF 1		33,2106	03601 0		2CADR	PREPOS29	TASK TO SET TRUNNION ANGLE TO -180 DEG.
3751	REF 1		33,2107	52067 1				
3752	REF 7	LAST 557	33,2110	3 4741 1		CA	REPOSBIT	
3753	REF 106	LAST 596	33,2111	26 110 0		ADS	RADMODES	SHOW THAT REPOSITIONING IS ON.
3754	REF 2	LAST 596	33,2112	1 2570 0		TCF	NOR29NOW	

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P3755 FORCE RENDEZVOUS RADAR INTO MODE 2.

3756	REF	74	LAST	596	33,2113	3 4753 1	R29REMOJ	CA	ONE	
3757	REF	26	LAST	596	33,2114	0 5203 0		TC	WAITLIST	
3758	REF	34	LAST	596	E7,1456			EBANK=	LOSCOUNT	
3759	REF	2	LAST	546	33,2115	02171 1		2CADR	REMODE	REMODE MUST RUN AS A TASK.
3759					33,2116	52067 1				
3760	REF	148	LAST	596	33,2117	0 4616 1		TC	BANKCALL	WAIT FOR END OF REMODING.
3761	REF	10	LAST	570	33,2120	17714 0		CADR	RADSTALL	
3762	REF	98	LAST	593	33,2121	1 5155 1		TCF	ENDOFJOB	BAD EXIT CAN'T HAPPEN.
3763	REF	99	LAST	597	33,2122	1 5155 1		TCF	ENDOFJOB	

R3764 TASK TO PREPOSITION THE RR TRUNNION ANGLE TO -180 DEG.

3765	REF	1			25,2000			SETLOC	R29S1	
3766					25,3601			BANK		
3767	REF	2	LAST	367	25,3601	3 4735 1	PREPOS29	CA	NEGMAX	-180 DEG.
3768	REF	5	LAST	532	25,3602	0 2241 1		TC	RTONLY	DRIVE TRUNNION CDU.
3769	REF	8	LAST	596	25,3603	4 4741 0		CS	REPOSBIT	SHOW THAT REPOSITIONING IS OFF.
3770	REF	107	LAST	596	25,3604	7 0110 0		MASK	RADMODES	
3771	REF	108	LAST	597	25,3605	54 110 0		TS	RADMODES	
3772	REF	27	LAST	592	25,3606	1 5261 0		TCF	TASKOVER	

R3773 COMPUTE LINE-OF-SIGHT AND LOS VELOCITY, AND PASS THEM TO THE R2900DES LOOP.

3775	REF	1			33,2045			SETLOC	R29	
3776					33,2123			BANK		
3777					33,2123	0 0006 1	R29.LOS	EXTEND		
3778	REF	4	LAST	336	33,2124	4 1235 0		DCS	PIPTIME	
3779	REF	252	LAST	573	33,2125	52 155 1		DXCH	MPAC	
3780					33,2126	0 0006 1		EXTEND		
3781	REF	16	LAST	569	33,2127	3 0025 0		DCA	TIME2	
3782	REF	253	LAST	597	33,2130	20 155 1		DAS	MPAC	(MPAC) = T-PIPTIME, SCALED B-28.
3783	REF	4	LAST	336	33,2131	54 163 1		TS	MODE	SET MODE TO DOUBLE PRECISION.
3784	REF	254	LAST	597	33,2132	3 0155 0		CA	MPAC +1	
3785					33,2133	0 0006 1		EXTEND		
3786	REF	24	LAST	550	33,2134	7 4740 1		MP	BIT12	
3787	REF	255	LAST	597	33,2135	52 155 1		DXCH	MPAC	T-PIPTIME NOW SCALED B-17.
3788	REF	58	LAST	591	33,2136	0 6037 0		TC	INTPRET	

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P3789 LOSCMFLG=0 MEANS THAT THE DESIGNATION IS READY FOR NEW DATA. SETTING LOSCMFLG MAKES IT GO AWAY SO SETUP29D CAN
 R3791 START IT UP WHEN THE DATA IS IN PLACE.

3792				33,2137	52315 1	PDVL	VSU	PUSH DOWN T-PIPTIME.
3793	REF	1		33,2140	01726 0		V(CSM)	
3794	REF	2	LAST	147	33,2141		V	LOSVEL = V(CSM) - V.
3795				33,2142	74325 0	PDDL	VXSC	SWAP LOSVEL FOR T-PIPTIME. MULTIPLY THEM
3796				33,2143	52255 1	VAD	VSU	AND ADD THE RESULT TO R(CSM) - R TO GET
3797	REF	1		33,2144	01720 0		R(CSM)	AN UP-TO-DATE LOS VECTOR IN SM AXES.
3798	REF	4	LAST	233	33,2145		R	
3799				33,2146	77414 0	BOFSET	EXIT	(BOFSET DOES ITS THING INHINTED.)
3800	REF	9	LAST	565	33,2147		LOSCMFLG	IF DESIGNATE LOOP IS OFF, CHANGE LOSCM-
3801	REF	1		33,2150	66152 1		SETUP29D	FLG TO ON AND GO TO SET UP NEW DATA.
3802	REF	3	LAST	596	33,2151	1 2570 0	TCF	NOR29NOW
								IF DES. LOOP IS ON, LET IT USE OLD DATA.
3803	REF	1		33,2152	25102 0	SETUP29D	STOVL	LOSSM
3804				33,2153	00001 0			0
3805				33,2154	77761 1		VXSC	
3806	REF	1		33,2155	26177 1			.5SECB17
3807	REF	1		33,2156	01761 0	STORE	LGSDVT/4	1/2 SECOND'S WORTH OF LOS VELOCITY.
3808				33,2157	77414 0	CLEAR	EXIT	
3809	REF	10	LAST	598	33,2160	01263 1		LOSCMFLG
								LET R29DLOOP USE NEW DATA.
3810	REF	41	LAST	596	33,2161	4 0074 0	CS	STATE
3811	REF	2	LAST	596	33,2162	7 4753 0	MASK	OLDESSIT
3812				33,2163	0 0006 1	EXTEND		
3813	REF	4	LAST	598	33,2164	1 2570 0	BZF	NOR29NOW
3814				33,2165	0 0004 0	INHINT		BRANCH IF R29 DES. LOOP IS REQUESTED.
3815	REF	42	LAST	598	33,2166	26 074 0	ADS	STATE
								OTHERWISE REQUEST IT NOW.
3816	REF	1		33,2167	11 056 1	CCS	PIPCR	SEE IF TASK SHOULD BE OFFSET ONE SECOND.
3817	REF	1		33,2170	4 4776 1	CS	SUPER110	-960 +1000 = 4.
3818	REF	4	LAST	381	33,2171	6 4777 1	AD	1SEC
3819	REF	27	LAST	597	33,2172	0 5203 0	TC	WAITLIST
3820	REF	35	LAST	597	E7,1456		EBANK=	LOSCOUNT
3821	REF	1		33,2173	03356 1	2CADR	BEGDES29	START BEGDES29 TASK ASAP.
3821	REF	1		33,2174	50067 0			
3822	REF	5	LAST	598	33,2175	1 2570 0	TCF	NOR29NOW
								RELINT AND CONTINUE SERVICER FUNCTIONS.
3823				33,2176	00006 1	.5SECB17	2DEC	50 8-17
3823				33,2177	10000 0			

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P3824 R29 DESIGNATE JOB AND TASK MACHINERY. TASK RECURS EVERY .5 SEC UNTIL DESIGNATE IS CALLED OFF; IT MAY WAIT FOR A
 R3826 CENTISECOND OR TWO IF IT COMES UP WHILE SETUP29D IS SUPPLYING NEW DATA.

3827				24,3356				BANK	24	
3828	REF	6	LAST	572	24,2000			SETLOC	P20S	
3829					24,3356			BANK		
3830	REF	1						COUNT*	11/R29	
3831	REF	3	LAST	596	24,3356	3	5031 0	BEGDES29	CAF	PRI021
3832	REF	12	LAST	596	24,3357	0	5072 1		TC	NOVAC
3833	REF	2	LAST	598	E3,1760				EBANK=	LOSVD7/4
3834	REF	1			24,3360		02547 0		2CADR	R29D0DES
3834	REF	1			24,3361		64063 0			START R29D0DES JOB TWICE A SECOND.
3835	REF	2	LAST	516	24,3362	3	4774 1	R29DLOOP	CAF	.5SEC
3836	REF	4	LAST	562	24,3363	0	5224 0		TC	VARDELAY
3837	REF	109	LAST	597	24,3364	4	0110 0		CS	RADMODES
3838	REF	8	LAST	596	24,3365	7	4742 0		MASK	DESIGBIT
3839	REF	201	LAST	596	24,3366	10	000 0		CCS	A
3840	REF	28	LAST	597	24,3367	1	5261 0		TCF	TASKOVER
										QUIT IF DESIGNATION IS CALLED OFF.
3841	REF	13	LAST	596	24,3370	4	0076 1		CS	FLAGWRD2
3842	REF	3	LAST	596	24,3371	7	4740 1		MASK	LOSCMBIT
3843					24,3372	0	0006 1		EXTEND	
3844					24,3373	1	3376 1		BZF	+3
3845	REF	14	LAST	599	24,3374	26	076 1		ADS	FLAGWRD2
3846	REF	2	LAST	598	24,3375	1	3356 0		TCF	BEGDES29
										BRANCH IF SETUP29D'S SUPPLYING NEW DATA.
3847	REF	75	LAST	597	24,3376	3	4753 1		CA	ONE
3848	REF	1			24,3377	1	3363 0		TCF	R29DLOOP +1
										WAIT A CENTISECOND FOR NEW DATA.

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P3849 R29DODES: RR DESIGNATION LOOP FOR R29

R3850 THIS ROUTINE DOES MUCH THE SAME THING AS DODES, BUT A GREAT DEAL FASTER. IT TAKES THE NON-UNITIZED LOS VECTOR
 R3852 IN STABLE MEMBER COORDINATES (LJSSM) AND A DELTA-LOS IN SM AXES (LOSVDI/4) WHICH IS 1/2 SEC TIMES LOS VELOCITY.
 R3854 AND DEVELOPS THE SHAFT AND TRUNNION COMMANDS USING SINGLE PRECISION AS MUCH AS POSSIBLE, AND INTERPRETIVE NOT AT
 R3856 ALL. THE UNIT(LOSSM + LOSVEL * 1 SEC) IS COMPUTED IN DP AND TRANSFORMED TO NAV BASE COORDINATES IN DOUBLE PRE-
 R3858 CISION (USING SP SINES AND COSINES OF CDU ANGLES), AND THE REST IS DONE IN SP.

R3860 THE FUNCTIONAL DIFFERENCE IS THAT R29DODES ALWAYS CLEARS LOSCHFLG WHEN IT ENDS, AND IT STARTS UP THE R29READ
 R3862 TASK WHEN LOCK-ON IS ACHIEVED.

3863				32,2547			BANK	32		
3864	REF	2	LAST	40	32,2000		SETLOC	F2DPS*32		
3865					32,2547		BANK			
3866	REF	1					COUNT*	\$/R29		
3867	REF	3	LAST	599	E3,1760		EBANK=	LOSVDI/4		
3868	REF	76	LAST	599	32,2547	3 4753 1	R29DODES	CA	ONE	
3869	REF	25	LAST	570	32,2550	55 107 1	TS	TANG		INDICATE 1ST PASS THRU VECTOR LOOP.
3870	REF	12	LAST	553	32,2551	3 4756 1	CA	FIVE		
3871	REF	202	LAST	599	32,2552	10 000 0	R29DVBEG	CCS	A	COUNT DOWN BY TWOS IN VECTOR LOOP.
3872	REF	168	LAST	560	32,2553	54 002 1	TS	Q		
3873	REF	26	LAST	600	32,2554	11 107 1	CCS	TANG		
3874	REF	1			32,2555	1 2563 1	TCF	R29DPAS1		DO THIS ON 1ST PASS THRU LOOP.
3875					32,2556	0 0006 1	EXTEND			(A "PASS" HERE MEANS 3 TIMES AROUND).
3876	REF	169	LAST	600	32,2557	5 0002 0	INDEX	Q		
3877	REF	4	LAST	600	32,2560	3 1761 0	DCA	LOSVDI/4		
3878	REF	170	LAST	600	32,2561	50 002 0	INDEX	Q		
3879	REF	2	LAST	598	32,2562	21 102 1	DAS	LOSSM		ADVANCE LOS VECTOR 1/2 SECOND.
3880					32,2563	0 0006 1	R29DPAS1	EXTEND		
3881	REF	171	LAST	600	32,2564	5 0002 0	INDEX	Q		
3882	REF	3	LAST	600	32,2565	3 1102 0	DCA	LOSSM		
3883	REF	172	LAST	600	32,2566	50 002 0	INDEX	Q		MOVE CURRENT LOS (1ST PASS) OR LOS PRO-
3884	REF	256	LAST	597	32,2567	52 156 1	DXCH	MPAC +1		JECTED 1/2 SEC AHEAD (2ND PASS).
3885	REF	27	LAST	600	32,2570	11 107 1	CCS	TANG		
3886	REF	1			32,2571	1 2577 1	TCF	R29DVEND		BUG OUT HERE IN 1ST PASS.
3887					32,2572	0 0006 1	EXTEND			
3888	REF	173	LAST	600	32,2573	5 0002 0	INDEX	Q		
3889	REF	5	LAST	600	32,2574	3 1761 0	DCA	LOSVDI/4		
3890	REF	174	LAST	600	32,2575	50 002 0	INDEX	Q		
3891	REF	257	LAST	600	32,2576	20 156 1	DAS	MPAC +1		PROJECT LOS 1 SECOND AHEAD (2ND PASS).
3892	REF	175	LAST	600	32,2577	10 002 1	R29DVEND	CCS	Q	
3893	REF	1			32,2600	1 2552 0	TCF	R29DVBEG		BRANCH TO CONTINUE VECTOR LOOP.

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P3894 UNITIZE AND TRANSFORM TO NAV BASE AXES THE PRESENT LOS (1ST PASS) OR THE 1-SEC PROJECTED LOS (2ND PASS).

3896	REF 258	LAST 600	32,2601	52 156 1	DXCH	MPAC +1	
3897	REF 259	LAST 601	32,2602	52 155 1	DXCH	MPAC	
3898	REF 1		32,2603	3 2774 1	CA	R29FXLOC	= ADRES INTB15+ -34D
3899	REF 18	LAST 356	32,2604	54 120 0	TS	FIXLOC	
3900	REF 1		32,2605	0 4713 0	TC	USPRCADR	WITH FIXLOC ARMED FOR LENGTH AND LENGTH-
3901	REF 1		32,2606	01023 1	CADR	UNIT	SQUARED. BORROW UNITIZING ROUTINE.
3902	REF 1		32,2607	0 7532 1	TC	MPACVBUF	MOVE UNIT(LOS) TO AX*SR*T ARG AREA.
3903	REF 28	LAST 600	32,2610	11 107 1	CCS	TANG	
3904			32,2611	1 2613 0	TCF	+2	
3905	REF 1		32,2612	1 2627 1	TCF	GOTANGLS	GET CDU ANGLES ONLY AFTER 1ST PASS.
3906			32,2613	0 0004 0	INHINT		ENSURE CONSISTENT CDU READINGS.
3907			32,2614	0 0006 1	EXTEND		
3908	REF 11	LAST 591	32,2615	3 0036 1	DCA	CDUT	
3909	REF 1		32,2616	53 767 1	DXCH	SAVECDUT	TRUNNION AND SHAFT ANGLES.
3910	REF 3	LAST 569	32,2617	3 0033 1	CA	CDUY	
3911	REF 16	LAST 579	32,2620	54 766 1	TS	CDUSPOT	
3912	REF 6	LAST 357	32,2621	3 0034 0	CA	CDUZ	
3913	REF 17	LAST 601	32,2622	54 770 0	TS	CDUSPOT +2	
3914	REF 11	LAST 569	32,2623	3 0032 0	CA	CDUX	
3915	REF 18	LAST 601	32,2624	54 772 1	TS	CDUSPOT +4	CDU ANGLES IN FUNNY ORDER FOR AX*SR*T.
3916	REF 149	LAST 597	32,2625	0 4616 1	TC	BANKCALL	
3917	REF 1		32,2626	47615 0	CADR	QUICTRIG	GET SINES AND COSINES OF CDU ANGLES.
3918	REF 19	LAST 563	32,2627	4 6245 0	GOTANGLS	CS	THREE
3919	REF 150	LAST 601	32,2630	0 4616 1	TC	BANKCALL	
3920	REF 1		32,2631	47675 0	CADR	AX*SR*T	TRANSFORM UNIT LOS TO NB AXES (ULOSNB).
3921	REF 29	LAST 601	32,2632	11 107 1	CCS	TANG	
3922			32,2633	1 2635 1	TCF	+2	
3923	REF 1		32,2634	1 2702 1	TCF	R29DPAS2	GO TO RR COMMAND COMP. AFTER 2ND PASS.

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P3924 COMPUTE COSINE OF THE ANGLE BETWEEN THE PRESENT LOS AND THE RR BORESIGHT VECTOR, AND SET THE SELFTRACK ENABLE IF
 R3926 THE COSINE IS APPROXIMATELY COS(.5 DEG) OR GREATER (I.E. SMALLER ANGLE).

3927				32,2635	0 0004 0	INHINT		
3928	REF	30	LAST	601	32,2636 55 107 1	TS	TANG	INDICATE 2ND PASS THRU VECTOR LOOP.
3929	REF	2	LAST	601	32,2637 3 1766 1	CA	SAVECDUT	
3930	REF	3	LAST	189	32,2640 0 5032 0	TC	SPCOS	
3931	REF	2	LAST	252	32,2641 54 166 1	TS	PUSHLOC	PUSHLOC = COS T.
3932	REF	3	LAST	602	32,2642 4 1766 0	CS	SAVECDUT	
3933	REF	3	LAST	188	32,2643 0 5033 1	TC	SPSIN	
3934	REF	5	LAST	597	32,2644 54 163 1	TS	MODE	MODE = -SIN T.
3935				32,2645 0 0006 1	EXTEND			
3936	REF	26	LAST	335	32,2646 7 0124 1	MP	VBUF +2	FORM - SIN T ULOSNB Y.
3937	REF	260	LAST	601	32,2647 52 155 1	DXCH	MPAC	
3938	REF	4	LAST	602	32,2650 3 1767 0	CA	SAVECDUT +1	
3939	REF	4	LAST	602	32,2651 0 5033 1	TC	SPSIN	
3940	REF	5	LAST	602	32,2652 55 1766 0	TS	SAVECDUT	SAVECDUT NOW = SIN S.
3941				32,2653 0 0006 1	EXTEND			
3942	REF	3	LAST	602	32,2654 7 0166 1	MP	PUSHLOC	
3943				32,2655 0 0006 1	EXTEND			
3944	REF	27	LAST	602	32,2656 7 0122 1	MP	VBUF	FORM SIN S COS T ULOSNB X.
3945	REF	261	LAST	602	32,2657 20 155 1	DAS	MPAC	
3946	REF	6	LAST	602	32,2660 3 1767 0	CA	SAVECDUT +1	
3947	REF	4	LAST	602	32,2661 0 5032 0	TC	SPCOS	
3948	REF	7	LAST	602	32,2662 55 1767 1	TS	SAVECDUT +1	SAVECDUT +1 NOW = COS S.
3949				32,2663 0 0006 1	EXTEND			
3950	REF	4	LAST	602	32,2664 7 0166 1	MP	PUSHLOC	
3951				32,2665 0 0006 1	EXTEND			
3952	REF	28	LAST	602	32,2666 7 0126 0	MP	VBUF +4	FORM COS S COS T ULOSNB Z.
3953	REF	262	LAST	602	32,2667 20 155 1	DAS	MPAC	COS(ERROR) = ULOSNB . (SIN S COS T.
3954				32,2670 0 0006 1	EXTEND			- SIN T, COS S COS T).
3955	REF	263	LAST	602	32,2671 3 0155 0	DCA	MPAC	
3956	REF	264	LAST	602	32,2672 20 155 1	DAS	MPAC	(ULOSNB IN VBUF WAS A HALF-UNIT VECTOR).
3957	REF	203	LAST	600	32,2673 10 000 0	CCS	A	TEST FOR + OVERFLOW, NONE, OR MINUS.
3958	REF	54	LAST	596	32,2674 3 4736 1	CA	BIT14	
3959				32,2675 12 676 0	NOOP			
3960				32,2676 0 0006 1	EXTEND			
3961	REF	40	LAST	596	32,2677 05 012 1	WBR	CHAN 2	IF PLUS OVERFLOW, SET SELFTRACK ENABLE.
3962				32,2700 0 0003 1	RELINT			
3963	REF	2	LAST	600	32,2701 1 2551 0	TCF	R29D/BEG -1	MAKE 2ND PASS THRU VECTOR LOOP.

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P3964 COMPUTE SHAFT AND TRUNNION COMMANDS TO NULL HALF THE ERROR IN HALF A SECOND.

3966	REF	8	LAST	602	32,2702	3 1767 0	R29DPAS2	CA	SAVECDUT +1	
3967					32,2703	0 0006 1		EXTEND		
3968	REF	29	LAST	602	32,2704	7 0122 1		MP	VBUF	FORM COS S ULOSNB*X.
3969	REF	31	LAST	602	32,2705	53 110 1		DXCH	TANG	
3970	REF	9	LAST	603	32,2706	4 1766 0		CS	SAVECDUT	
3971					32,2707	0 0006 1		EXTEND		
3972	REF	30	LAST	603	32,2710	7 0126 0		MP	VBUF +4	FORM - SIN S ULOSNB*Z.
3973	REF	32	LAST	603	32,2711	21 110 1		DAS	TANG	RAW SHAFT CMD = ULOSNB* . (COS S.).
3974	REF	6	LAST	602	32,2712	4 0163 1		CS	MODE	- SIN S)
3975					32,2713	0 0006 1		EXTEND		
3976	REF	10	LAST	603	32,2714	7 1766 0		MP	SAVECDUT	
3977					32,2715	0 0006 1		EXTEND		
3978	REF	31	LAST	603	32,2716	7 0122 1		MP	VBUF	FORM SIN T SIN S ULOSNB*X.
3979	REF	265	LAST	602	32,2717	52 155 1		DXCH	MPAC	
3980	REF	5	LAST	602	32,2720	3 0166 0		CA	PUSHLOC	
3981					32,2721	0 0006 1		EXTEND		
3982	REF	32	LAST	603	32,2722	7 0124 1		MP	VBUF +2	FORM COS T ULOSNB*Y.
3983	REF	266	LAST	603	32,2723	20 155 1		DAS	MPAC	
3984	REF	7	LAST	603	32,2724	4 0163 1		CS	MODE	
3985					32,2725	0 0006 1		EXTEND		
3986	REF	11	LAST	603	32,2726	7 1767 1		MP	SAVECDUT +1	
3987					32,2727	0 0006 1		EXTEND		
3988	REF	33	LAST	603	32,2730	7 0126 0		MP	VBUF +4	FORM SIN T COS S ULOSNB*Z.
3989	REF	267	LAST	603	32,2731	20 155 1		DAS	MPAC	RAW TRUNNION CMD = ULOSNB* .
3990	REF	268	LAST	603	32,2732	3 0154 1		CA	MPAC	(SIN S SIN T, COS T, SIN S COS T).
3991					32,2733	0 0006 1		EXTEND		
3992	REF	1			32,2734	7 2775 1		MP	RR29GAIN	
3993	REF	33	LAST	603	32,2735	57 107 0		XCH	TANG	STORE REFINED T CMD, GET RAW S CMD.
3994					32,2736	0 0006 1		EXTEND		
3995	REF	2	LAST	603	32,2737	7 2775 1		MP	RR29GAIN	
3996	REF	34	LAST	603	32,2740	55 110 1		TS	TANG +1	STORE REFINED S CMD.

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P3997 WHETHER OR NOT TRACKING WAS ENABLED THIS TIME. CHECK ON RR DATA-GOOD. IF PRESENT, STOP DESIGNATING AND START
 R3999 READING DATA FROM THE RENDEZVOUS RADAR.

4000	REF 27	LAST 592	32,2741	3 4750 1	DG000?	CAF	BIT4	
4001			32,2742	0 0006 1		EXTEND		
4002	REF 20	LAST 592	32,2743	02 033 0		RAND	CHAN33	GET RR DATA-GOOD BIT.
4003			32,2744	0 0004 0		INHINT		(MAINLY FOR RROUT).
4004			32,2745	0 0006 1		EXTEND		
4005	REF 1		32,2746	1 2752 1		BZF	R29LOKON	BRANCH IF DATA-GOOD IS PRESENT.
4006	REF 151	LAST 601	32,2747	0 4616 1		TC	BANKCALL	
4007	REF 3	LAST 552	32,2750	52306 0		CADR	RROUT	DATA-GOOD IS ABSENT, SO SEND COMMANDS.
4008	REF 1		32,2751	1 2770 1		TCF	END29DOD	
4009	REF 9	LAST 599	32,2752	4 4742 0	R29LOKON	CS	DESIGBIT	
4010	REF 110	LAST 599	32,2753	7 0110 0		MASK	RADMODES	
4011	REF 111	LAST 604	32,2754	54 110 0		TS	RADMODES	SHOW THAT DESIGNATION IS OVER.
4012	REF 34	LAST 571	32,2755	4 4752 1		CS	BIT2	
4013			32,2756	0 0006 1		EXTEND		
4014	REF 41	LAST 602	32,2757	03 012 1		WAND	CHAN12	DISABLE RR ERROR COUNTERS.
4015	REF 2	LAST 219	32,2760	3 4743 0		CA	READRBIT	
4016	REF 11	LAST 555	32,2761	26 077 0		ADS	FLAGWRD3	SHOW THAT READING HAS BEEN REQUESTED.
4017	REF 2	LAST 598	32,2762	11 056 1		CCS	PIPCTR	SEE IF TASK SHOULD BE OFFSET 1 SEC.
4018	REF 2	LAST 598	32,2763	4 4776 1		CS	SUPER110	- 96D + 100D = 4.
4019	REF 5	LAST 598	32,2764	6 4777 1		AD	1SEC	0 + 100D = 100D.
4020	REF 28	LAST 598	32,2765	0 5203 0		TC	WAITLIST	
4021	REF 36	LAST 598	E7,1456			EBANK=	LOSCOUNT	
4022	REF 1		32,2766	03400 0		2CADR	R29READ	START READING TASK AND JOB.
4022	REF 1		32,2767	50067 0				
4023	REF 4	LAST 599	32,2770	4 4740 1	END29DOD	CS	LOSCMBIT	
4024	REF 15	LAST 599	32,2771	7 0076 1		MASK	FLAGWRD2	
4025	REF 16	LAST 604	32,2772	54 076 1		TS	FLAGWRD2	ALWAYS CLEAR LOSCMFLG.
4026	REF 100	LAST 597	32,2773	1 5155 1		TCF	ENDOFJOB	
4027	REF 4	LAST 96	32,2774	00052 0	R29FXLOC	ADRES	INTB15+ -340	
4028			32,2775	56655 1	RR29GAIN	DEC	-.53624	
4029	REF 6	LAST 590	E3,1760		LOSVDT/4	EQUALS	LOSVEL	
4030	REF 14	LAST 590	1101		LOSSM	EQUALS	RRTARGET	
4031	REF 6	LAST 566	E3,1766		SAVECDUT	EQUALS	MLOSV	

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P4032 RR READING IS SET UP BY R29DDDES WHEN IT DETECTS RR LOCK-ON.

4033				24,3400				BANK 24	
4034	REF	7	LAST	599	24,2000			SETLOC P20S	
4035				24,3400				BANK	
4036	REF	2	LAST	599 TO 600:	18	18*		COUNT# 55/R29	
4037	REF	37	LAST	604	E7.1456			EBANK= LOSCOUNT	
4038	REF	10	LAST	546	24,3400	3 7714 1	R29READ	CAF PRI026	CALLED BY WAITLIST.
4039	REF	13	LAST	599	24,3401	0 5072 1		TC NOVAC	
4040	REF	38	LAST	605	E7.1456			EBANK= LOSCOUNT	
4041	REF	1			24,3402	03413 1		2CADR R29RDJOB	START JOB TO READ AND DOWNLINK FOR R29.
4041	REF	1			24,3403	50067 0			
4042	REF	4	LAST	562	24,3404	3 5000 1		CA 2SECS	
4043	REF	5	LAST	599	24,3405	0 5224 0		TC VARDELAY	
4044	REF	12	LAST	604	24,3406	3 0077 1		CA FLAGWRD3	2 SECONDS LATER, SEE IF READING IS STILL
4045	REF	3	LAST	604	24,3407	7 4743 1		MASK READRBIT	ALLOWED (NO TRACKER FAIL ETC.)
4046	REF	204	LAST	602	24,3410	10 000 0		CCS A	
4047	REF	2	LAST	604	24,3411	1 3400 1		TCF R29READ	IT'S OK; CALL IT AGAIN.
4048	REF	29	LAST	599	24,3412	1 5261 0		TCF TASKOVER	IT AIN'T; WAIT FOR REDESIGNATE.
4049	REF	13	LAST	605	24,3413	3 0077 1	R29RDJOB	CA FLAGWRD3	CALLLED VIA NOVAC.
4050	REF	3	LAST	280	24,3414	7 4741 0		MASK NR29FBIT	
4051	REF	205	LAST	605	24,3415	10 000 0		CCS A	TEST "NOR29FLG".
4052	REF	1			24,3416	1 3475 0		TCF ENDRRD29	R29 IS NOW OVER, STOP AT ONCE.
4053	REF	112	LAST	604	24,3417	3 0110 1		CA RADMODES	
4054	REF	5	LAST	537	24,3420	7 4752 1		MASK AUTOMBIT	
4055	REF	206	LAST	605	24,3421	10 000 0		CCS A	TEST RR-NOT-IN-AUTO-MODE BIT.
4056	REF	2	LAST	605	24,3422	1 3475 0		TCF ENDRRD29	ASTRO TOOK RR OUT OF AUTO MODE.
4057	REF	152	LAST	604	24,3423	0 4616 1		TC BANKCALL	
4058	REF	4	LAST	569	24,3424	53103 0		CADR RRRDOT	INITIATE READING OF RANGE RATE.
4059	REF	153	LAST	605	24,3425	0 4616 1		TC BANKCALL	
4060	REF	11	LAST	597	24,3426	17714 0		CADR RADSTALL	GO TO SLEEP UNTIL IT'S READY.
4061	REF	3	LAST	605	24,3427	1 3475 0		TCF ENDRRD29	BAD READ; REDESIGNATE.

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P4062 R29 RADAR READING CONTINUED.

4063	REF 7	LAST 569	24,3430	53'106 0	DXCH	TIMEHOLD	
4064	REF 269	LAST 603	24,3431	52'155 1	DXCH	MPAC	TIME OF RR READING, FOR DOWNLINK.
4065			24,3432	0'0004 0	INHINT		BE SURE OF 5 CONSISTENT CDU ANGLES.
4066			24,3433	0'0006 1	EXTEND		
4067	REF 12	LAST 601	24,3434	3'0036 1	DCA	CDUT	
4068	REF 270	LAST 606	24,3435	52'157 0	DXCH	MPAC +2	RRCDU ANGLES AT RR READ, FOR DOWNLINK.
4069			24,3436	0'0006 1	EXTEND		
4070	REF 4	LAST 601	24,3437	3'0034 0	DCA	CDUY	
4071	REF 271	LAST 606	24,3440	52'161 0	DXCH	MPAC +4	MPAC'S 7 WORDS ARE BUFFER FOR COPYCYCLE.
4072	REF 12	LAST 601	24,3441	3'0032 0	CA	CDUX	
4073	REF 272	LAST 606	24,3442	54'162 0	TS	MPAC +6	IMUCDU ANGLES AT RR READ, FOR DOWNLINK.
4074	REF 154	LAST 605	24,3443	0'4616 1	R29RANGE TC	BANKCALL	
4075	REF 3	LAST 570	24,3444	53'105 0	CADR	RRRANGE	INITIATE READING OF RR RANGE.
4076	REF 155	LAST 606	24,3445	0'4616 1	TC	BANKCALL	
4077	REF 12	LAST 605	24,3446	17'114 0	CADR	RADSTALL	GO TO SLEEP UNTIL IT'S READY.
4078	REF 1		24,3447	1'3466 1	TCF	R29RRR?	BAD READ OR SCALE CHANGE ... WHICH?
4079			24,3450	0'0004 0	INHINT		
4080	REF 6	LAST 570	24,3451	53'334 0	DXCH	DNRRANGE	COPYCYCLE TO LAY OUT NEW R29 DOWNLINK.
4081	REF 6	LAST 577	24,3452	53'757 1	DXCH	RM	
4082	REF 273	LAST 606	24,3453	52'155 1	DXCH	MPAC	
4083	REF 7	LAST 584	24,3454	53'755 0	DXCH	MKTIME	
4084	REF 274	LAST 606	24,3455	52'157 0	DXCH	MPAC +2	
4085	REF 9	LAST 591	24,3456	53'753 0	DXCH	TANGNB	
4086	REF 275	LAST 606	24,3457	52'161 0	DXCH	MPAC +4	
4087	REF 8	LAST 585	24,3460	53'460 0	DXCH	AIG	
4088	REF 276	LAST 606	24,3461	3'0162 1	CA	MPAC +6	
4089	REF 6	LAST 579	24,3462	55'461 1	TS	ADG	
4090	REF 77	LAST 600	24,3463	3'4753 1	CA	ONE	
4091	REF 4	LAST 314	24,3464	55'462 1	TS	TRKMKCNT	SHOW THAT DOWNLINK DATA IS CONSISTENT.
4092	REF 101	LAST 604	24,3465	1'5155 1	TCF	ENDOFJOB	
4093	REF 18	LAST 571	24,3466	4'0101 0	R29RRR? CS	FLAGWRD5	
4094	REF 29	LAST 551	24,3467	7'4742 0	MASK	BIT10	
4095	REF 207	LAST 605	24,3470	10'000 0	CCS	A	WAS IT A SCALE CHANGE (REAL OR PHONY)?
4096	REF 4	LAST 605	24,3471	1'3475 0	TCF	ENDRRD29	NO, A BAD READ; REDESIGNATE.
4097	REF 52	LAST 569	24,3472	0'5516 0	TC	DOWNFLAG	
4098	REF 3	LAST 569	24,3473	00'120 1	ADRES	RNGSCFLG	
4099	REF 1		24,3474	1'3443 0	TCF	R29RANGE	YES; CLEAR FLAG AND READ AGAIN.
4100	REF 126	LAST 588	24,3475	3'4755 1	ENDRRD29 CA	ZERO	TROUBLE MADE US COME HERE TO LEAVE THE
4101	REF 5	LAST 606	24,3476	55'462 1	TS	TRKMKCNT	RR-READING MODE. DISCREDIT DOWNTEL.
4102	REF 53	LAST 606	24,3477	0'5516 0	TC	DOWNFLAG	
4103	REF 1		24,3500	00'063 1	ADRES	READRFLG	
4104	REF 55	LAST 602	24,3501	4'4736 0	CS	BIT14	
4105			24,3502	0'0006 1	EXTEND		

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4106 REF 42 LAST 604 24,3503 03 012 1
4107 REF 102 LAST 606 24,3504 1 5155 1

WAND CHAN12
TCF ENDOFJOB

REMOVE TRACK-ENABLE DISCRETE.

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P4108 W-MATRIX MONITOR

4109				31,2007		BANK 31	
4110	REF	1		31,2000		SETLOC VB67	
4111				31,2007		BANK	
4112	REF	1				COUNT* 55/EXTVB	
4113	REF	3	LAST 317	E4.1600		EBANK= HWPOS	
4114	REF	59	LAST 597	31,2007	0 6037 0	V67CALL TC	INTPRET
4115				31,2010	77624 1	CALL	
4116	REF	1		31,2011	62120 0		V67WH
4117				31,2012	77776 1	EXIT	
4118				31,2013	0 0006 1	EXTEND	SAVE THE PRESENT N99 VALUES FOR
4119	REF	4	LAST 608	31,2014	3 1601 1	DCA	HWPOS
4120	REF	2	LAST 317	31,2015	53 607 0	DXCH	HWBIAS +2
4121				31,2016	0 0006 1	EXTEND	COMPARISON AFTER THE DISPLAY
4122	REF	2	LAST 317	31,2017	3 1603 0	DCA	HWVEL
4123	REF	3	LAST 608	31,2020	53 611 1	DXCH	HWBIAS +4
41231				31,2021	0 0006 1	EXTEND	
41232	REF	4	LAST 608	31,2022	3 1605 0	DCA	HWBIAS
41233	REF	5	LAST 608	31,2023	53 613 0	DXCH	HWBIAS +6
4124	REF	1		31,2024	3 2143 0	V06N99DS CAF	V06N99
4125	REF	156	LAST 606	31,2025	0 4616 1	TC	BANKCALL
4126	REF	7	LAST 290	31,2026	20334 1	CADR	COXDSPF
4127	REF	33	LAST 488	31,2027	1 5472 1	TCF	ENDEXT
4128	REF	1		31,2030	1 2032 0	TCF	V6N99PRO
4129	REF	1		31,2031	1 2024 1	TCF	V06N99DS
4133				31,2032	22 007 0	V6N99PRO ZL	
4134	REF	13	LAST 600	31,2033	3 4756 1	CA	FIVE
4135	REF	176	LAST 600	31,2034	54 002 1	N99LOOP TS	Q
4136	REF	177	LAST 608	31,2035	50 002 0	INDEX	Q
4137	REF	5	LAST 608	31,2036	4 1600 1	CS	HWPOS
4138	REF	178	LAST 608	31,2037	50 002 0	INDEX	Q
4139	REF	6	LAST 608	31,2040	6 1606 0	AD	HWPOS +6
4140	REF	88	LAST 569	31,2041	26 001 1	ADS	L
4141	REF	179	LAST 608	31,2042	10 002 1	CCS	0
4142	REF	1		31,2043	1 2034 0	TCF	N99LOOP
4143	REF	208	LAST 606	31,2044	22 000 1	LXCH	A
4144				31,2045	0 0006 1	EXTEND	
4145	REF	1		31,2046	1 2051 0	BZF	V06N9933
4146	REF	31	LAST 558	31,2047	0 5504 0	TC	UPFLAG
4147	REF	1		31,2050	00160 0	ADRES	V67FLAG
4148	REF	60	LAST 608	31,2051	0 6037 0	V06N9933 TC	INTPRET
4149				31,2052	77414 0	BON	EXIT
4150	REF	2	LAST 608	31,2053	03707 1		V67FLAG
4151				31,2054	62056 0		+2
4152	REF	34	LAST 608	31,2055	1 5472 1	TCF	ENDEXT
4153				31,2056	77745 1	DLOAD	

THE SUM OF ALL DIFFERENCES MUST BE ZERO.

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4154	REF	7	LAST	608	31,2057	02201 0		WNPOS
4156					31,2060	72412 0	SL4	SL1
4157					31,2061	14001 0	STODL	0D
4158	REF	3	LAST	608	31,2062	02203 1		WNVEL
4161					31,2063	14003 1	STODL	2D
41611	REF	6	LAST	608	31,2064	02205 1		WNBIAS
416113					31,2065	77661 0	SL	
416116					31,2066	20213 0		100
41612					31,2067	00005 1	STORE	4D
4162					31,2070	72014 1	BON	LXA,1
4163	REF	12	LAST	584	31,2071	04307 1		SURFFLAG
4164	REF	1			31,2072	62102 0		V67SURF
4165					31,2073	00000 1		0D
4166					31,2074	72130 0	SXA,1	LXA,1
4167	REF	3	LAST	584	31,2075	02000 0		WRENDPOS
4168					31,2076	00002 0		2D
4169					31,2077	52130 1	SXA,1	GOTO
4170	REF	2	LAST	584	31,2100	02001 1		WRENDVEL
4171	REF	1			31,2101	62110 0		V67CLRF
4172					31,2102	66150 0	V67SURF	LXA,1
4173					31,2103	00000 1		0D
4174	REF	2	LAST	584	31,2104	02006 0		WSURFPOS
4175					31,2105	66150 0	LXA,1	SXA,1
4176					31,2106	00002 0		2D
4177	REF	2	LAST	584	31,2107	02007 1		WSURFVEL
4178					31,2110	66150 0	V67CLRF	LXA,1
41781					31,2111	00004 0		4D
41782	REF	2	LAST	585	31,2112	02003 0		WTRUN
41783					31,2113	77730 0	SXA,1	
41784	REF	2	LAST	585	31,2114	02002 1		WSHAFT
41785					31,2115	77414 0	CLEAR	EXIT
4179	REF	9	LAST	585	31,2116	02676 1		RENDWFLG
4180	REF	35	LAST	603	31,2117	1 5472 1	TCF	ENDEXT
4181					31,2120	40020 1	V67NW	STQ
4182	REF	5	LAST	380	31,2121	00051 0		S2
4183					31,2122	62123 0		+1
4184					31,2123	45014 0	CLEAR	CALL
4185	REF	3	LAST	608	31,2124	03667 0		V67FLAG
4186	REF	17	LAST	583	31,2125	27414 0		INTSTALL
4187					31,2126	71331 0	SSP	DLOAD
4188	REF	6	LAST	385	31,2127	00051 0		SI
4189					31,2130	00006 1	DEC	6
4190	REF	6	LAST	581	31,2131	06522 1		ZEROVECS
4191	REF	8	LAST	609	31,2132	02201 0	STORE	WNPOS
4192	REF	4	LAST	609	31,2133	02203 1	STORE	WNVEL
41921	REF	7	LAST	609	31,2134	02205 1	STORE	WNBIAS
4193					31,2135	77770 1	AXT,1	
4194					31,2136	00066 1	DEC	54
4195					31,2137	47573 0	NXPOSVEL	VLOAD*
4195	REF	15	LAST	585	31,2140	02467 0		W+54D,1

SHIFT FROM NOUN SCALING (B-5) TO
INTERNAL SCALING (B+5)

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41963				31,2141	77650 1		GOTO	
41966	REF	1		31,2142	60002 0		ADDPUS	
4197				31,2143	01543 1	V06N99	VN	0699
4198	REF	1		30,2000			SETLOC	VB67A
4199				30,2002			BANK	
4200	REF	1					COUNT*	\$/EXTVB
4203				30,2002	77615 0	ADDPUS	DAD	
4204	REF	9	LAST	609	30,2003	02201 0		WWPOS
4205	REF	10	LAST	610	30,2004	02201 0	STORE	WWPOS
4206				30,2005	47573 0		VLOAD*	VSQ
4207	REF	16	LAST	609	30,2006	02555 0		W +1080.1
4208				30,2007	77615 0		DAD	
4209	REF	5	LAST	609	30,2010	02203 1		WWVEL
4210	REF	6	LAST	610	30,2011	02203 1	STORE	WWVEL
42101				30,2012	47573 0		VLOAD*	VSQ
42102	REF	17	LAST	610	30,2013	02643 1		W +1620.1
42103				30,2014	77615 0		DAD	
42104	REF	8	LAST	609	30,2015	02205 1		WWBIAS
42105	REF	9	LAST	610	30,2016	02205 1	STORE	WWBIAS
4211				30,2017	75500 0		TIX.1	SQRT
4212	REF	1		30,2020	62137 0			NXPUSVEL
421203				30,2021	77661 0		SR	
421206				30,2022	20613 1			100
42121	REF	10	LAST	610	30,2023	16205 1	STOOL	WWBIAS
42122	REF	7	LAST	610	30,2024	02203 1		WWVEL
42123				30,2025	77766 0		SQRT	
4213	REF	8	LAST	610	30,2026	16203 1	STOOL	WWVEL
4214	REF	11	LAST	610	30,2027	02201 0		WWPOS
4215				30,2030	77766 0		SQRT	
4216	REF	12	LAST	610	30,2031	02201 0	STORE	WWPOS
4217				30,2032	52000 0		BOV	GOTO
4218				30,2033	60035 1			+2
4219	REF	1		30,2034	60042 1			V67XXX
4220				30,2035	77745 1		DLOAD	
4221	REF	4	LAST	378	30,2036	06530 1		PPDSMAX
4222	REF	13	LAST	610	30,2037	02201 0	STORE	WWPOS
4223	REF	9	LAST	610	30,2040	02203 1	STORE	WWVEL
42231	REF	11	LAST	610	30,2041	02205 1	STORE	WWBIAS
4224				30,2042	45345 1	V67XXX	DLOAD	DSU
42241	REF	14	LAST	610	30,2043	02201 0		WWPOS
42242	REF	1		30,2044	20060 0			FT99999
42243				30,2045	71240 1		BMN	DLOAD
42244				30,2046	60051 0			+3
42245	REF	2	LAST	610	30,2047	20060 0		FT99999
42246	REF	15	LAST	610	30,2050	02201 0	STORE	WWPOS
42247				30,2051	66150 0		LXA.1	SXA.1
4225	REF	6	LAST	609	30,2052	00051 0		S2
4225	REF	2	LAST	297	30,2053	00052 0		QPRET

SHIFT FROM INTERNAL SCALING (B+5) TO
NOUN SCALING (B-5)

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4227				30,2054	77776 1		EXIT	
4228	REF	39	LAST	563	30,2055	0 4635 0	TC	POSTJUMP
4229	REF	2	LAST	297	30,2056	27425 1	CADR	INTWAKE
4230				30,2057	01670 1	FT99999	2DEC	30479 B-19
4230				30,2060	17000 1			

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4232				25,3607			BANK	25	
4233	REF	3	LAST	555	25,2000		SETLOC	PADARUPT	
4234				25,3607			BANK		
4235	REF	3	LAST	555 TO	561:	209 212*	COUNT*	1\$/RRUPT	
4236	REF	39	LAST	605	E7,1456		EBANK=	LOSCOUNT	
4237	REF	78	LAST	606	25,3607	3 4753 1	R12LITES	CA	ONE
4238	REF	26	LAST	524	25,3610	7 1303 1		MASK	IMODES33
4239	REF	209	LAST	608	25,3611	10 000 0		CCS	A
4240	REF	1			25,3612	1 4707 1		TCF	ISWPETRN
4241	REF	1			25,3613	0 3630 1		TC	HLIGHT
4242	REF	2	LAST	612	25,3614	0 3625 0		TC	HLIGHT -3
4243	REF	2	LAST	612	25,3615	1 4707 1		TCF	ISWRETRN
4244	REF	33	LAST	572	25,3616	3 4753 1	RADLITES	CA	BIT1
4245	REF	27	LAST	612	25,3617	7 1303 1		MASK	IMODES33
4246	REF	210	LAST	612	25,3620	10 000 0		CCS	A
4247	REF	180	LAST	608	25,3621	0 0002 0		TC	Q
4248	REF	26	LAST	557	25,3622	4 4747 0		CS	BIT5
4249	REF	28	LAST	560	25,3623	6 0061 0		AD	ITEMP1
4250	REF	211	LAST	612	25,3624	10 000 0		CCS	A
4251	REF	79	LAST	612	25,3625	4 4753 0		CS	ONE
4252	REF	1			25,3626	1 3664 1		TCF	VLIGHT
4253	REF	1			25,3627	1 4570 0		TCF	RRTRKF
4254	REF	4	LAST	258	25,3630	54 065 0	HLIGHT	TS	ITEMP5
									ZERO ITEMPS FOR H INDEX
4255	REF	1			25,3631	3 4747 1		CA	HLITE
4256	REF	89	LAST	608	25,3632	54 001 1		TS	L
4257	REF	8	LAST	559	25,3633	3 0107 1		CA	FLGWRD11
4258	REF	3	LAST	559	25,3634	7 4751 1		MASK	SCABBIT
4259	REF	212	LAST	612	25,3635	10 000 0		CCS	A
4260	REF	1			25,3636	1 3656 0		TCF	ONLITES
4261	REF	1			25,3637	3 4747 1		CA	LRALTBIT
4262	REF	113	LAST	605	25,3640	7 0110 0	BOTHLITS	MASK	RADNODES
4263	REF	213	LAST	612	25,3641	10 000 0		CCS	A
4264	REF	2	LAST	612	25,3642	1 3656 0		TCF	ONLITES
4265	REF	9	LAST	612	25,3643	3 0107 1		CA	FLGWRD11
4266	REF	5	LAST	612	25,3644	50 065 1		INDEX	ITEMPS
4267	REF	1			25,3645	7 4753 0		MASK	HFLSHBIT
4268	REF	214	LAST	612	25,3646	10 000 0		CCS	A
4269	REF	2	LAST	612	25,3647	1 4570 0		TCF	RRTRKF

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4270					25,3650	0 0006 1	LITIT	EXTEND	
4271	REF	3	LAST	180	25,3651	22 066 1		QXCH	ITEMP6
4272	REF	2	LAST	524	25,3652	0 4602 1		TC	TRKFLON +1
4273					25,3653	0 0006 1		EXTEND	
4274	REF	4	LAST	613	25,3654	22 066 1		QXCH	ITEMP6
4275	REF	3	LAST	612	25,3655	1 4570 0		TCF	RRTRKF
4276	REF	6	LAST	612	25,3656	50 065 1	ONLITES	INDEX	ITEMP5
4277	REF	2	LAST	612	25,3657	4 4753 0		CS	HFLSH3IT
4278	REF	10	LAST	612	25,3660	7 0107 0		MASK	FLGWRD11
4279	REF	11	LAST	613	25,3661	54 107 0		TS	FLGWRD11
4280	REF	90	LAST	612	25,3662	3 0001 0		CA	L
4281	REF	1			25,3663	1 3650 0		TCF	LITIT
4282	REF	7	LAST	613	25,3664	54 065 0	VLIGHT	TS	ITEMP5
4283	REF	1			25,3665	3 4751 0		CA	VLITE
4284	REF	91	LAST	613	25,3666	54 001 1		TS	L
4285	REF	26	LAST	556	25,3667	3 4744 1		CA	BIT8
4286	REF	1			25,3670	1 3640 1		TCF	BOTHLITS
4287	REF	27	LAST	612	4747		HLITE	EQUALS	BIT5
4288	REF	29	LAST	569	4751		VLITE	EQUALS	BIT3

*** END OF LEMP20S .127 ***

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P0023 PROGRAM DESCRIPTION P30 DATE 3-6-67

R0024 MOD.1 BY RAMA AIYAWAR

R0025 FUNCTIONAL DESCRIPTION

R0026 ACCEPT ASTRONAUT INPUTS OF TIG, DELV(LV)

R0027 CALL IMU STATUS CHECK ROUTINE (R02)

R0028 DISPLAY TIME TO GO, APOGEE, PERIGEE, DELV(MAG), MGA AT IGN

R0029 REQUEST BURN PROGRAM

R0030 CALLING SEQUENCE VIA JOB FROM V37

R0031 EXIT VIA V37 CALL OR TO GOTOPDOH (V34E)

R0032 SUBROUTINE CALLS-FLAGJP, PHASCHNG, BANKCALL, ENDOFJOB, GOFLASH, GOFLASHR

R0033 GOPERF3R, INTPRET, BLANKET, GOTOPDOH, R02BOTH, S30.1,

R0034 TTG/N35, MIDGIM, DISPMGA

R0035 ERASABLE INITIALIZATION- STATE VECTOR

R0036 OUTPUT-RINIT, VINIT, +MGA, VTIG, RTIG, DELVSIN, DELVSAB, DELVSLV, HAPD,

R0037 HPER, TTOGO

R0038 DEBRIS- A,L, MPAC, PUSHLIST

00381					32,2776				BANK	32	
00382	REF	1			35,2000				SETLOC	P30S	
00383					35,2000				BANK		
00384	REF	2	LAST	314	E4,1652				EBANK=	+MGA	
0039	REF	1							COUNT*	\$/P30	
0040	REF	32	LAST	608	35,2000	0	5504	0	TC	UPFLAG	SET UPDATE FLAG
0041	REF	3	LAST	495	35,2001	00027	1		ADRES	UPDATFLG	
00411	REF	33	LAST	614	35,2002	0	5504	0	TC	UPFLAG	SET TRACK FLAG
00412	REF	4	LAST	502	35,2003	00031	0		ADRES	TRACKFLG	
0042	REF	1			35,2004	3	2025	1	CAF	V06N33	T-OF IGN
0043	REF	1			35,2005	0	3712	0	TC	VNPOOH	RETURNS ON PROCEED, POOH ON TERMINATE
0051	REF	1			35,2006	3	3727	0	CAF	V06N81	DISPLAY DELTA V (LV)
0052	REF	2	LAST	614	35,2007	0	3712	0	TC	VNPOOH	REDISPLAY ON RECYCLE
0057	REF	54	LAST	606	35,2010	0	5516	0	TC	DOWNFLAG	RESET UPDATE FLAG
0058	REF	4	LAST	614	35,2011	00027	1		ADRES	UPDATFLG	
0059	REF	61	LAST	608	35,2012	0	6037	0	TC	INTPRET	
0060					35,2013	77624	1		CALL		
0061	REF	1			35,2014	70000	0			S30.1	
0067					35,2015	77414	0		SET	EXIT	
00675	REF	5	LAST	614	35,2016	00470	1			UPDATFLG	
0068	REF	1			35,2017	3	2026	1	CAF	V06N42	DISPLAY APOGEE, PERIGEE, DELTA V
0069	REF	3	LAST	614	35,2020	0	3712	0	TC	VNPOOH	

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0070	REF	62	LAST	614	35,2021	0 6037 0	TC	INTPRET
0071					35,2022	77614 1	SETGO	
0072	REF	1			35,2023	01027 0		XDELVFLG
0073	REF	1			35,2024	72540 0		REVNL645
0100					35,2025	01441 1	VN	0633
0102					35,2026	01452 0	VN	0642

FOR P40'S: EXTERNAL DELTA-V GUIDANCE.
TRKMKCNT, TGO, +MGA DISPLAY

L P30.P37

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P0105 PROGRAM DESCRIPTION S30.1 DATE 9NOV66

R0106 MOD NO 1 LOG SECTION P30.P37

R0107 MOD BY RAMA AIYAWAR **

R0108 FUNCTIONAL DESCRIPTION

R0109 BASED ON STORED TARGET PARAMETERS(R OF IGNITION(RTIG),V OF

R0110 IGNITION(VTIG),TIME OF IGNITION (TIG)),COMPUTE PERIGEE ALTITUDE

R0111 APOGEE ALTITUDE AND DELTAV REQUIRED(DELVSIN).

R0112 CALLING SEQUENCE

R0113 L CALL

R0114 L+1 S30.1

R0115 NORMAL EXIT MODE

R0116 AT L+2 OR CALLING SEQUENCE (GOTO L+2)

R0117 SUBROUTINES CALLED

R0118 LEMPREC

R0119 PERIAPD

R0120 ALARM OR ABORT EXIT MODES

R0121 NONE

R0122 ERASABLE INITIALIZATION REQUIRED-

R0123 TIG TIME OF IGNITION DP B28CS

R0124 DELVSLV SPECIFIED DELTA-V IN LOCAL VERT.

R0125 COORDS. OF ACTIVE VEHICLE AT

R0126 TIME OF IGNITION VECTOR B+7 METERS/CS

R0127 OUTPUT

R0128 RTIG POSITION AT TIG VECTOR B+29 METERS

R0129 VTIG VELOCITY AT TIG VECTOR B+29 METERS/CS

R0130 PDL 4D APOGEE ALTITUDE DP B+29 M, B+27 METERS.

R01301 HAPD APOGEE ALTITUDE DP B+29 METERS

R0131 PDL 8D PERIGEE ALTITUDE DP B+29 M, B+27 METERS.

R01311 HPER PERIGEE ALTITUDE DP B+29 METERS

R0132 DELVSIN SPECIFIED DELTA-V IN INERTIAL

R0133 COORD. OF ACTIVE VEHICLE AT

R0134 TIME OF IGNITION VECTOR B+7 METERS/CS

R0135 DELVSAB MAG. OF DELVSIN VECTOR B+7 METERS/CS

R0136 DEBRIS QTEMP TEMP. ERASABLE

R0137 QPRET.MPAC

R0138 PUSHLIST

0139	REF	1	34,2000	SETLOC P30S1
0140			34,2000	BANK

0141	REF	1		COUNT* 55/S30S
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0142			34,2000	71220-1 S30.1	STQ DLOAD	
0143	REF	1	34,2001	03632 0	QTEMP	
0144	REF	9	LAST 493	34,2002	03442 0	TIG
0145	REF	21	LAST 589	34,2003	34041 0	STCALL TDEC1
0146	REF	3	LAST 207	34,2004	27057 0	LEMPREC

TIME IGNITION SCALED AT 2(+28)CS

ENCKE ROUTINE FOR LEM

0147			34,2005	67175-0	VLOAD SXA.2
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01471	REF	10	LAST	589	34,2006	00001 0	RATT	
0148	REF	1			34,2007	02777 1	RTX2	
0150	REF	2	LAST	142	34,2010	03642 1	STORE RTIG	RADIUS VECTOR AT IGNITION TIME
0153					34,2011	57456 1	UNIT VCOMP	
0154	REF	3	LAST	143	34,2012	27656 1	STOVL DELVSIN	ZRF/LV IN DELVSIN SCALED AT 2
0155	REF	6	LAST	589	34,2013	00007 0	VATT	VELOCITY VECTOR AT TIG. SCALED 2(7) +/CS
0156	REF	2	LAST	142	34,2014	03650 1	STORE VTIG	
0158					34,2015	53435 0	VXV UNIT	
0159	REF	3	LAST	617	34,2016	03642 1	RTIG	
0160					34,2017	66001 0	SETPD SXA.1	
0161					34,2020	00001 0	0	
01611	REF	2	LAST	124	34,2021	02776 0	RTX1	
0162					34,2022	47206 0	PUSH VXV	YRF/LV PDL 0 SCALED AT 2
0163	REF	4	LAST	617	34,2023	03656 1	DELVSIN	
0164					34,2024	63372 1	VSL1 PDVL	
0165					34,2025	63315 0	PDVL PDVL	YRF/LV PDL 6 SCALED AT 2
0166	REF	5	LAST	617	34,2026	03656 1	DELVSIN	ZRF/LV PDL 120 SCALED AT 2
0167	REF	2	LAST	198	34,2027	03434 1	DELVSLV	
0168					34,2030	76505 0	VXM VSL1	
0169					34,2031	00001 0	0	
0170	REF	6	LAST	617	34,2032	03656 1	STORE DELVSIN	DELTAV IN INERT. COOR. SCALED TO B+7H/CS
0172					34,2033	77646 0	ABVAL	
0173	REF	2	LAST	142	34,2034	27664 0	STOVL DELVSAB	DELTA V MAG.
0174	REF	4	LAST	617	34,2035	03642 1	RTIG	(FOR PERIAPD)
0175					34,2036	53315 0	PDVL VAD	VREQUIRED = VTIG + DELVSIN (FOR PERIAPD)
0176	REF	3	LAST	617	34,2037	03650 1	VTIG	
0177	REF	7	LAST	617	34,2040	03656 1	DELVSIN	
01771					34,2041	77624 1	CALL	
0178	REF	1			34,2042	46316 1	PERIAPD1	
01781					34,2043	77624 1	CALL	
01782	REF	1			34,2044	46426 0	SHIFTR1	RESCALE IF NEEDED
017822					34,2045	77624 1	CALL	LIMIT DISPLAY TO 9999.9 N. MI.
017824	REF	1			34,2046	45636 0	MAXCHK	
01783	REF	2	LAST	314	34,2047	16321 0	STOVL HPEP	PERIGEE ALT 2(29) METERS, FOR DISPLAY
01784					34,2050	00005 1	4D	
01785					34,2051	77624 1	CALL	
01786	REF	2	LAST	617	34,2052	46426 0	SHIFTR1	RESCALE IF NEEDED
01787					34,2053	77624 1	CALL	LIMIT DISPLAY TO 9999.9 N. MI.
01788	REF	2	LAST	617	34,2054	45636 0	MAXCHK	
0179	REF	4	LAST	314	34,2055	36317 1	STCALL HAPG	APOGEE ALT 2(29) METERS, FOR DISPLAY
0180	REF	2	LAST	616	34,2056	03632 0	QTEMP	

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P0010 COELLIPTIC SEQUENCE INITIATION (CSI) PROGRAMS (P32 AND P72)

R0011 MOD NO -1 LOG SECTION - P32-P35, P72-P75

R0012 MOD BY WHITE.P DATE 1JUNE67

R0013 PURPOSE

- R0014 (1) TO CALCULATE PARAMETERS ASSOCIATED WITH THE FOLLOWING
R0015 CONCENTRIC FLIGHT PLAN MANEUVERS - THE CO-ELLIPTIC SEQUENCE
R0016 INITIATION (CSI) MANEUVER AND THE CONSTANT DELTA ALTITUDE
R0017 (CDH) MANEUVER.
- R0018 (2) TO CALCULATE THESE PARAMETERS BASED UPON MANEUVER DATA
R0019 APPROVED AND KEYED INTO THE DSKY BY THE ASTRONAUT.
- R0020 (3) TO DISPLAY TO THE ASTRONAUT AND THE GROUND DEPENDENT VARIABLES
R0021 ASSOCIATED WITH THE CONCENTRIC FLIGHT PLAN MANEUVERS FOR
R0022 APPROVAL BY THE ASTRONAUT/GROUND.
- R0023 (4) TO STORE THE CSI TARGET PARAMETERS FOR USE BY THE DESIRED
R0024 THRUSTING PROGRAM.

R0025 ASSUMPTIONS

- R0026 (1) AT A SELECTED TPI TIME THE LINE OF SIGHT BETWEEN THE ACTIVE
R0027 AND PASSIVE VEHICLES IS SELECTED TO BE A PRESCRIBED ANGLE (E)
R0028 FROM THE HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE
R00285 POSITION.
- R0029 (2) THE TIME BETWEEN CSI IGNITION AND CDH IGNITION MUST BE
R0030 COMPUTED TO BE GREATER THAN 10 MINUTES FOR SUCCESSFUL
R0031 COMPLETION OF THE PROGRAM.
- R0032 (3) THE TIME BETWEEN CDH IGNITION AND TPI IGNITION MUST BE
R0033 COMPUTED TO BE GREATER THAN 10 MINUTES FOR SUCCESSFUL
R0034 COMPLETION OF THE PROGRAM.
- R0035 (4) CDH DELTA V IS SELECTED TO MINIMIZE THE VARIATION OF THE
R0036 ALTITUDE DIFFERENCE BETWEEN THE ORBITS.
- R0037 (5) CSI BURN IS DEFINED SUCH THAT THE IMPULSIVE DELTA V IS IN THE
R0038 HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE POSITION AT CSI
R00385 IGNITION.
- R0039 (6) THE PERICENTER ALTITUDE OF THE ORBIT FOLLOWING CSI AND CDH
R0040 MUST BE GREATER THAN 35,000 FT (LUNAR ORBIT) OR 85 NM (EARTH
R0041 ORBIT) FOR SUCCESSFUL COMPLETION OF THIS PROGRAM.
- R0042 (7) THE CSI AND CDH MANEUVERS ARE ORIGINALLY ASSUMED TO BE
R0043 PARALLEL TO THE PLANE OF THE CSM ORBIT. HOWEVER CREW

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R0044 MODIFICATION OF DELTA V (LV) COMPONENTS MAY RESULT IN AN
R0045 OUT-OF-PLANE CSI MANEUVER.

R0046 (8) STATE VECTOR UPDATES BY P27 ARE DISALLOWED DURING AUTOMATIC
R0047 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION 10).

R0048 (9) COMPUTED VARIABLES MAY BE STORED FOR LATER VERIFICATION BY
R0049 THE GROUND. THESE STORAGE CAPABILITIES ARE NORMALLY LIMITED
R0050 ONLY TO THE PARAMETERS FOR ONE THRUSTING MANEUVER AT A TIME
R0051 EXCEPT FOR CONCENTRIC FLIGHT PLAN MANEUVER SEQUENCES.

R0052 (10) THE RENDEZVOUS RADAR MAY OR MAY NOT BE USED TO UPDATE THE LM
R0053 OR CSM STATE VECTORS FOR THIS PROGRAM. IF RADAR USE IS
R0054 DESIRED THE RADAR WAS TURNED ON AND LOCKED ON THE CSM BY
R0055 PREVIOUS SELECTION OF P20. RADAR SIGHTING MARKS WILL BE MADE
R0056 AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN ENABLED BY THE
R0057 TRACK AND UPDATE FLAGS (SEE P20). THE RENDEZVOUS TRACKING
R0058 MARK COUNTER IS ZEROED BY THE SELECTION OF P20 AND AFTER EACH
R0059 THRUSTING MANEUVER.

R0060 (11) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R0061 (12) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R0062 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R0063 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R0064 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R0065 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.

R0066 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R0067 COMPLETED THE FINAL MANEUVER COMPUTATION AND DISPLAY
R0068 CYCLE.

R0069 EXTERNAL DELTA V STEERING FLAG - DESIGNATES THE TYPE OF
R0070 STEERING REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE
R0071 THRUSTING PROGRAM SELECTED AFTER COMPLETION OF THIS
R0072 PROGRAM.

R0073 (13) IT IS NORMALLY REQUIRED THAT THE ISS BE ON FOR 1 HOUR PRIOR TO
R0074 A THRUSTING MANEUVER.

R0075 (14) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTRY -

R0076 P32 IF THIS VEHICLE IS ACTIVE VEHICLE.

R0077 P72 IF THIS VEHICLE IS PASSIVE VEHICLE.

R0110 INPUT

R0111 (1) TCSI TIME OF THE CSI MANEUVER

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R0112 (2) NN NUMBER OF APSIDAL CROSSINGS THRU WHICH THE ACTIVE
R0113 VEHICLE ORBIT CAN BE ADVANCED TO OBTAIN THE CDH
R0114 MANEUVER POINT
R0115 (3) ELEV DESIRED LOS ANGLE AT TPI
R0116 (4) TTPI TIME OF THE TPI MANEUVER
R0130 OUTPUT

R0131 (1) TRMKCNT NUMBER OF MARKS
R0132 (2) TTOGO TIME TO GO
R0133 (3) +MGA MIDDLE GIMBAL ANGLE
R0134 (4) DIFFALT DELTA ALTITUDE AT CDH
R0135 (5) T1TOT2 DELTA TIME FROM CSI TO CDH
R0136 (6) T2TOT3 DELTA TIME FROM CDH TO TPI
R0137 (7) DELVLVC DELTA VELOCITY AT CSI - LOCAL VERTICAL COORDINATES
R0138 (8) DELVLVC DELTA VELOCITY AT CDH - LOCAL VERTICAL COORDINATES

R0139 DOWNLINK

R01391 (1) TCSI TIME OF THE CSI MANEUVER
R01392 (2) TCDH TIME OF THE CDH MANEUVER
R01393 (3) TTPI TIME OF THE TPI MANEUVER
R01394 (4) TIG TIME OF THE CSI MANEUVER
R01395 (5) DELVEET1 DELTA VELOCITY AT CSI - REFERENCE COORDINATES
R01396 (6) DELVEET2 DELTA VELOCITY AT CDH - REFERENCE COORDINATES
R01397 (7) DIFFALT DELTA ALTITUDE AT CDH
R01398 (8) NN NUMBER OF APSIDAL CROSSINGS THRU WHICH THE ACTIVE
R01399 VEHICLE ORBIT CAN BE ADVANCED TO OBTAIN THE CDH
R0140 MANEUVER POINT
R01401 (9) ELEV DESIRED LOS ANGLE AT TPI

R01402 COMMUNICATION TO THRUSTING PROGRAMS

R01403 (1) TIG TIME OF THE CSI MANEUVER
R01404 (2) RTIG POSITION OF ACTIVE VEHICLE AT CSI - BEFORE ROTATION
R01405 INTO PLANE OF PASSIVE VEHICLE
R01406 (3) VTIG VELOCITY OF ACTIVE VEHICLE AT CSE - BEFORE ROTATION
R01407 INTO PLANE OF PASSIVE VEHICLE
R01408 (4) DELVSIN DELTA VELOCITY AT CSI - REFERENCE COORDINATES
R01409 (5) DELVSAB MAGNITUDE OF DELTA VELOCITY AT CSI
R0141 (6) XDELVFLG SET TO INDICATE EXTERNAL DELTA V VG COMPUTATION

R0150 SUBROUTINES USED

R0151 AVFLAGA
R0152 AVFLAGP
R01525 P20FLGON
R0153 VARALARM
R0154 BANKCALL
R0155 GOFLLASH
R0156 GUTOPPOH

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R01562 VNPOOH
 R01564 GOFLASHR
 R0157 BLANKET
 R0158 ENDOFJOB
 R0159 SELECTMU
 R0160 ADVANCE
 R0161 INTINT
 R0162 PASSIVE
 R0163 CSI/A
 R0164 S32/33.1
 R0165 DISDVLVC
 R0166 VN1645

0400				35,2027		BANK 35
0401	REF	1		35,2000		SETLOC CSI/CDH
0402				35,2027		BANK
0403	REF	1		E7,1470		EBANK= SUBEXIT
0404	REF	1				COUNT* \$\$/P3272
0500	REF	1		35,2027	0 2347 0 P32	TC AVFLAGA
0502	REF	1		35,2030	0 2032 1	TC P32STRT
0503	REF	1		35,2031	0 2354 1 P72	TC AVFLAGP
050305				35,2032	0 0006 1 P32STRT	EXTEND
050306	REF	1		35,2033	3 2420 0	DCA P30ZERO
050307	REF	3	LAST 315	35,2034	53'621 1	DXCH CENTANG
05031	REF	1		35,2035	0 2053 0	TC P32/P72A
05032				35,2036	77734 1 ALMXITA	SXA,2
05033	REF	2	LAST 141	35,2037	03613 0	CSIALRM
05034				35,2040	77740 1 ALMXIT	LXC,1
05035	REF	3	LAST 621	35,2041	03613 0	CSIALRM
05038				35,2042	77533 1	SLOAD* EXIT
05039	REF	1		35,2043	32423 0	ALARM/TB -1.1
0504	REF	277	LAST 606	35,2044	3 0154 1	CA MPAC
05041	REF	3	LAST 388	35,2045	0 5744 0	TC VARALARM
05042	REF	1		35,2046	3 5006 1	CAF V05N09
05043	REF	157	LAST 608	35,2047	0 4616 1	TC BANKCALL
05044	REF	8	LAST 493	35,2050	20476 0	CADR GOFLASH
05045	REF	6	LAST 493	35,2051	0 6001 0	TC GOTOPOOH
05046				35,2052	0 2046 1	TC -4
0505	REF	1		35,2053	0 2361 1 P32/P72A	TC P20FLGDN
05051	REF	2	LAST 621	35,2054	3 2417 1	CAF P30ZERO
0506	REF	3	LAST 315	35,2055	55'467 1	TS NN +1
05061	*REF	4	LAST 305	35,2056	55'633 1	TS TCSI
05062	*REF	5	LAST 621	35,2057	55'634 0	TS TCSI +1
0507	*REF	1		35,2060	3 2410 0 VN0611	CAF V06N11 TCSI
0508	REF	4	LAST 614	35,2061	0 3712 0	TC VNPOOH
050801*REF	63	LAST 615		35,2062	0 6037 0	TC INTPRET
050802*				35,2063	57545 1	DLOAD DCOMP
050803*REF	6	LAST 621		35,2064	03634 0	TC TCSI
050804*				35,2065	71240 1	BMN DLOAD
050805*REF	1			35,2066	72113 1	VN0655

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050806*REF	3	LAST	500	35,2067	01643-1		TETLEM
050807*REF	22	LAST	616	35,2070	34041-0	STCALL	TDEC1
050808*REF	1			35,2071	46360-0		PRECSET
050809*				35,2072	53775-1	VLOAD	VSR*
05081 *REF	1			35,2073	03536-1		RACT3
050811*				35,2074	57176-0		0,2
050812*REF	2	LAST	494	35,2075	26655-0	STOVL	RVEC
050813*REF	2	LAST	141	35,2076	03544-1		VACT3
050814*				35,2077	43057-1	VSR*	SET
050815*				35,2100	57176-0		0,2
050816*REF	2	LAST	494	35,2101	03466-0		RVSX
050817*REF	3	LAST	494	35,2102	16744-1	STOVL	VVEC
050818*REF	5	LAST	610	35,2103	06530-1		DPPOS MAX
050819*REF	2	LAST	125	35,2104	36756-0	STCALL	RDESIRED
05082 *REF	1			35,2105	25547-0		TIMERAD
050821*				35,2106	77615-0	DAD	
050822*REF	1			35,2107	03574-1		TDEC2
050823*REF	7	LAST	621	35,2110	03634-0	STORE	TCSI
050824*				35,2111	77776-1	EXIT	
050825*REF	1			35,2112	0-2060-0	TC	VN0611
050826*				35,2113	77776-1	EXIT	
0509 REF	1			35,2114	3-3724-0	CAF	V06N55 NN. ELEV(RGLUS)
0510 REF	158	LAST	621	35,2115	0-4616-1	TC	BANKCALL
0511 REF	9	LAST	621	35,2116	20476-0	CADR	GOFLASH
0512 REF	7	LAST	621	35,2117	0-6001-0	TC	GOTOPDOH
0513				35,2120	0-2122-1	TC	+2
0514				35,2121	0-2114-1	TC	-5
0518 REF	1			35,2122	3-3723-1	CAF	V06N37 TTPI
0519 REF	5	LAST	621	35,2123	0-3712-0	TC	VNPOOH
0520 REF	64	LAST	621	35,2124	0-6037-0	TC	INTPRET
0521				35,2125	77745-1	DLOAD	
0522 REF	8	LAST	622	35,2126	03634-0		TCSI
0523 REF	10	LAST	616	35,2127	37442-1	STCALL	TIG
0524 REF	1			35,2130	20000-0		SELECTMU
0525				35,2131	77624-1	P32/P72B CALL	
0526 REF	1			35,2132	71016-0		ADVANCE
0527				35,2133	77201-1	SETPD	VLOAD
0528				35,2134	00001-0		OD
0529 REF	3	LAST	144	35,2135	03506-1		VPASS1
0530				35,2136	65315-0	PDVL	PDDL
0531 REF	2	LAST	141	35,2137	03500-1		RPASS1
0532 REF	9	LAST	622	35,2140	03634-0		TCSI
0533				35,2141	65325-0	PDDL	PDDL
0534 REF	4	LAST	306	35,2142	03636-1		TTPI
0535 REF	1			35,2143	33732-1		TWOPI
0536				35,2144	45006-0	PUSH	CALL
0537 REF	1			35,2145	73466-1		INTINT
0538				35,2146	77624-1	CALL	
0539 REF	1			35,2147	46412-1		PASSIVE
0540				35,2150	77624-1	CALL	

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0541	REF	1		35,2151	70113 0		CSI/A
0542				35,2152	43014 0	P32/P72C BON	SET
0543	REF	1		35,2153	01311 0		FINALFLG
0544	REF	1		35,2154	72156 0		P32/P72D
0545	REF	6	LAST 614	35,2155	00470 1		UPDATFLG
0546				35,2156	77745 1	P32/P72D DLOAD	
0547	REF	3	LAST 316	35,2157	02253 1		T1TOT2
0548	REF	4	LAST 623	35,2160	02253 1	P32/P72E STORE	T1TOT2
0549				35,2161	51025 1	DSU	BPL
0550	REF	1		35,2162	32422 1		60MIN
0551	REF	1		35,2163	72160 0		P32/P72E
0552				35,2164	77745 1	DLOAD	
0553	REF	2	LAST 316	35,2165	02255 1		T2TOT3
0554	REF	3	LAST 623	35,2166	02255 1	P32/P72F STORE	T2TOT3
0555				35,2167	51025 1	DSU	BPL
0556	REF	2	LAST 623	35,2170	32422 1		60MIN
0557	REF	1		35,2171	72166 0		P32/P72F
0558				35,2172	77776 1	EXIT	
0559	REF	1		35,2173	3 2412 1	CAF	V06N75
0560	REF	6	LAST 622	35,2174	0 3712 0	TC	VNPOOH
0561	REF	65	LAST 622	35,2175	0 6037 0	TC	INTPRET
0562				35,2176	45175 0	VLOAD	CALL
0563	REF	3	LAST 198	35,2177	02267 0		DELVEET1
0566	REF	1		35,2200	71100 0		S32/33.1
0567	REF	4	LAST 623	35,2201	26267 0	STOVL	DELVEET1
05671	REF	2	LAST 117	35,2202	02311 0		RACT2
05672	REF	2	LAST 117	35,2203	26303 0	STOVL	RACT1
0568	REF	3	LAST 198	35,2204	02275 0		DELVEET2
0569				35,2205	45170 0	AXT,1	CALL
05691				35,2206	01522 0	VN	0682
0572	REF	1		35,2207	72370 0		DISDVLVC
0573				35,2210	77745 1	DLOAD	
05731	REF	5	LAST 622	35,2211	03636 1		TTPI
05732	REF	1		35,2212	37640 1	STCALL	TTPIO
0574	REF	1		35,2213	73606 0		VN1645
0575				35,2214	77650 1	GOTO	
0576	REF	1		35,2215	72131 1		P32/P72B

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P1010 CONSTANT DELTA HEIGHT (CDH) PROGRAMS (P33 AND P73)

R1011 MOD NO -1 LOG SECTION - P32-P35, P72-P75

R1012 MOD BY WHITE.P DATE 1JUNE67

R1013 PURPOSE

R1014 (1) TO CALCULATE PARAMETERS ASSOCIATED WITH THE CONSTANT DELTA
R1015 ALTITUDE MANEUVER (CDH).

R1016 (2) TO CALCULATE THESE PARAMETERS BASED UPON MANEUVER DATA
R1017 APPROVED AND KEYED INTO THE DSKY BY THE ASTRONAUT.

R1018 (3) TO DISPLAY TO THE ASTRONAUT AND THE GROUND DEPENDENT VARIABLES
R1019 ASSOCIATED WITH THE CDH MANEUVER FOR APPROVAL BY THE
R1020 ASTRONAUT/GROUND.

R1021 (4) TO STORE THE CDH TARGET PARAMETERS FOR USE BY THE DESIRED
R1022 THRUSTING PROGRAM.

R1023 ASSUMPTIONS

R1024 (1) THIS PROGRAM IS BASED UPON PREVIOUS COMPLETION OF THE
R1025 CO-ELLIPTIC SEQUENCE INITIATION (CSI) PROGRAM (P32/P72).
R1026 THEREFORE --

R1027 (A) AT A SELECTED TPI TIME (NOW IN STORAGE) THE LINE OF SIGHT
R1028 BETWEEN THE ACTIVE AND PASSIVE VEHICLES WAS SELECTED TO BE
R1029 A PRESCRIBED ANGLE (E) (NOW IN STORAGE) FROM THE
R1030 HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE POSITION.

R1031 (B) THE TIME BETWEEN CSI IGNITION AND CDH IGNITION WAS
R1032 COMPUTED TO BE GREATER THAN 10 MINUTES.

R1033 (C) THE TIME BETWEEN CDH IGNITION AND TPI IGNITION WAS
R1034 COMPUTED TO BE GREATER THAN 10 MINUTES.

R1035 (D) THE VARIATION OF THE ALTITUDE DIFFERENCE BETWEEN THE
R1036 ORBITS WAS MINIMIZED.

R1037 (E) CSI BURN WAS DEFINED SUCH THAT THE IMPULSIVE DELTA V WAS
R1038 IN THE HORIZONTAL PLANE DEFINED BY ACTIVE VEHICLE

R10385 POSITION AT CSI IGNITION.

R1039 (F) THE PERICENTER ALTITUDES OF THE ORBITS FOLLOWING CSI AND
R1040 CDH WERE COMPUTED TO BE GREATER THAN 35,000 FT FOR LUNAR
R1041 ORBIT OR 85 NM FOR EARTH ORBIT.

R1042 (G) THE CSI AND CDH MANEUVERS WERE ASSUMED TO BE PARALLEL TO
R1043 THE PLANE OF THE PASSIVE VEHICLE ORBIT. HOWEVER, CREW

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R1044 MODIFICATION OF DELTA V (LV) COMPONENTS MAY HAVE RESULTED
R1045 IN AN OUT-OF-PLANE MANEUVER.

R1046 (2) STATE VECTOR UPDATES BY P27 ARE DISALLOWED DURING AUTOMATIC
R1047 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION 4).

R1048 (3) COMPUTED VARIABLES MAY BE STORED FOR LATER VERIFICATION BY
R1049 THE GROUND. THESE STORAGE CAPABILITIES ARE NORMALLY LIMITED
R1050 ONLY TO THE PARAMETERS FOR ONE THRUSTING MANEUVER AT A TIME
R1051 EXCEPT FOR CONCENTRIC FLIGHT PLAN MANEUVER SEQUENCES.

R1052 (4) THE RENDEZVOUS RADAR MAY OR MAY NOT BE USED TO UPDATE THE LM
R1053 OR CSM STATE VECTORS FOR THIS PROGRAM. IF RADAR USE IS
R1054 DESIRED THE RADAR WAS TURNED ON AND LOCKED ON THE CSM BY
R1055 PREVIOUS SELECTION OF P20. RADAR SIGHTING MARKS WILL BE MADE
R1056 AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN ENABLED BY THE
R1057 TRACK AND UPDATE FLAGS (SEE P20). THE RENDEZVOUS TRACKING
R1058 MARK COUNTER IS ZEROED BY THE SELECTION OF P20 AND AFTER EACH
R1059 THRUSTING MANEUVER.

R1060 (5) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R1061 (6) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R1062 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R1063 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R1064 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R1065 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.

R1066 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R1067 COMPLETED THE FINAL MANEUVER COMPUTATION AND DISPLAY
R1068 CYCLE.

R1069 EXTERNAL DELTA V STEERING FLAG - DESIGNATES THE TYPE OF
R1070 STEERING REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE
R1071 THRUSTING PROGRAM SELECTED AFTER COMPLETION OF THIS
R1072 PROGRAM.

R1073 (7) IT IS NORMALLY REQUIRED THAT THE ISS BE ON FOR 1 HOUR PRIOR TO
R1074 A THRUSTING MANEUVER.

R1075 (8) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTRY -

R1076 P33 IF THIS VEHICLE IS ACTIVE VEHICLE.

R1077 P73 IF THIS VEHICLE IS PASSIVE VEHICLE.

R1110 INPUT

R1111 (1) TTPIO TIME OF THE TPI MANEUVER - SAVED FROM P32/P72

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R1112 (2) ELEV DESIRED LOS ANGLE AT TPI - SAVED FROM P32/P72
R1113 (3) TCDH TIME OF THE CDH MANEUVER

R1130 OUTPUT

R1131 (1) TRKMKCNT NUMBER OF MARKS
R1132 (2) TTOGO TIME TO GO
R1133 (3) +MGA MIDDLE GIMBAL ANGLE
R1134 (4) DIFFALT DELTA ALTITUDE AT CDH
R1135 (5) T2TOT3 DELTA TIME FROM CDH TO COMPUTED TPI
R1136 (6) NONTPI DELTA TIME FROM NOMINAL TPI TO COMPUTED TPI
R1137 (7) DELVLVC DELTA VELOCITY AT CDH - LOCAL VERTICAL COORDINATES

R1139 DOWNLINK

R11391 (1) TCDH TIME OF THE CDH MANEUVER
R11392 (2) TTPI TIME OF THE TPI MANEUVER
R11393 (3) TIG TIME OF THE CDH MANEUVER
R11394 (4) DELVEET2 DELTA VELOCITY AT CDH - REFERENCE COORDINATES
R11395 (5) DIFFALT DELTA ALTITUDE AT CDH
R11396 (6) ELEV DESIRED LOS ANGLE AT TPI
R11402 COMMUNICATION TO THRUSTING PROGRAMS

R11403 (1) TIG TIME OF THE CDH MANEUVER
R11404 (2) RTIG POSITION OF ACTIVE VEHICLE AT CDH - BEFORE ROTATION
R11405 INTO PLANE OF PASSIVE VEHICLE
R11406 (3) VTIG VELOCITY OF ACTIVE VEHICLE AT CDH - BEFORE ROTATION
R11407 INTO PLANE OF PASSIVE VEHICLE
R11408 (4) DELVSIN DELTA VELOCITY AT CDH - REFERENCE COORDINATES
R11409 (5) DELVSAB MAGNITUDE OF DELTA VELOCITY AT CDH
R1141 (6) XDELVFLG SET TO INDICATE EXTERNAL DELTA V VG COMPUTATION

R1150 SUBROUTINES USED

R1151 AVFLAGA
R1152 AVFLAGP
R11525 P20FLGUN
R1153 VNPOOH
R1154 SELECTMU
R1155 ADVANCE
R1156 CDHMVR
R1157 INTINT3P
R1158 ACTIVE
R1159 PASSIVE
R1160 S33/34.1
R1161 ALARM
R1162 BANKCALL
R1163 GOF LASH
R1164 GOTUPOOH
R1155 S32/33.1

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R1167

VN1645

1499	REF	1					COUNT* \$\$/P3373
1500	REF	2	LAST	621	35,2216	0 2347 0	P33 TC AVFLAGA
1502	REF	1			35,2217	0 2221 1	TC P33/P73A
1503	REF	2	LAST	621	35,2220	0 2354 1	P73 TC AVFLAGP
1505	REF	2	LAST	621	35,2221	0 2361 1	P33/P73A TC P20FLGON
15051	REF	1			35,2222	3 2411 1	CAF V06N13 TCDH
1506	REF	7	LAST	623	35,2223	0 3712 0	TC VNPOOH
1507	REF	66	LAST	623	35,2224	0 6037 0	TC INTPRET
1508					35,2225	77745 1	DLOAD
15081	REF	2	LAST	623	35,2226	03640 0	TTPI0
15082	REF	6	LAST	623	35,2227	17636 1	STODL TTPI
1509	REF	4	LAST	305	35,2230	01777 1	TCDH
1510	REF	11	LAST	622	35,2231	37442 1	STCALL TIG
1511	REF	2	LAST	622	35,2232	20000 0	SELECTMU
1512					35,2233	77624 1	P33/P73B CALL
1513	REF	2	LAST	622	35,2234	71016 0	ADVANCE
1514					35,2235	77624 1	CALL
1515	REF	1			35,2236	71133 0	CDHMR
1516					35,2237	77201 1	SETPD VLOAD
1517					35,2240	00001 0	OD
1518	REF	3	LAST	622	35,2241	03544 1	VACT3
1519					35,2242	45115 0	PDVL CALL
1520	REF	3	LAST	623	35,2243	02311 0	RACT2
1521	REF	1			35,2244	71071 1	INTINT3P
1522					35,2245	77624 1	CALL
1523	REF	1			35,2246	46402 0	ACTIVE
1524					35,2247	77201 1	SETPD VLOAD
1525					35,2250	00001 0	OD
1526	REF	2	LAST	141	35,2251	03530 1	VPASS2
1527					35,2252	45115 0	PDVL CALL
1528	REF	2	LAST	141	35,2253	03522 1	RPASS2
1529	REF	2	LAST	627	35,2254	71071 1	INTINT3P
1530					35,2255	77624 1	CALL
1531	REF	2	LAST	622	35,2256	46412 1	PASSIVE
1532					35,2257	43145 0	DLOAD SET
1533	REF	3	LAST	621	35,2260	32420 0	P30ZERO
1534	REF	1			35,2261	03460 0	ITSWICH
1535	REF	1			35,2262	36317 1	STCALL NOMTPI
1536	REF	1			35,2263	72764 1	S33/34.1
1537					35,2264	77454 1	BZE EXIT
1538	REF	1			35,2265	72302 0	P33/P73C
1539	REF	27	LAST	593	35,2266	0 5567 0	TC ALARM
1540					35,2267	00611 1	OCT 611
1541	REF	2	LAST	621	35,2270	3 5006 1	CAF V05N09
1542	REF	159	LAST	622	35,2271	0 4616 1	TC BANKCALL
1543	REF	10	LAST	622	35,2272	20476 0	CADR GOFLASH
1544	REF	8	LAST	622	35,2273	0 6001 0	TC GOTDPOOH
1545					35,2274	0 2276 0	TC +2

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1546	REF	2	LAST	627	35,2275	0 2221 1	TC	P33/P73A
1547	REF	67	LAST	627	35,2276	0 6037 0	TC	INTPRET
1548					35,2277	77745 1	DLOAD	
1549	REF	4	LAST	627	35,2300	32420 0		P30ZERO
1550	REF	2	LAST	627	35,2301	02317 0	STORE	NOMTPI
1551					35,2302	43014 0	P33/P73C BON	SET
1552	REF	2	LAST	623	35,2303	01311 0		FINALFLG
1553	REF	1			35,2304	72306 1		P33/P73D
1554	REF	7	LAST	623	35,2305	00470 1		UPDATFLG
1557					35,2306	43345 1	P33/P73D DLOAD	DAD
1558	REF	3	LAST	628	35,2307	02317 0		NOMTPI
1559	REF	7	LAST	627	35,2310	03636 1		TTPI
1560	REF	8	LAST	628	35,2311	03636 1	STORE	TTPI
1561					35,2312	77625 0	DSU	
1562	REF	5	LAST	627	35,2313	01777 1		TCOH
1563					35,2314	51025 1	P33/P73E DSU	BPL
1564	REF	3	LAST	623	35,2315	32422 1		60MIN
1565	REF	1			35,2316	72314 1		P33/P73E
1566					35,2317	77615 0	DAD	
1567	REF	4	LAST	628	35,2320	32422 1		60MIN
1568	REF	5	LAST	623	35,2321	16253 1	STOOL	T1TOT2
1569	REF	9	LAST	628	35,2322	03636 1		TTPI
1570					35,2323	41425 1	DSU	PUSH
1571	REF	3	LAST	627	35,2324	03640 0		TTPI0
1572					35,2325	45246 0	P33/P73F ABS	DSU
1573	REF	5	LAST	628	35,2326	32422 1		60MIN
1574					35,2327	43244 1	BPL	DAD
1575	REF	1			35,2330	72325 0		P33/P73F
15751	REF	6	LAST	628	35,2331	32422 1		60MIN
15753					35,2332	45565 0	SIGN	STADR
15755	REF	4	LAST	623	35,2333	75522 0	STORE	T2TOT3
1576					35,2334	77776 1	EXIT	
1577	REF	2	LAST	623	35,2335	3 2412 1	CAF	V06M75
1578	REF	8	LAST	627	35,2336	0 3712 0	TC	VNPOUH
1579	REF	68	LAST	628	35,2337	0 6037 0	TC	INTPRET
1580					35,2340	45175 0	VLOAD	CALL
1581	REF	4	LAST	623	35,2341	02275 0		DELVEET2
1584	REF	2	LAST	623	35,2342	71100 0		S32/33.1
1585	REF	5	LAST	628	35,2343	36275 1	STCALL	DELVEET2
1589	REF	2	LAST	623	35,2344	73606 0		VNI645
1590					35,2345	77650 1	GOTO	
1591	REF	1			35,2346	72233 0		P33/P73B

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P3800 AVFLAGA/P

R3850 SUBROUTINES USED

R3851 UPFLAG
R3852 DOWNFLAG

3900				35,2347	0 0006 1	AVFLAGA	EXTEND	AVFLAG = LEM
3901	REF	2	LAST 621	35,2350	23'470 0		QXCH SUBEXIT	
3902	REF	34	LAST 614	35,2351	0 5504 0		TC UPFLAG	
3903	REF	1		35,2352	00050 1		ADRES AVFLAG	
3904	REF	3	LAST 629	35,2353	0 1470 0		TC SUBEXIT	
3905				35,2354	0 0006 1	AVFLAGP	EXTEND	AVFLAG = CSM
3906	REF	4	LAST 629	35,2355	23'470 0		QXCH SUBEXIT	
3907	REF	55	LAST 614	35,2356	0 5516 0		TC DOWNFLAG	
3908	REF	2	LAST 629	35,2357	00050 1		ADRES AVFLAG	
3909	REF	5	LAST 629	35,2360	0 1470 0		TC SUBEXIT	
39091				35,2361	0 0006 1	P20FLGUN	EXTEND	
39092	REF	6	LAST 629	35,2362	23'470 0		QXCH SUBEXIT	
39093	REF	35	LAST 629	35,2363	0 5504 0		TC UPFLAG	
3910	REF	8	LAST 628	35,2364	00027 1		ADRES UPDATFLG	SET UPDATFLG
39101	REF	36	LAST 629	35,2365	0 5504 0		TC UPFLAG	
39102	REF	5	LAST 614	35,2366	00031 0		ADRES TRACKFLG	SET TRACKFLG
3911	REF	7	LAST 629	35,2367	0 1470 0		TC SUBEXIT	

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P4600 DISDVLVC

R4650 SUBROUTINES USED

R4651 S32/33.X

R4652 VNPOOH

4700	REF	11	LAST	316	35,2370	03434 1	DISDVLVC	STORE	DELVLVC
4701					35,2371	45020 1		STQ	CALL
4702	REF	2	LAST	140	35,2372	03463 0			NORMEX
47021	REF	1			35,2373	71120 1			S32/33.X
47022					35,2374	64375 1		VLOAD	MXV
47023	REF	12	LAST	630	35,2375	03434 1			DELVLVC
47024					35,2376	00001 0			OD
470241					35,2377	66172 0		VSL1	SXA.1
470243	REF	1			35,2400	03615 0			VERBNOUN
47025	REF	13	LAST	630	35,2401	03434 1		STORE	DELVLVC
47026					35,2402	77776 1		EXIT	
4703	REF	2	LAST	630	35,2403	3 1615 1		CA	VERBNOUN
4704	REF	9	LAST	628	35,2404	0 3712 0		TC	VNPOOH
4705	REF	69	LAST	628	35,2405	0 6037 0		TC	INTPRET
4706					35,2406	77650 1		GOTO	
4707	REF	3	LAST	630	35,2407	03463 0			NORMEX

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P4800 CONSTANTS

4901	35,2410	01413 0	V06N11	VN	0611	
4902	35,2411	01415 0	V06N13	VN	0613	
4903	35,2412	01513 1	V06N75	VN	0675	
4914	35,2413	77776 1	SN359+	2DEC	-.000086601	
4914	35,2414	62460 1				
4915	35,2415	17777 0	CS359+	2DEC	+.499999992	
4915	35,2416	37776 0				
4916	35,2417	00000 1	P30ZERO	2DEC	0	
4916	35,2420	00000 1				
4917	35,2421	00025 0	60MIN	2DEC	360000	
4917	35,2422	37100 1				
4919	35,2423	00600 1	ALARM/TB	OCT	00600	NO 1
4920	35,2424	00601 0		OCT	00601	2
4921	35,2425	00602 0		OCT	00602	3
4922	35,2426	00603 1		OCT	00603	4
4923	35,2427	00604 0		OCT	00604	5
4924	35,2430	00605 1		OCT	00605	6
4925	35,2431	00606 1		OCT	00606	7

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P5000 CSI/A

R5150 SUBROUTINES USED

R5152 VECSHIFT
 R5153 TIMETHET
 R5154 PERIAP0
 R5155 SHIFTRI
 R5156 INTINT2C
 R5157 CDHMVR
 R5158 PERIAP01
 R5159 INTINT
 R5160 ACTIVE

5400		34,2057		BANK 34		
5401	REF 1	34,2000		SETLOC CSI/CDH1		
5402		34,2057		BANK		
5403	REF 8 LAST 629	E7,1470		EBANK= SUBEXIT		
5404	REF 1			COUNT* \$\$/CSI		
5413		34,2057	00000 1	LOOPMX	2DEC 16	
5413		34,2060	00020 0			
5414		34,2061	00003 1	INITST	2DEC .03048 B-7	INITIAL DELDV = 10 FPS
5414		34,2062	34661 1			
5415		34,2063	00606 1	DVMAX1	2DEC 3.0480 B-7	MAXIMUM DV1 = 1000 FPS
5415		34,2064	04467 0			
5416		34,2065	00601 0	DVMAX2	2DEC 3.014472 B-7	989 FPS
5416		34,2066	33216 1			
5417		34,2067	10000 0	1DPB2	2DEC 1.08-2	
5417		34,2070	00000 1			
5418		34,2071	00000 1	1DPB23	2DEC 1	
5418		34,2072	00001 0			
5419		34,2073	00004 0	PMINE	2DEC 157420 B-29	85 NM - MUST BE 8 WORDS BEFORE PMINM
5419		34,2074	31566 0			
5420		34,2075	00000 1	EPSILN1	2DEC .0003048 B-7	.1 FPS
5420		34,2076	01177 1			
5421		34,2077	00002 0	NICKELDP	2DEC .021336 B-7	7 FPS (CHANGED FROM .05 FPS)
5421		34,2100	27311 1			
5422		34,2101	77754 1	FIFPSDP	2DEC -.152400 B-7	50 FPS
5422		34,2102	57611 0			
5423		34,2103	00000 1	PMINM	2DEC 10668 B-29	35000 FT - MUST BE 8 WORDS AFTER PMINE
5423		34,2104	12326 0			
5424		34,2105	00116 1	DELMAX1	2DEC .6096000 B-7	200 FPS
5424		34,2106	00730 0			
5425		34,2107	00000 1	ONETHTH	2DEC .0001 B-3	
5425		34,2110	06433 0			
5426		34,2111	00003 1	TMIN	2DEC 60000	10 MIN
5426		34,2112	25140 0			
5500		34,2113	43014 0	CSI/A	CLEAR SET	INITIALIZE INDICATORS
5501	REF 1	34,2114	03260 0		S32.1F1	DVT1 HAS EXCEEDED MAX INDICATOR
5502	REF 1	34,2115	03061 0		S32.1F2	FIRST PASS FOR NEWTON ITERATION INDICATR

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5503				34,2116	43014 0	CLEAR	SET		
5504	REF	1		34,2117	03262 1		S32.1F3A	00=1ST 2-PASSES 2ND CYCLE 01=FIRST CYCLE	
5505	REF	1		34,2120	03063 1		S32.1F3B	10=2ND CYCLE 11=50FPS STAGE 2ND CYCLE	
5506				34,2121	77745 1	DLOAD			
5507	REF	5	LAST	628	34,2122	32420 0		P30ZERO	
5508	REF	1			34,2123	03606 1	STORE	LOOPCT	
5509	REF	4	LAST	621	34,2124	03614 1	STORE	CSIALRM	
5510					34,2125	77201 1	SETPD	VLOAD	
5511					34,2126	00001 0		00	
5512	REF	3	LAST	623	34,2127	02303 0		RACT1	
5513					34,2130	41446 1	ABVAL	PUSH	RAI
5514					34,2131	70501 1	NORM	SRI	
5515	REF	2	LAST	487	34,2132	00050 1		X2	829-N2+ B1 PL040
5516					34,2133	51515 1	PDVL	ABVAL	
5517	REF	1			34,2134	03552 0		RPASS3	
5518					34,2135	55301 0	NORM	BDDV	RA1/RP3
5519	REF	5	LAST	586	34,2136	00047 1		X1	
5520					34,2137	53664 0	XSU.2	SR*	B2
5521	REF	6	LAST	633	34,2140	00046 0		X1	
5522					34,2141	57175 0		1,2	
5523					34,2142	41215 1	DAD	DMP	(1+(RA1/RP3))RA1
5524	REF	1			34,2143	30070 0		1DPB2	829+B2=B31 PLOOD
5525					34,2144	65301 0	NORM	PDDL	PL02D
5526	REF	7	LAST	633	34,2145	00047 1		X1	
5527	REF	1			34,2146	02321 0		RTMU	
5528					34,2147	56342 1	SR1	DDV	838-B31= B7 PLOOD
5529					34,2150	75457 0	SL*	SQRT	B7
5530					34,2151	20172 1		0 -7,1	
5531					34,2152	53515 0	PDVL	UNIT	PL02D
5532	REF	4	LAST	633	34,2153	02303 0		RACT1	
5533					34,2154	47315 0	PDVL	VXV	
5534	REF	2	LAST	117	34,2155	02261 0		UP1	
5535					34,2156	77656 1	UNIT		UNIT(URP1 X UVPI X URA1) = UH1
5536					34,2157	72441 0	DOT	SL1	VA1 . UH1
5537	REF	2	LAST	144	34,2160	03472 0		VACT1	B7
5538					34,2161	45421 1	BDSU	STADR	PLOOD
5539	REF	3	LAST	141	34,2162	60203 0	STODL	DELVCSI	
5540	REF	1			34,2163	30062 0		INITST	10 FPS
5541	REF	4	LAST	142	34,2164	03612 1	STORE	DELDV	
5542					34,2165	43345 1	DLOAD	DAD	IF LOOPCT = 16
5543	REF	2	LAST	633	34,2166	03606 1		LOOPCT	
5544	REF	1			34,2167	30072 1		1DPB28	
5545	REF	3	LAST	633	34,2170	03606 1	STORE	LOOPCT	
5546					34,2171	77025 0	DSU	AXT,2	
5547	REF	1			34,2172	30060 1		LOOPMX	
5548					34,2173	00006 1		6	
5549					34,2174	77644 1	BPL		
5550	REF	1			34,2175	70776 0		SCNDSOL	
5551					34,2176	77601 0	SETPD		
5552					34,2177	00001 0		00	

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5553				34,2200	51545-1	DLOAD	ABS	
5554	REF	4	LAST	633	34,2201		DELVCSI	
5555				34,2202	50025-0	DSU	BMN	
5556	REF	1			34,2203		DVMAX1	
5557	REF	1			34,2204		CSI/B23	
5558				34,2205	43174-1	AXT,2	BON	
5559				34,2206	00007-0		7	
5560	REF	2	LAST	632	34,2207		S32.1F1	
5561	REF	2	LAST	633	34,2210		SCNDSOL	
5562				34,2211	43014-0	BOFF	BON	
5563	REF	2	LAST	633	34,2212		S32.1F3A	
5564	REF	1			34,2213		CSI/B22	FLAG 3 NEQ 3
5565	REF	2	LAST	633	34,2214		S32.1F3B	
5566	REF	3	LAST	634	34,2215		SCNDSOL	
5567				34,2216	71214-0	CSI/B22 SET	DLOAD	
5568	REF	3	LAST	634	34,2217		S32.1F1	
5569	REF	1			34,2220		DVMAX2	
5570				34,2221	77765-0	SIGN		
5571	REF	5	LAST	634	34,2222		DELVCSI	
5572	REF	6	LAST	634	34,2223		STORE DELVCSI	
5573				34,2224	41575-0	CSI/B23 VLOAD	PUSH	
5574	REF	5	LAST	633	34,2225		RACT1	
5575				34,2226	63256-0	UNIT	PDVL	
5576	REF	3	LAST	633	34,2227		UPI	
5577				34,2230	53435-0	VXV	UNIT	UNIT(URP1 X UVPI X URA1) = UH1
5578				34,2231	76561-1	VXSC	VSL1	
5579	REF	7	LAST	634	34,2232		DELVCSI	
5580	REF	5	LAST	623	34,2233		STORE DELVEET1	
5581				34,2234	40055-0	VAD	BOV	
5582	REF	3	LAST	633	34,2235		VACT1	
5583	REF	1			34,2236		CSI/B23D	
5584	REF	2	LAST	142	34,2237	CSI/B23D STCALL	VACT4	
5585	REF	1			34,2240		VECSHIFT	
5586	REF	4	LAST	622	34,2241		STOVL VVEC	
5587				34,2242	77614-1	SET		
5588	REF	3	LAST	622	34,2243		RVSU	
5589	REF	3	LAST	622	34,2244		STOVL RVEC	
5590	REF	1			34,2245		SN359+	
5591	REF	3	LAST	494	34,2246		STCALL SNTH	ALSO CETH
5592	REF	2	LAST	494	34,2247		TIMETHET	
5593				34,2250	72142-0	SR1	LXA,1	
5594	REF	3	LAST	617	34,2251		RTX1	
5595	REF	1			34,2252		STCALL HAFPA1	
5596	REF	1			34,2253		PERIAPO	
5597				34,2254	77624-1	CALL		
5598	REF	3	LAST	617	34,2255		SHIFTR1	
5599	REF	1			34,2256		STOVL POSTCSI	
5600	REF	4	LAST	621	34,2257		CENTANG	
560001				34,2260	52054-1	BZE	GOTO	
560002				34,2261	70263-1		+2	

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560003	REF	1		34,2262	70372 0
560004				34,2263	77745 1
560005	REF	2	LAST 125	34,2264	02752 0
5601				34,2265	50025 0
5602	REF	1		34,2266	30110 1
5603	REF	2	LAST 635	34,2267	70372 0
5604				34,2270	45145 0
5605	REF	1		34,2271	00041 1
5606	REF	4	LAST 634	34,2272	46426 0
5607				34,2273	60201 1
5608				34,2274	00003 1
5609	REF	8	LAST 633	34,2275	00047 1
5610				34,2276	50315 0
5611	REF	6	LAST 634	34,2277	02303 0
5612	REF	3	LAST 634	34,2300	03566 1
5613				34,2301	56246 1
5614				34,2302	00003 1
5615				34,2303	45257 0
5616				34,2304	20201 0
5617	REF	1		34,2305	30100 0
5618				34,2306	71240 1
5619	REF	3	LAST 635	34,2307	70372 0
5620	REF	2	LAST 125	34,2310	02740 0
5621				34,2311	45312 0
5622	REF	2	LAST 633	34,2312	30070 0
5623				34,2313	14017 1
5624	REF	3	LAST 117	34,2314	02317 0
5625				34,2315	56342 1
5626				34,2316	41325 0
5627	REF	3	LAST 635	34,2317	02740 0
5628	REF	2	LAST 635	34,2320	00041 1
5629				34,2321	77624 1
5630	REF	5	LAST 635	34,2322	46426 0
5631				34,2323	72412 0
5632				34,2324	41366 1
5633				34,2325	52414 1
5634	REF	2	LAST 37	34,2326	04343 1
5635	REF	1		34,2327	70330 0
5636				34,2330	50315 0
5637	REF	7	LAST 635	34,2331	02303 0
5638	REF	4	LAST 635	34,2332	03566 1
5639	REF	2	LAST 142	34,2333	03617 1
5640				34,2334	77646 0
5641				34,2335	41301 0
5642	REF	3	LAST 633	34,2336	00050 1
5643				34,2337	53660 1
5644	REF	4	LAST 635	34,2340	00047 1
5645				34,2341	20204 0
5646				34,2342	14015 0
5647	REF	6	LAST 633	34,2343	32420 0

	CIRCL		
DLOAD	ECC		
DSU	BMN		
	ONETHTH		
	CIRCL		
DLOAD	CALL		
	R1		
	SHIFTR1		
SETPD	NORM		
	2D		
	X1		
PDVL	DOT		PLO4D
	RACT1		
	VACT4		
ABS	DDV		
	020	(/RDOTV)/R1	836-329= 87
SL*	DSU		
	0,1		
	NICKELDP		
BMN	DLOAD		
	CIRCL		
	P		
SL2	DSU		
	1DPB2		
STOUL	140		
	RTSR1/MU		
SR1	DDV	(1/RDOTMU)/R1	8-16-829 = 8-45 PLO2D
PDDL	DMP		
	P		
	R1		
CALL			
	SHIFTR1		
SL4	SL1		
SQRT	DMP	((P/MU)**.5)/R1	814+8-45 = 8-31 PLO2D
BOFF	SL3		
	CMOONFLG		
	CSI/B3		
CSI/B3	PDVL		
	DOT		
	RACT1		
	VACT4		
STORE	RDOTV		
ABS			
NORM	DMP	((P/MU)**.5)RDOTV/R1	PLO2D
	X2		
XSU,1	SL*		8-31+836-83= 82
	X2		
	3.1		
STOUL	12D		
	P30ZERD		

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5648				34,2344	00021-1	STORE	160	
5649				34,2345	53575-0	VLOAD	UNIT	
5650				34,2346	00015-0		120	
5651	REF	4	LAST	634	34,2347	26730-1	STOVL	SNTH ALSO STORES CSTH AND 0
5652	REF	8	LAST	635	34,2350	02303-0		RACT1
5653				34,2351	75315-1	PDVL	SIGN	
5654	REF	5	LAST	635	34,2352	03566-1		VACT4
5655	REF	3	LAST	635	34,2353	03617-1		RDOTV
5656				34,2354	45076-1	VGOMP	CALL	
5657	REF	2	LAST	634	34,2355	46416-0		VECSHIFT
5658	REF	5	LAST	634	34,2356	26744-1	STOVL	VVEC
5659				34,2357	77614-1	SET		
5660	REF	4	LAST	634	34,2360	03466-0		RVSU
5661	REF	4	LAST	634	34,2361	36655-1	STCALL	RVEC
5662	REF	3	LAST	634	34,2362	24732-1		TIMETHET
5663				34,2363	51125-0	PDDL	BPL	
5664	REF	4	LAST	636	34,2364	03617-1		RDOTV
5665	REF	1			34,2365	70376-1		NTP/2
5666				34,2366	45345-1	DLOAD	DSU	
5667	REF	2	LAST	634	34,2367	03604-0		HAFPA1
5668				34,2370	52006-0	PUSH	GOT0	
5669	REF	2	LAST	636	34,2371	70376-1		NTP/2
5670				34,2372	71201-1	CIRCL SETPD	DLOAD	
5671				34,2373	00001-0		000	
5672	REF	7	LAST	635	34,2374	32420-0		P30ZERO
5673				34,2375	77606-1	PUSH		
5674				34,2376	41345-0	NTP/2 DLOAD	DMP	
5675	REF	4	LAST	621	34,2377	03467-1		NN
5676	REF	3	LAST	636	34,2400	03604-0		HAFPA1
5677				34,2401	45261-0	SL	DSU	
5678				34,2402	20217-1		140	
5679				34,2403	77615-0	DAD		
5680	REF	10	LAST	622	34,2404	03634-0		TCSI
5681	REF	6	LAST	628	34,2405	01777-1	STORE	TCDH
5682				34,2406	77021-1	BDSU	AXT,2	
5683	REF	10	LAST	628	34,2407	03636-1		TTPI
5684				34,2410	00005-1		50	
5685				34,2411	40240-0	BMN	SETPD	
5686	REF	4	LAST	634	34,2412	70776-0		SCNDSOL
5687				34,2413	00001-0		00	
5688				34,2414	63375-0	VLOAD	PDVL	
5689	REF	6	LAST	636	34,2415	03566-1		VACT4
5690	REF	9	LAST	636	34,2416	02303-0		RACT1
5691				34,2417	77624-1	CALL		
5692	REF	1			34,2420	71062-0		INTINT20
5693	REF	4	LAST	627	34,2421	26311-0	STOVL	RACT2
5694	REF	7	LAST	617	34,2422	00007-0		VATT
5695	REF	1			34,2423	27514-1	STOVL	VACT2
5696	REF	4	LAST	622	34,2424	03506-1		VPASS1
5697				34,2425	63201-1	SETPD	PDVL	

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5698				34,2426	00001 0	OD		
5699	REF	3	LAST	622	34,2427	03500 1	RPASS1	
5700				34,2430	77624 1	CALL		
5701	REF	2	LAST	636	34,2431	71062 0	INTINT2C	
5702	REF	3	LAST	627	34,2432	27522 1	STOVL	RPASS2
5703	REF	8	LAST	636	34,2433	00007 0	VATT	
5704	REF	3	LAST	627	34,2434	37530 0	STCALL	VPASS2
5705	REF	2	LAST	627	34,2435	71133 0	CDHMVR	
5706				34,2436	40375 1	VLOAD	SETPD	
5707	REF	5	LAST	636	34,2437	02311 0	RACT2	
5708				34,2440	00001 0	OD		
5709				34,2441	45115 0	PDVL	CALL	
5710	REF	4	LAST	627	34,2442	03544 1	VACT3	
5711	REF	2	LAST	617	34,2443	46316 1	PERIAP01	
5712				34,2444	77624 1	CALL		
5713	REF	6	LAST	635	34,2445	46426 0	SHIFTR1	
5714	REF	2	LAST	141	34,2446	27604 0	STOVL	POSTCDH
5715	REF	5	LAST	637	34,2447	03544 1	VACT3	
5716				34,2450	63201 1	SETPD	PDVL	
5717				34,2451	00001 0	OD		
5718	REF	6	LAST	637	34,2452	02311 0	RACT2	
5719				34,2453	65325 0	PDDL	PDDL	
5720	REF	7	LAST	636	34,2454	01777 1	TCDH	
5721	REF	11	LAST	636	34,2455	03636 1	TTPI	
5722				34,2456	41525 0	PDDL	PUSH	
5723	REF	2	LAST	622	34,2457	33732 1	TWOPI	
5724				34,2460	77624 1	CALL		
5725	REF	2	LAST	622	34,2461	73466 1	INTINT	
5726				34,2462	77624 1	CALL		
5727	REF	2	LAST	627	34,2463	46402 0	ACTIVE	
5728				34,2464	77745 1	DLOAD		
5738	REF	4	LAST	315	34,2465	02257 0	ELEV	
5739				34,2466	73401 0	SETPD	SINE	
5740				34,2467	00007 0	6D		
5741				34,2470	53515 0	PDVL	UNIT	
5742	REF	2	LAST	622	34,2471	03536 1	RACT3	
5743				34,2472	00001 0	STORE	00D	URA3 AT 00D
5744				34,2473	47315 0	PDVL	VXV	PL14D,PL08D
5745	REF	4	LAST	634	34,2474	02261 0	UP1	
5746				34,2475	77656 1	UNIT		
5747				34,2476	71525 0	PDDL	COSINE	UNIT(URA3XUVA3XURA3) = UH3 B1 PL14D
5748	REF	5	LAST	637	34,2477	02257 0	ELEV	
5749				34,2500	45561 1	VXSC	STADR	(COSLOS)(UH3) B2 PL08D
5750				34,2501	77754 1	STORE	18D	PLUS
5751				34,2502	74345 0	DLOAD	VXSC	(SINLOS)(URA3) = U B2 PL00D
5752				34,2503	76455 1	VAD	VSL1	
5753				34,2504	00023 0	18D		B1
5754				34,2505	50206 0	PUSH	DOT	PL06D
5755	REF	3	LAST	637	34,2506	03536 1	RACT3	(U . RA3) = TEMP1 B1 +B29=B30
5756				34,2507	41552 0	SL1	PUSH	B29 PL08D

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5757			34,2510	72316 0	DSQ	TLOAD	TEMP1**2	B58
5758	REF 278	LAST 621	34,2511	00155 0		MPAC		
5759			34,2512	50315 0	PDVL	DOT		PL11D
5760	REF 4	LAST 637	34,2513	03536 1		RACT3		
5761	REF 5	LAST 638	34,2514	03536 1		RACT3		
5762			34,2515	57551 1	TLOAD	DCOMP	RA3.RA3	
5763	REF 279	LAST 638	34,2516	00155 0		MPAC		
5764			34,2517	50315 0	PDVL	DOT	RP3.RP3	B58-PL14D
5765	REF 2	LAST 633	34,2520	03552 0		RPASS3		
5766	REF 3	LAST 638	34,2521	03552 0		RPASS3		PL11D
5767			34,2522	76371 0	TAU	TAD	TEMP1**2+RA3.RA3+RP3.RP3=TEMP2	PL08D
5768			34,2523	71244 0	BPL	DLOAD		
5769	REF 1		34,2524	70542 0		K1ORK2		
5770	REF 4	LAST 633	34,2525	03606 1		LOOPCT		
5771			34,2526	77025 0	DSU	AXT,2		
5772	REF 2	LAST 633	34,2527	30072 1		1DPB28		
5773			34,2530	00001 0		1D		
5774			34,2531	77654 0	BZE			
5775	REF 1		34,2532	72036 1		ALMXITA		
5776			34,2533	70545 1	DLOAD	SR1		
5777	REF 5	LAST 633	34,2534	03612 1		DELDV		
5778	REF 6	LAST 638	34,2535	03612 1	STORE	DELDV		
5779			34,2536	77621 1	BDSU			
5780	REF 1		34,2537	03576 0		DVPREV		
5781	REF 8	LAST 634	34,2540	37574 0	STCALL	DELVCSE		
5782	REF 1		34,2541	70165 1		CSI/B1		
5783			34,2542	41566 1	K1ORK2	SQRT	TEMP3 = TEMP2**5	B29 PL10D
5784			34,2543	45276 0	DCOMP	DSU		
5785			34,2544	00007 0		DSU	-TEMP1-TEMP3 =K2 AT 100	
5786			34,2545	14013 0	STODL	100		PL08D
5787			34,2546	45425 0	DSU	STADR		PL06D
5788			34,2547	77762 1	STORE	120	-TEMP1+TEMP3 =K1 AT 120	
5789			34,2550	77646 0	ABS			
5790			34,2551	14017 1	STODL	140		
5791			34,2552	00013 0		100		
5792			34,2553	45246 0	ABS	DSU		
5793			34,2554	00017 1		140		
5794			34,2555	71240 1	BMN	DLOAD		
5795	REF 1		34,2556	70561 1		K2.		
5796			34,2557	00015 0		120		
5797			34,2560	00013 0	STORE	100	K=K1	
5798			34,2561	77745 1	K2.	DLOAD		
5799			34,2562	00013 0		100		
5800			34,2563	76561 1	VXSC	VSL1		
5801			34,2564	53455 0	VAD	UNIT	V=RA3+KU UNIT	B1
5802	REF 6	LAST 638	34,2565	03536 1		RACT3		
5803			34,2566	53515 0	PDVL	UNIT		PL06D
5804	REF 4	LAST 638	34,2567	03552 0		RPASS3		
5805			34,2570	53515 0	PDVL	UNIT		PL12D
5806	REF 1		34,2571	03560 1		VPASS3		

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5807				34,2572	63235 0	VXV	PDVL	UVP3 X URP3	PL18D
5808				34,2573	00007 0		06D		
5809				34,2574	00007 0		06D		
5810				34,2575	50235 0	VXV	DOT		
5811				34,2576	00001 0		00D		
5812				34,2577	77626 0	STADR			PL12D
5813				34,2600	53762 1	STOVL	12D	(URP3XV) . (UVP3XURP3)=TEMP	PL06D
5814				34,2601	72441 0	DOT	SL1		PL00D
5815				34,2602	75326 1	ARCCOS	SIGN		
5816				34,2603	00015 0		12D		B0
5817				34,2604	41542 1	SR1	PUSH	GAMMA=SIGN(TEMP)ARCOS(UNITV.URP3)	PL02D
5818				34,2605	71214 0	BON	DLOAD		
5819	REF	2	LAST	632	34,2606		S32.1F2		
5820	REF	1			34,2607		FRSTPAS		
5821					34,2610		00D	NOT THE FIRST PASS OF A CYCLE	
5822					34,2611	DSU	PDDL	GAMMA-GAMPREV	B1 PL04D
5823	REF	2	LAST	142	34,2612		GAMPREV		
5824	REF	9	LAST	638	34,2613		DELVCSI		
5825					34,2614	DSU	NORM		B7
5826	REF	2	LAST	638	34,2615		DVPREV		
5827	REF	9	LAST	635	34,2616		X1		
5828					34,2617	BDDV	PDDL	(GAM-GAMPREV)/(DV-DVPREV)	B-6+N1 PL06D
5829					34,2620		02D	= SLOPE	
5830	REF	10	LAST	639	34,2621		DELVCSI		
5831	REF	3	LAST	639	34,2622	STORE	DVPREV		
5832					34,2623	BOFF	BOFF		
5833	REF	3	LAST	634	34,2624		S32.1F3A		
5834	REF	1			34,2625		THRDCHK		
5835	REF	3	LAST	634	34,2626		S32.1F3B		
5836	REF	2	LAST	639	34,2627		THRDCHK		
5837					34,2630	DLOAD	DMP		
5838					34,2631		02D		
5839	REF	3	LAST	639	34,2632		GAMPREV		
5840					34,2633	BPL	DLOAD		
5841	REF	1			34,2634		FIFTYFPS		
5842	REF	2	LAST	633	34,2635		INITST		
5843					34,2636	SIGN			
5844	REF	7	LAST	638	34,2637		DELDV		
5845	REF	8	LAST	639	34,2640	STORE	DELDV		
5846					34,2641	SET	CLEAR		
5847	REF	4	LAST	639	34,2642		S32.1F3A		
5848	REF	4	LAST	639	34,2643		S32.1F3B		
5849					34,2644	FRSTPAS	DLOAD		
5850					34,2645		00D		
5851	REF	4	LAST	639	34,2646	STODL	GAMPREV		
5852	REF	11	LAST	639	34,2647		DELVCSI		
5853	REF	4	LAST	639	34,2650	STORE	DVPREV		
5854					34,2651	DSU	CLEAR		
5855	REF	9	LAST	639	34,2652		DELDV		
5856	REF	3	LAST	639	34,2653		S32.1F2		

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5857	REF	12	LAST	639	34,2654	37574 0	STCALL	DELVCSI	
5858	REF	2	LAST	638	34,2655	70165 1		CSI/B1	
5859					34,2656	43014 0	THRDCHK	BON	BON
5860	REF	5	LAST	639	34,2657	03302 0		S32.1F3A	
5861	REF	1			34,2660	70702 0		NEWTN	
5862	REF	5	LAST	639	34,2661	03303 1		S32.1F3B	
5863	REF	2	LAST	640	34,2662	70702 0		NEWTN	
5864					34,2663	75345 1	FIFTYFPS	DLOAD	SIGN
5865	REF	1			34,2664	30102 1		FIFPSDP	
5866					34,2665	00005 1		C4D	
5867					34,2666	77765 0		SIGN	
5868	REF	5	LAST	639	34,2667	03610 0		GAMPREV	
5869	REF	10	LAST	639	34,2670	03612 1	STORE	DELDV	
5870					34,2671	43276 0	DCOMP	DAD	
5871	REF	13	LAST	640	34,2672	03574 1		DELVCSI	
5872	REF	14	LAST	640	34,2673	17574 1	STOOL	DELVCSI	
5873					34,2674	00001 0		COO	
5874					34,2675	43014 0	SET	SET	
5875	REF	6	LAST	640	34,2676	03063 1		S32.1F3B	
5876	REF	6	LAST	640	34,2677	03062 0		S32.1F5A	
5877	REF	6	LAST	640	34,2700	37610 1	STCALL	GAMPREV	
5878	REF	1			34,2701	70176 0		CSI/B2	
5879					34,2702	60345 0	NEWTN	DLOAD	NORM
5880					34,2703	00005 1		C4D	
5881	REF	5	LAST	635	34,2704	00050 1		X2	
5882					34,2705	54065 0	BDDV	XSU,1	
5883					34,2706	00001 0		000	
5884	REF	6	LAST	640	34,2707	00047 1		X2	
5885					34,2710	77657 0	SR*		
5886					34,2711	20601 1		0,1	
5887	REF	11	LAST	640	34,2712	17612 1	STOOL	DELDV	
5888					34,2713	00001 0		000	
5889	REF	7	LAST	640	34,2714	03610 0	STORE	GAMPREV	
5890					34,2715	51545 1	DLOAD	ABS	
5891	REF	12	LAST	640	34,2716	03612 1		DELDV	
5892					34,2717	45206 1	PUSH	DSU	PLOBD
5893	REF	1			34,2720	30076 0		EPSILN1	
5894					34,2721	71240 1	BMN	DLOAD	
5895	REF	1			34,2722	70737 0		CSI/SOL	
5896					34,2723	50025 0	DSU	BMN	
5897	REF	1			34,2724	30106 0		DELMAX1	
5898	REF	1			34,2725	70732 0		CSISTEP	
5899					34,2726	75445 1	DLOAD	SIGN	
5900	REF	2	LAST	640	34,2727	30106 0		DELMAX1	
5901	REF	13	LAST	640	34,2730	03612 1		DELDV	
5902	REF	14	LAST	640	34,2731	03612 1	STORE	DELDV	
5903					34,2732	45345 1	DLOAD	DSU	CSISTEP
5904	REF	15	LAST	640	34,2733	03574 1		DELVCSI	
5905	REF	15	LAST	640	34,2734	03612 1		DELDV	
5906	REF	16	LAST	640	34,2735	37574 0	STCALL	DELVCSI	

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5907	REF	3	LAST	640	34,2736	70165 1		CSI/B1
5908					34,2737	77145 1	CSI/SOL DLOAD	AXT,2
5909	REF	2	LAST	634	34,2740	03602 0		POSTCSI
5910					34,2741	00002 0		2
5911					34,2742	77750 0	LXA,1	
5912	REF	4	LAST	634	34,2743	02776 0		RTXI
5913					34,2744	50023 0	DSU*	BMN
5914	REF	1			34,2745	30072 1		PMINE -2,1
5915	REF	5	LAST	636	34,2746	70776 0		SCNDSOL
5916					34,2747	71374 1	AXT,2	DLOAD
5917					34,2750	00003 1		3
5918	REF	3	LAST	637	34,2751	03604 0		POSTCDH
5919					34,2752	50023 0	DSU*	BMN
5920	REF	2	LAST	641	34,2753	30072 1		PMINE -2,1
5921	REF	6	LAST	641	34,2754	70776 0		SCNDSOL
5922					34,2755	45345 1	DLOAD	DSU
5923	REF	8	LAST	637	34,2756	01777 1		TCDH
5924	REF	11	LAST	636	34,2757	03634 0		TCSI
5925	REF	6	LAST	628	34,2760	02253 1	STORE	T1TOT2
5926					34,2761	45374 0	AXT,2	DSU
5927					34,2762	00004 0		4
5928	REF	1			34,2763	30112 0		TMIN
5929					34,2764	77040 0	BMN	AXT,2
5930	REF	7	LAST	641	34,2765	70776 0		SCNDSOL
5931					34,2766	00005 1		5
5932					34,2767	45345 1	DLOAD	DSU
5933	REF	12	LAST	637	34,2770	03636 1		TTP1
5934	REF	9	LAST	641	34,2771	01777 1		TCDH
5935	REF	5	LAST	628	34,2772	02255 1	STORE	T2TOT3
5936					34,2773	51025 1	DSU	BPL
5937	REF	2	LAST	641	34,2774	30112 0		TMIN
5938	REF	1			34,2775	72152 1		P32/P72C
5939					34,2776	43014 0	SCNDSOL BDN	BOFF
5940	REF	7	LAST	640	34,2777	03302 0		S32.1F3A
5941	REF	1			34,3000	72040 0		ALMXIT
5942	REF	7	LAST	640	34,3001	03343 0		S32.1F3B
5943	REF	2	LAST	641	34,3002	72040 0		ALMXIT
5944					34,3003	71334 0	SXA,2	DLOAD
5945	REF	5	LAST	633	34,3004	03613 0		CSIALRM
5946	REF	8	LAST	636	34,3005	32420 0		P30ZERO
5947					34,3006	43014 0	CLEAR	SET
5948	REF	4	LAST	634	34,3007	03260 0		S32.1F1
5949	REF	4	LAST	639	34,3010	03061 0		S32.1F2
5950					34,3011	43014 0	CLEAR	CLEAR
5951	REF	8	LAST	641	34,3012	03262 1		S32.1F3A
5952	REF	8	LAST	641	34,3013	03263 0		S32.1F3B
5953	REF	5	LAST	638	34,3014	37606 0	STCALL	LOOPCT
5954	REF	1			34,3015	70125 0		CSI/B

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P6000 ADVANCE

R6050 SUBROUTINES USED

R6051 PRECSET
R6052 ROTATE

6100					34,3016	71220 1	ADVANCE	STQ	DLOAD
6101	REF	9	LAST	632	34,3017	03470 1			SUBEXIT
6102	REF	12	LAST	627	34,3020	03442 0			TIG
6103	REF	23	LAST	622	34,3021	34041 0		STCALL	TDEC1
6104	REF	2	LAST	622	34,3022	46360 0			PRECSET
6105					34,3023	77214 0		SET	VLOAD
61055	REF	2	LAST	615	34,3024	01067 1			XDELVFLG
6106	REF	2	LAST	638	34,3025	03560 1			VPASS3
6107	REF	4	LAST	637	34,3026	03530 1		STORE	VPASS2
6108	REF	5	LAST	636	34,3027	27506 1		STOVL	VPASS1
6109	REF	5	LAST	638	34,3030	03552 0			RPASS3
6110	REF	4	LAST	637	34,3031	03522 1		STORE	RPASS2
6111	REF	4	LAST	637	34,3032	03500 1		STORE	RPASS1
6112					34,3033	47256 0		UNIT	VXV
6113	REF	6	LAST	642	34,3034	03506 1			VPASS1
6114					34,3035	77656 1		UNIT	
6115	REF	5	LAST	637	34,3036	26261 0		STOVL	UPI
6116	REF	7	LAST	638	34,3037	03536 1			RACT3
6117	REF	5	LAST	617	34,3040	37642 0		STCALL	RTIG
6118	REF	1			34,3041	71052 0			ROTATE
6119	REF	7	LAST	637	34,3042	02311 0		STORE	RACT2
6120	REF	10	LAST	636	34,3043	26303 0		STOVL	RACT1
6121	REF	6	LAST	637	34,3044	03544 1			VACT3
6122	REF	4	LAST	617	34,3045	37650 0		STCALL	VTIG
6123	REF	2	LAST	642	34,3046	71052 0			ROTATE
6124	REF	2	LAST	636	34,3047	03514 1		STORE	VACT2
6125	REF	4	LAST	634	34,3050	37472 1		STCALL	VACT1
6126	REF	10	LAST	642	34,3051	03470 1			SUBEXIT

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P6200 ROTATE

6300				34,3052	41406 0	ROTATE	PUSH	PUSH
6301				34,3053	74241 0		DOT	VXSC
6302	REF	6	LAST	642	34,3054	02261 0		UPI
6303	REF	7	LAST	643	34,3055	02261 0		UPI
6304				34,3056	51352 1		VSL2	BVSU
6305				34,3057	63256 0		UNIT	PDVL
6306				34,3060	74246 1		ABVAL	VXSC
6307				34,3061	43572 0		VSL1	RVQ

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P7000 INTINTNA

7100					34,3062	65325 0	INTINT2C	PDDL	PDDL	
7101	REF	12	LAST	641	34,3063	03634 0			TCSI	
7102	REF	10	LAST	641	34,3064	01777 1			TCOH	
7103					34,3065	41525 0		PDDL	PUSH	
7104	REF	3	LAST	637	34,3066	33732 1			TWOPI	
7105					34,3067	77650 1		GOTO		
7106	REF	3	LAST	637	34,3070	73466 1			INTINT	
7107					34,3071	65325 0	INTINT3P	PDDL	PDDL	
7108	REF	11	LAST	644	34,3072	01777 1			TCOH	
7109	REF	13	LAST	641	34,3073	03636 1			TTPI	
7110					34,3074	41525 0		PDDL	PUSH	
7111	REF	9	LAST	641	34,3075	32420 0			P30ZERO	
7112					34,3076	77650 1		GOTO		
7113	REF	4	LAST	644	34,3077	73466 1			INTINT	

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P7400 S32/33.1

R7450 SUBROUTINES USED

R7451 S32/33.X

7500				34,3100	76020 1	S32/33.1	STQ	AXT,1
75001	REF	11	LAST	642	34,3101	03470 1		SUBEXIT
75002				34,3102	01521 0		VN	0681
75003				34,3103	77624 1		CALL	
75004	REF	2	LAST	623	34,3104	72370 0		DISDVLVC
7501				34,3105	77624 1		CALL	
7502	REF	2	LAST	630	34,3106	71120 1		S32/33.X
7503				34,3107	61375 1		VLOAD	VX1
7504	REF	14	LAST	630	34,3110	03434 1		DELVLVC
7505				34,3111	00001 0			30
75051				34,3112	77772 0		VSL1	
7506	REF	8	LAST	617	34,3113	03656 1	STORE	DELVSIN
7507				34,3114	51406 1		PUSH	ABVAL
7508	REF	3	LAST	617	34,3115	27664 0	STOVL	DELVSAB
7509				34,3116	77650 1		GUTC	
7510	REF	12	LAST	645	34,3117	03470 1		SUBEXIT

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P7800 S32/33.X

7900				34,3120	77201 1	S32/33.X	SETPD	VLOAD
7901				34,3121	00007 0			6D
7902	REF	8	LAST	643	34,3122	02261 0		UPI
7903				34,3123	63276 1		VCOMP	PDVL
7904	REF	11	LAST	642	34,3124	02303 0		PACT1
7905				34,3125	57456 1		UNIT	VCOMP
7906				34,3126	47206 0		PUSH	VXV
7907	REF	9	LAST	646	34,3127	02261 0		UPI
7908				34,3130	77772 0		VSLI	
7909				34,3131	00001 0		STORE	OD
7910				34,3132	77616 0		RVQ	

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P8000 CDHMVR

R8050 SUBROUTINES USED

R8051 VEC SHIFT

R8052 TIMETHET

R8053 SHIFTRI

8100				34,3133	77220 1	CDHMVR	STQ	VLOAD	
8101	REF	13	LAST	645	34,3134			SUBEXIT	
8102	REF	8	LAST	642	34,3135			RACT2	
8103					34,3136		PUSH	UNIT	
8104	REF	1			34,3137		STOVL	UNVEC	UR SUB A
8105	REF	5	LAST	642	34,3140			RPASS2	
8106					34,3141		UNIT	DOT	
8107	REF	2	LAST	647	34,3142			UNVEC	
8108					34,3143		PUSH	SL1	
8109	REF	3	LAST	494	34,3144		STODL	CSTH	
8110					34,3145		DSQ	PDDL	
8111	REF	4	LAST	586	34,3146			DPI/4TH	
8112					34,3147		SR2	DSU	
8113					34,3150		SQRT	SL1	
8114					34,3151		PDVL	VCOMP	
8115					34,3152		VXV		
8116	REF	6	LAST	647	34,3153			RPASS2	
8117					34,3154		DOT	PDDL	
8118	REF	10	LAST	646	34,3155			UPI	
8119					34,3156		SIGN	STADR	
8120	REF	5	LAST	636	34,3157		STOVL	SNTH	
8121	REF	7	LAST	647	34,3160			RPASS2	
8122					34,3161		PDVL	CALL	
8123	REF	5	LAST	642	34,3162			VPASS2	
8124	REF	3	LAST	636	34,3163			VECSHIFT	
8125	REF	6	LAST	636	34,3164		STOVL	VVEC	
8126					34,3165		CLEAR		
8127	REF	5	LAST	636	34,3166			RVSU	
8128	REF	5	LAST	636	34,3167		STCALL	RVEC	
8129	REF	4	LAST	636	34,3170			TIMETHET	
8130					34,3171		LXA,2	VSL*	
8131	REF	2	LAST	617	34,3172			RTX2	
8132					34,3173			0,2	
8133					34,3174		STORE	180	
8134					34,3175		DOT	SLIR	
8135	REF	3	LAST	647	34,3176			UNVEC	
8136					34,3177		PDVL	ABVAL	OD = V SUB PV
8137					34,3200		SL*	PDVL	
8138					34,3201			0,2	
8139	REF	9	LAST	647	34,3202			RACT2	
8140					34,3203		ABVAL	PDDL	2D = LENGTH OF R SUB A
8141					34,3204		DSU		

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8142				34,3205	00003 1		02D			
8143	REF	4	LAST	316	34,3206	17600 1	STODL	DIFFALT	DELTA H IN METERS	B+29
8144	REF	2	LAST	125	34,3207	02742 1		R1A		
8145					34,3210	65301 0	NORM	PDDL	2 - R V** / MU	04D
8146	REF	10	LAST	639	34,3211	00047 1		X1		
8147	REF	3	LAST	635	34,3212	00041 1		R1		
8148					34,3213	77624 1	CALL			
8149	REF	7	LAST	637	34,3214	46426 0		SHIFTR1		
8150					34,3215	56362 0	SR1*	DDV		
8151					34,3216	41457 1	SL*	PUSH		
8152					34,3217	20174 1		0 - 5.1		
8153					34,3220	55225 1	DSU	PDDL	A SUB A	B+29 04D
8154	REF	5	LAST	648	34,3221	03600 1		DIFFALT		
8155					34,3222	56302 0	SR2	DDV	A SUB P	B+31
8156					34,3223	00005 1		04D		B+2
8157					34,3224	75406 1	PUSH	SQRT	A SUB P/A SUB A	06D
8158					34,3225	41275 1	DMPR	DMP		
8159					34,3226	00007 0		06D		
8160					34,3227	00001 0		00D		
8161					34,3230	65272 0	SL3R	PDDL	V SUB AV METERS/CS	B+7 08D
8162					34,3231	00003 1		02D	R SUB A MAGNITUDE	B+29
8163					34,3232	65301 0	NORM	PDDL		
8164	REF	11	LAST	648	34,3233	00047 1		X1		
8165	REF	2	LAST	633	34,3234	02321 0		RTMU		
8166					34,3235	56342 1	SR1	DDV	2MU B+38	
8167					34,3236	55257 1	SL*	PDDL	2 MU/R SUBAA	B+14 10D
8168					34,3237	20174 1		0 - 5.1		
8169					34,3240	00005 1		04D	ASUBA	B+29
8170					34,3241	65301 0	NORM	PDDL		
8171	REF	7	LAST	640	34,3242	00050 1		X2		
8172	REF	3	LAST	648	34,3243	02321 0		RTMU		
8173					34,3244	56342 1	SR1	DDV		
8174					34,3245	44257 1	SL*	PDSU		
8175					34,3246	57604 1		0 - 5.2	2U/R - U/A	B+14 (METERS/CS) 50
8176					34,3247	63525 0	PDDL	DSQ		10D
8177					34,3250	00011 1		08D		
8178					34,3251	75421 1	BDSU	SQRT		
8179					34,3252	47315 0	PDVL	VXV	SQRT(MU(2/R SUB A-1/A SUB A)-V SUB A2)	10D
8180	REF	11	LAST	647	34,3253	02261 0		UP1		
8181	REF	4	LAST	647	34,3254	03544 1		UNVEC		
8182					34,3255	74256 0	UNIT	VXSC		
8183					34,3256	00013 0		10D		
8184					34,3257	74315 0	PDVL	VXSC		
8185	REF	5	LAST	648	34,3260	03544 1		UNVEC		
8186					34,3261	00011 1		08D		
8187					34,3262	76455 1	VAD	VSL3		
8188					34,3263	77626 0	STADR			
8189	REF	7	LAST	642	34,3264	74233 0	STORE	VACT3		
8190					34,3265	77651 0	VSU			
8191	REF	3	LAST	642	34,3266	03514 1		VACT2		

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8199	REF	6	LAST	628	34.3267	36275 1
8200	REF	14	LAST	647	34.3270	03470 1

STCALL DELVEET2
SUBEXIT

DELTA VCDH - REFERENCE COORDINATES

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P8201 COMPTGO

R8202 SUBROUTINES USED

R8203 CLOKTASK
R8204 2PHSCHNG

8205				35,2432
8206	REF	2	LAST	621
8207				35,2432

BANK	35
SETLOC	CSI/CDH
BANK	

8208	REF	1		E7,1465
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EBANK= RTRN

8209	REF	1		
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COUNT* \$\$\$/P3575

8210				35,2432	0 0006	1	COMPTGO
8211	REF	2	LAST	650	35,2433	23*465	1
8212	REF	127	LAST	606	35,2434	3-4755	1
8213	REF	2	LAST	148	35,2435	55*163	0
8214	REF	35	LAST	604	35,2436	3-4752	0
8215				35,2437	0 0004	0	
8216	REF	29	LAST	604	35,2440	0 5203	0
8217	REF	2	LAST	242	E7,1455		
8218	REF	2	LAST	243	35,2441	02717	1
8218				35,2442	74067	0	
8219	REF	3	LAST	502	35,2443	0 5327	1
8220				35,2444	40036	0	
8221				35,2445	05024	1	
8222				35,2446	13000	0	
8223	REF	3	LAST	650	35,2447	0 1465	1

EXTEND	
QXCH	RTRN
CAF	ZERO
TS	DISPDEX
CAF	BIT2
INHINT	
TC	WAITLIST
EBANK=	WHICH
2CADR	CLOKTASK
TC	2PHSCHNG
OCT	40036
OCT	05024
OCT	13000
TC	KTRN

L GENERAL LAMBERT AIMPOINT GUIDANCE

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P0001 GENERAL LAMBERT AIMPOINT GUIDANCE **

R0002 WRITTEN BY RAMA M AIYAWAR

R0003 PROGRAM P-31 DESCRIPTION **

R0004 1. TO ACCEPT TARGETING PARAMETERS OBTAINED FROM A SOURCE EXTERNAL
R0005 TO THE LEM AND COMPUTE THERE FROM THE REQUIRED-VELOCITY AND
R0006 OTHER INITIAL CONDITIONS REQUIRED BY LM FOR DESIRED MANEUVER.
R0007 THE TARGETING PARAMETERS ARE TIG (TIME OF IGNITION), TARGET
R0008 VECTOR (RTARG), AND THE TIME FROM TIG UNTIL THE TARGET IS
R0009 REACHED(DELTT4), DESIRED TIME OF FLIGHT FROM RINIT TO RTARG..

R0010 ASSUMPTIONS **

R0011 1. THE TARGET PARAMETERS MAY HAVE BEEN LOADED PRIOR TO THE
R0012 EXECUTION OF THIS PROGRAM.
R0013 2. THIS PROGRAM IS APPLICABLE IN EITHER EARTH OR LUNAR ORBIT.
R0014 3. THIS PROGRAM IS DESIGNED FOR ONE-MAN OPERATION, AND SHOULD
R0015 BE SELECTED BY THE ASTRONAUT BY DSKY ENTRY V37 E31.

R0016 SUBROUTINES USED **

R0017 MANUPARM, TTG/N35, R02BOTH, MIDGIM, DISPMGA, FLAGDOWN, BANKCALL,
R0018 GOTOPDOH, ENDOFJOB, PHASCHNG, GOFLASHR, GOFLASH.

R0019 MANUPARM CALCULATES APOGEE, PERIGEE ALTITUDES AND DELTAV DESIRED
R0020 FOR THE MANEUVER.

R0021 TTG/N35 CLOKKTASK - UPDATES CLOCK.

R0022 MIDGIM CALCULATES MIDDLE GIMBAL ANGLE FOR DISPLAY.

R0023 R02BOTH IMU - STATUS CHECK ROUTINE.

R0024 DISPLAYS USED IN P-31LM **

R0025 V06N33 DISPLAY SOTRED TIG (IN HRS. MINS. SECS)
R0026 V06N42 DISPLAY APOGEE, PERIGEE, DELTAV.
R0027 V16N35 DISPLAY TIME FROM TIG.
R0028 V06N45 TIME FROM IGNITION AND MIDDLE GIMBAL ANGLE.

R0029 ERASABLE INITIALIZATION REQUIRED **

R0030 TIG TIME OF IGNITION DP (B+28) CS.

R0031 DELTT4 DESIRED TIME OF FLIGHT DP (B+28) CS
R0032 FROM RINIT TO RTARG.

R0033 RTARG RADIUS VECTOR OF TARGET POSITION VECTOR

R0034 RADIUS VECTOR SCALED TO (B+29) METERS IF EARTH ORBIT

L GENERAL LAMBERT AIMPOINT GUIDANCE

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R0035 RADIUS VECTOR SCALED TO (B+27) METERS IF MOON ORBIT

R0036 OUTPUT **

R0037 HAPD APOGEE ALTITUDE

R0038 HPER PERIGEE ALTITUDE

R0039 VGDISP MAG. OF DELTAV FOR DISPLAY, SCALING B+7 M/CS EARTH

R0040 MAG. OF DELTAV FOR DISPLAY, SCALING B+5 M/CS MOON

R0041 MIDGIM MIDDLE GIMBAL ANGLE

R0042 XDELVFLG RESETS XDELVFLG FOR LAMBERT-VG COMPUTATIONS

R0043 ALARMS OR ABORTS NONE **

R0044 RESTARTS ARE VIA GROUP 4 **

0045 REF 1 35,2000

0046 35,2450

SETLOC GLM

BANK

0047 REF 15 LAST 649 E7,1470

EBANK= SUBEXIT

0048 REF 1

COUNT* \$\$/P31

0049 REF 3 LAST 627 35,2450 0 2361 1 P31

TC P20FLGON

0051 REF 2 LAST 614 35,2451 3 2025 1

CAF V06N33

TIG

0052 REF 10 LAST 630 35,2452 0 3712 0

TC VNPOOH

0053 REF 70 LAST 630 35,2453 0 6037 0

TC INTPRET

0054 35,2454 71214 0

CLEAR DLOAD

0055 REF 9 LAST 629 35,2455 00670 0

UPDATFLG

0056 REF 13 LAST 642 35,2456 03442 0

TIG

0057 REF 24 LAST 642 35,2457 34041 0

STCALL TDEC1

INTEGRATE STATE VECTORS TO TIG

0058 REF 4 LAST 616 35,2460 27057 0

LEMPREC

0059 35,2461 40375 1

VLOAD SETPD

0060 REF 11 LAST 617 35,2462 00001 0

RATT

0061 35,2463 00001 0

GD

0062 REF 6 LAST 642 35,2464 03642 1

STORE RTIG

0063 REF 1 35,2465 26323 1

STOVL RINIT

0064 REF 9 LAST 637 35,2466 00007 0

VATT

0065 REF 5 LAST 642 35,2467 03650 1

STORE VTIG

0066 REF 1 35,2470 16331 1

STOVL VINIT

0067 REF 10 LAST 644 35,2471 32420 0

P30ZERO

0068 35,2472 65206 0

PUSH PDDL

E4 AND NUMIT = 0

0069 REF 3 LAST 198 35,2473 03452 1

DELLT4

0070 35,2474 66015 0

DAD SXA.1

0071 REF 14 LAST 652 35,2475 03442 0

TIG

0072 REF 5 LAST 641 35,2476 02776 0

TX1

0073 REF 4 LAST 198 35,2477 03631 0

STORE TPASS4

0074 35,2500 45134 0

SXA.2 CALL

0075 REF 3 LAST 647 35,2501 02777 1

RTX2

0076 REF 1 35,2502 22000 1

INITVEL

0077 35,2503 41575 0

VLOAD PUSH

L GENERAL LAMBERT AIMPOINT GUIDANCE

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0078	REF	3	LAST	198	35,2504	02366 0		DELVEET3	
0079	REF	9	LAST	645	35,2505	03656 1	STORE	DELVSIN	
0080					35,2506	43046 1	ABVAL	CLEAR	
0081	REF	3	LAST	642	35,2507	01267 0		XDELVFLG	
0082	REF	3	LAST	314	35,2510	37664 1	STCALL	VGDISP	
0083	REF	1			35,2511	15733 1		GET.LVC	
0084					35,2512	63375 0	VLOAD	PDVL	
0085	REF	7	LAST	652	35,2513	03642 1		RTIG	
0086	REF	1			35,2514	02337 1		VIPEIME	
0087					35,2515	77624 1	CALL		
0088	REF	3	LAST	637	35,2516	46316 1		PERIAP01	
0089					35,2517	77624 1	CALL		
0090	REF	8	LAST	648	35,2520	46426 0		SHIFTR1	
00902					35,2521	77624 1	CALL		LIMIT DISPLAY TO 9999.9 N. MI.
00904	REF	3	LAST	617	35,2522	45636 0		MAXCHK	
0091	REF	3	LAST	617	35,2523	16321 0	STUDL	HPER	
0092					35,2524	00005 1		40	
0093					35,2525	77624 1	CALL		
0094	REF	9	LAST	653	35,2526	46426 0		SHIFTR1	
00942					35,2527	77624 1	CALL		LIMIT DISPLAY TO 9999.9 N. MI.
00944	REF	4	LAST	653	35,2530	45636 0		MAXCHK	
0095	REF	5	LAST	617	35,2531	02317 0	STORE	HAPO	
0096					35,2532	77776 1	EXIT		
0097	REF	2	LAST	614	35,2533	3 3727 0	CAF	V06N81	DELVLVC
0098	REF	11	LAST	652	35,2534	0 3712 0	TC	VNPOOH	
0099	REF	2	LAST	614	35,2535	3 2026 1	CAF	V06N42	HAPO, HPER, VGDISP
0100	REF	12	LAST	653	35,2536	0 3712 0	TC	VNPOOH	
0101	REF	71	LAST	652	35,2537	0 6037 0	TC	INTPRET	
0102					35,2540	45014 0	REVN1645 SET	CALL	TRKMKCNT, TTOGO, +MGA
0103	REF	3	LAST	628	35,2541	01071 0		FINALFLG	
0104	REF	3	LAST	628	35,2542	73606 0		VN1645	
0105					35,2543	77650 1	GOTO		
0106	REF	2	LAST	615	35,2544	72540 0		REVN1645	

*** END OF LEMP30S .103 ***

L GROUND TRACKING DETERMINATION PROGRAM - P21

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P0001 GROUND TRACKING DETERMINATION PROGRAM P21
R0002 PROGRAM DESCRIPTION
R0003 MOD NO - 1
R0004 MOD BY - N.M. NEVILLE
R0005 FUNCTIONAL DESCRIPTION-
R0006
R0007 TO PROVIDE THE ASTRONAUT DETAILS OF THE LM OR CSM GROUND TRACK WITHOUT
R0008 THE NEED FOR GROUND COMMUNICATION (REQUESTED BY DSKY).
R0009 CALLING SEQUENCE -
R0010
R0011 ASTRONAUT REQUEST THROUGH DSKY V37E21E
R0012 SUBROUTINES CALLED-
R0013
R0014 GOPERF4
R0015 GOFLASH
R0016 THISPREC
R0017 OTHPREC
R0018 LAT-LONG
R0019 NORMAL EXIT MODES-
R0020
R0021 ASTRONAUT REQUEST THROUGH DSKY TO TERMINATE PROGRAM V34E
R0022 ALARM OR ABORT EXIT MODES-
R0023
R0024 NONE
R0025 OUTPUT -
R0026
R0027 OCTAL DISPLAY OF OPTION CODE AND VEHICLE WHOSE GROUND TRACK IS TO BE
R0028 COMPUTED
R0029 OPTION CODE 00002
R0030 THIS 00001
R0031 OTHER 00002
R0032 DECIMAL DISPLAY OF TIME TO BE INTEGRATED TO HOURS . MINUTES . SECONDS
R0033 DECIMAL DISPLAY OF LAT, LONG, ALT
R0034 ERASABLE INITIALIZATION REQUIRED
R0035
R0036 AXD 2DEC 4.652459653 E-5 RADIANS 368-69 CONSTANTS"
R0037
R0038 -AYD 2DEC 2.147535898 E-5 RADIANS
R0039
R0040 AZD 2DEC .7753206164 REVOLUTIONS
R0041 FOR LUNAR ORBITS 504LM VECTOR IS NEEDED
R0042
R0043 504LM 2DEC -2.700340600 E-5 RADIANS
R0044
R0045 504LM _2 2DEC -7.514128400 E-4 RADIANS
R0046
R0047 504LM _4 2DEC -2.553198641 E-4 RADIANS
R0048
R0049 NONE
R0050 DEBRIS

GROUND TRACKING DETERMINATION PROGRAM - P21

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ADDRESS	OPERATION	DATA	COMMENT
0051	CENTRALS=A,Q,L		
0052	OTHER-THOSE USED BY THE ABOVE LISTED SUBROUTINES		
0053	SEE LEMPREC,LAT-LONG		
0055	REF 8 LAST 492 30,2000	SBANK= LOWSUPER	FOR LOW 2CADR'S.
0056	REF 8 LAST 605 33,2200	BANK 33	
0057	REF 8 LAST 605 24,2000	SETLOC P20S	
0058	REF 8 LAST 605 24,3505	BANK	
0059	REF 4 LAST 240 E7,1762	EBANK= P21TIME	
0060	REF 1	COUNT* \$\$/P21	
0061	REF 80 LAST 612 24,3505 3 4753 1 PROG21	CAF ONE	
0062	REF 3 LAST 493 24,3506 55 145 1	TS OPTION2	ASSUMED VEHICLE IS LM . R2 = 00001
0063	REF 36 LAST 650 24,3507 3 4752 0	CAF BIT?	OPTION 2
0064	REF 160 LAST 627 24,3510 0 4616 1	TC BANKCALL	
0065	REF 2 LAST 493 24,3511 20633 0	CADR GOPERF4	
0066	REF 9 LAST 627 24,3512 0 6001 0	TC GOTOPDOH	TERMINATE
0067	REF 9 LAST 627 24,3513 0 3515 0	TC +2	PROCEED VALUE OF ASSUMED VEHICLE OK
0068	REF 9 LAST 627 24,3514 0 3507 0	TC -5	R2 LOADED THROUGH DSKY
0069	REF 1 24,3515 3 3665 1 P21PROG1	CAF VCN?4	LOAD DESIRED TIME OF LAT-LONG.
0070	REF 161 LAST 655 24,3516 0 4616 1	TC BANKCALL	
0071	REF 11 LAST 627 24,3517 20476 0	CADR GOF LASH	
0072	REF 10 LAST 655 24,3520 0 6001 0	TC GOTOPDOH	TERM
0073	REF 10 LAST 655 24,3521 0 3523 0	TC +2	PROCEED VALUES OK
0074	REF 10 LAST 655 24,3522 0 3515 0	TC -5	TIME LOADED THROUGH DSKY
0075	REF 72 LAST 653 24,3523 0 6037 0	TC INTERPRET	
0076	REF 72 LAST 653 24,3524 77745 1	DLOAD	
0077	REF 23 LAST 571 24,3525 01046 1	DSPTM1	
0078	REF 25 LAST 652 24,3526 34041 0	STCALL TDEC1	INTEGRATE TO TIME SPECIFIED IN TDEC
0079	REF 18 LAST 609 24,3527 27414 0	INTSTALL	
0080	REF 18 LAST 609 24,3530 43014 0	BON CLEAR	
0081	REF 1 24,3531 00304 0	P21FLAG	
0082	REF 1 24,3532 51550 0	P21CONT	ON---RECYCLE USING BASE VECTOR
0083	REF 17 LAST 583 24,3533 01674 0	VINTFLAG	OFF--1ST PASS CALL BASE VECTOR
0084	REF 17 LAST 583 24,3534 70535 0	SLOAD SR1	
0085	REF 4 LAST 655 24,3535 01146 0	OPTION2	
0086	REF 4 LAST 655 24,3536 43030 0	BHIZ SET	
0087	REF 4 LAST 655 24,3537 51541 0	+2	ZERO--THIS VEHICLE(LM)
0088	REF 18 LAST 655 24,3540 01474 1	VINTFLAG	ONE--OTHER VEHICLE(CM)
0089	REF 18 LAST 655 24,3541 43014 0	CLEAR CLEAR	
0090	REF 12 LAST 583 24,3542 01676 1	DIMOF LAG	
0091	REF 6 LAST 583 24,3543 01673 1	INTYPFLG	PRECISION
0092	REF 6 LAST 583 24,3544 77624 1	CALL	
0093	REF 9 LAST 584 24,3545 27134 1	INTEGRV	CALCULATE
0094	REF 9 LAST 584 24,3546 77650 1	GOTO	-AND
0095	REF 1 24,3547 51571 0	P21VSAVE	-SAVE BASE VECTOR
0096	REF 1 24,3550 77775 1 P21CONT	VLOAD	
0097	REF 2 LAST 148 24,3551 03676 0	P21EASER	RECYCLE--INTEG FROM BASE VECTOR
0098	REF 5 LAST 495 24,3552 25535 0	STOVL RCV	--POS

L GROUND TRACKING DETERMINATION PROGRAM - P21

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0099	REF	2	LAST	148	24,3553	03704 1		P21BASEV	
0100	REF	4	LAST	321	24,3554	15543 1	STOOL	VCV	--VEL
0101	REF	5	LAST	655	24,3555	03763 0		P21TIME	
0102	REF	5	LAST	495	24,3556	01517 0	STORE	TET	--TIME
0103					24,3557	43014 0	CLEAR	CLEAR	
0104	REF	13	LAST	655	24,3560	01676 1		DIMOF LAG	
0105	REF	1			24,3561	00263 0		MOONFLAG	
0106					24,3562	53135 0	SLOAD	BZE	
0107	REF	1			24,3563	01164 0		P21ORIG	
0108					24,3564	51567 1		+3	ZERO=EARTH
0109					24,3565	77614 1	SET		---2=MOON
0110	REF	2	LAST	656	24,3566	00063 1		MOONFLAG	
0111					24,3567	77624 1	+3 CALL		
0112	REF	1			24,3570	27107 1		INTEGRVS	
0113					24,3571	77745 1	P21VSAVE DLOAD		SAVE CURRENT BASEVECTOR
0114	REF	7	LAST	589	24,3572	00015 0		TAT	
0115	REF	6	LAST	656	24,3573	27763 0	STOVL	P21TIME	--TIME
0116	REF	4	LAST	494	24,3574	00017 1		RATT1	
0117	REF	3	LAST	655	24,3575	27676 0	STOVL	P21BASER	--POS B-29 OR B-27
0118	REF	7	LAST	494	24,3576	00025 0		VATT1	
0119	REF	3	LAST	656	24,3577	03704 1	STORE	P21BASEV	--VEL B-07 OR B-05
01191					24,3600	53646 0	ABVAL	SL*	
01192					24,3601	57576 1		0,2	
01193	REF	3	LAST	317	24,3602	27712 0	STOVL	P21VEL	VEL/ FOR N91 DISP
01194	REF	12	LAST	652	24,3603	00001 0		RATT	
01195					24,3604	50256 0	UNIT	DOT	
01196	REF	10	LAST	652	24,3605	00007 0		VATT	U(R).V
01197					24,3606	67471 1	DDV	ASIN	U(R).U(V)
01198	REF	4	LAST	656	24,3607	03712 0		P21VEL	
01199	REF	3	LAST	317	24,3610	03714 0	STORE	P21GAM	SIN-1 U(R).U(V) , -90 TO 890
0120					24,3611	67334 1	SXA,2	SLOAD	
0121	REF	2	LAST	656	24,3612	01163 1		P21ORIG	0=EARTH
0122	REF	5	LAST	655	24,3613	01146 0		OPTION2	
0123					24,3614	46142 1	SR1	BHIZ	
0124					24,3615	51620 1		+3	
0125					24,3616	77650 1	GOTO		
0126					24,3617	51623 1		+4	
0127					24,3620	77614 1	+3 BON		
0128	REF	13	LAST	609	24,3621	04307 1		SURFFLAG	
0129	REF	1			24,3622	51625 1		P21DSP	
0130					24,3623	77614 1	+4 SET		
0131	REF	2	LAST	655	24,3624	00064 0		P21FLAG	
0132					24,3625	67214 1	P21DSP CLEAR	SLOAD	GENERATE DISPLAY DATA
0133	REF	1			24,3626	01663 0		LUNAFLAG	
0134	REF	8	LAST	648	24,3627	00050 1		X2	
0135					24,3630	43054 1	BZE	SET	
0136					24,3631	51633 0		+2	0=EARTH
0137	REF	2	LAST	656	24,3632	01463 1		LUNAFLAG	
0138					24,3633	77775 1	VLOAD		
0139	REF	13	LAST	656	24,3634	00001 0		RATT	

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0140	REF	2	LAST	114	24,3635	16032 1	STODL	ALPHAV	
0141	REF	8	LAST	656	24,3636	00015 0		TAT	
0142					24,3637	45014 0	CLEAR	CALL	
0143	REF	1			24,3640	00662 0		ERADFLAG	
0144	REF	1			24,3641	26351 1		LAT-LONG	
01442					24,3642	77605 1	DMP		MPAC = ALT.METERS B-29
01443	REF	1			24,3643	11667 0		K.01	
01445	REF	2	LAST	317	24,3644	03716 1	STORE	P21ALT	ALT/100 FOR N91 DISP
0145					24,3645	77776 1	EXIT		
0146	REF	1			24,3646	3 3664 0	CAF	V06N43	DISPLAY LAT, LONG, ALT
0147	REF	162	LAST	655	24,3647	0 4616 1	TC	BANKCALL	LAT, LONG = 1/2 REVS B0
0148	REF	12	LAST	655	24,3650	20476 0	CADR	GOFLASH	ALT = KM B14
0149	REF	11	LAST	655	24,3651	0 6001 0	TC	GOTOPDOH	TERM
0150	REF	12	LAST	657	24,3652	0 6001 0	TC	GOTOPDOH	
0151	REF	73	LAST	655	24,3653	0 6037 0	TC	INTPRET	V32E RECYCLE
0152					24,3654	43345 1	DLOAD	DAD	
0153	REF	7	LAST	656	24,3655	03763 0		P21TIME	
0154	REF	1			24,3656	11663 1		600SEC	600 SECONDS OR 10 MIN
0155	REF	24	LAST	655	24,3657	01046 1	STORE	DSPTM1	
0156					24,3660	77634 0	RTB		
0157	REF	1			24,3661	51515 1		P21PROG1	
0158					24,3662	00003 1	600SEC	2DEC	60000 10 MIN
0158					24,3663	25140 0			
0159					24,3664	01453 1	V06N43	VN	00643
0160					24,3665	01442 1	V6N34	VN	00634
01602					24,3666	00243 1	K.01	2DEC	.01
01602					24,3667	32703 1			

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R0010 TRANSFER PHASE INITIATION (TPI) PROGRAMS (P34 AND P74)

R0011 MOD NO -1 LUG SECTION - P32-P35, P72-P75

R0012 MOD BY WHITE.P DATE 1JUNE67

R0013 PURPOSE

R0014 (1) TO CALCULATE THE REQUIRED DELTA-V AND OTHER INITIAL CONDITIONS

R0015 REQUIRED BY THE ACTIVE VEHICLE FOR EXECUTION OF THE TRANSFER

R0016 PHASE INITIATION (TPI) MANEUVER, GIVEN -

R0017 (A) TIME OF IGNITION TIG (TPI) OR THE ELEVATION ANGLE (E) OF

R0018 THE ACTIVE/PASSIVE VEHICLE LOS AT TIG (TPI).

R0019 (B) CENTRAL ANGLE OF TRANSFER (CENTANG) FROM TIG (TPI) TO

R0020 INTERCEPT TIME (TIG (TPF)).

R0021 (2) TO CALCULATE TIG (TPI) GIVEN E OR E GIVEN TIG (TPI).

R0022 (3) TO CALCULATE THESE PARAMETERS BASED UPON MANEUVER DATA

R0023 APPROVED AND KEYED INTO THE DSKY BY THE ASTRONAUT.

R0024 (4) TO DISPLAY TO THE ASTRONAUT AND THE GROUND CERTAIN DEPENDENT

R0025 VARIABLES ASSOCIATED WITH THE MANEUVER FOR APPROVAL BY THE

R0026 ASTRONAUT/GROUND.

R0027 (5) TO STORE THE TPI TARGET PARAMETERS FOR USE BY THE DESIRED

R0028 THRUSTING PROGRAM.

R0029 ASSUMPTIONS

R0030 (1) LM ONLY - THIS PROGRAM IS BASED UPON PREVIOUS COMPLETION OF

R0031 THE CONSTANT DELTA ALTITUDE (CDH) PROGRAM (P33/P73).

R0032 THEREFORE -

R0033 (A) AT A SELECTED TPI TIME (NOW IN STORAGE) THE LINE OF SIGHT

R0034 BETWEEN THE ACTIVE AND PASSIVE VEHICLES WAS SELECTED TO BE

R0035 A PRESCRIBED ANGLE (E) (NOW IN STORAGE) FROM THE

R0036 HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE POSITION.

R0037 (B) THE TIME BETWEEN CDH IGNITION AND TPI IGNITION WAS

R0038 COMPUTED TO BE GREATER THAN 10 MINUTES.

R0039 (C) THE VARIATION OF THE ALTITUDE DIFFERENCE BETWEEN THE

R0040 ORBITS WAS MINIMIZED.

R0041 (D) THE PERICENTER ALTITUDES OF ORBITS FOLLOWING CSI AND

R0042 CDH WERE COMPUTED TO BE GREATER THAN 35,000 FT FOR LUNAR

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R0043 ORBIT OR 85 NM FOR EARTH ORBIT.

R0044 (E) THE CSI AND CDH MANEUVERS WERE ASSUMED TO BE PARALLEL TO
R0045 THE PLANE OF THE PASSIVE VEHICLE ORBIT. HOWEVER, CREW
R0046 MODIFICATION OF DELTA V (LV) COMPONENTS MAY HAVE RESULTED
R0047 IN AN OUT-OF-PLANE MANEUVER.

R0048 (2) STATE VECTOR UPDATED BY P27 ARE DISALLOWED DURING AUTOMATIC
R0049 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION (4)).

R0050 (3) THIS PROGRAM MUST BE DONE OVER A TRACKING STATION FOR REAL
R0051 TIME GROUND PARTICIPATION IN DATA INPUT AND OUTPUT. COMPUTED
R0052 VARIABLES MAY BE STORED FOR LATER VERIFICATION BY THE GROUND.
R0053 THESE STORAGE CAPABILITIES ARE LIMITED ONLY TO THE PARAMETERS
R0054 FOR ONE THRUSTING MANEUVER AT A TIME EXCEPT FOR CONCENTRIC
R0055 FLIGHT PLAN MANEUVER SEQUENCES.

R0056 (4) THE RENDEZVOUS RADAR MAY OR MAY NOT BE USED TO UPDATE THE LM
R0057 OR CSM STATE VECTORS FOR THIS PROGRAM. IF RADAR USE IS
R0058 DESIRED THE RADAR WAS TURNED ON AND LOCKED ON THE CSM BY
R0059 PREVIOUS SELECTION OF P20. RADAR SIGHTING MARKS WILL BE MADE
R0060 AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN ENABLED BY THE
R0061 TRACK AND UPDATE FLAGS (SEE P20). THE RENDEZVOUS TRACKING
R0062 MARK COUNTER IS ZEROED BY THE SELECTION OF P20 AND AFTER EACH
R0063 THRUSTING MANEUVER.

R0064 (5) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R0065 (6) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R0066 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R0067 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R0068 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R0069 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.

R0070 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R0071 SELECTED THE FINAL MANEUVER COMPUTATION CYCLE.

R0072 EXTERNAL DELTA V FLAG - DESIGNATES THE TYPE OF STEERING
R0073 REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE THRUSTING
R0074 PROGRAM SELECTED AFTER COMPLETION OF THIS PROGRAM.

R0075 (7) ONCE THE PARAMETERS REQUIRED FOR COMPUTATION OF THE MANEUVER
R0076 HAVE BEEN COMPLETELY SPECIFIED, THE VALUE OF THE ACTIVE
R0077 VEHICLE CENTRAL ANGLE OF TRANSFER IS COMPUTED AND STORED.
R0078 THIS NUMBER WILL BE AVAILABLE FOR DISPLAY TO THE ASTRONAUT
R0079 THROUGH THE USE OF VO6N52.

R0080 THE ASTRONAUT WILL CALL THIS DISPLAY TO VERIFY THAT THE
R0081 CENTRAL ANGLE OF TRANSFER OF THE ACTIVE VEHICLE IS NOT WITHIN

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R0082 170 TO 190 DEGREES. IF THE ANGLE IS WITHIN THIS ZONE THE
R0083 ASTRONAUT SHOULD REASSESS THE INPUT TARGETING PARAMETERS BASED
R0084 UPON DELTA V AND EXPECTED MANEUVER TIME.

R0085 (3) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTRY -

R0086 P34 IF THIS VEHICLE IS ACTIVE VEHICLE.

R0087 P74 IF THIS VEHICLE IS PASSIVE VEHICLE.

R0088 INPUT

R0089 (1) TTPI TIME OF THE TPI MANEUVER
R0090 (2) ELEV DESIRED LOS ANGLE AT TPI
R0091 (3) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE DURING
R0092 TRANSFER FROM TPI TO TIME OF INTERCEPT

R0093 OUTPUT

R0094 (1) TRKMKCNT NUMBER OF MARKS
R0095 (2) TTOGO TIME TO GO
R0096 (3) +MGA MIDDLE GIMBAL ANGLE
R0097 (4) TTPI COMPUTED TIME OF TPI MANEUVER
R0098 OR
R0099 ELEV COMPUTED LOS ANGLE AT TPI
R0100 (5) POSTTPI PERIGEE ALTITUDE AFTER THE TPI MANEUVER
R0101 (6) DELVTPI MAGNITUDE OF DELTA V AT TPI
R0102 (7) DELVTPF MAGNITUDE OF DELTA V AT INTERCEPT
R0103 (8) DVLOS DELTA VELOCITY AT TPI - LINE OF SIGHT
R0104 (9) DELVLVC DELTA VELOCITY AT TPI - LOCAL VERTICAL COORDINATES

R0105 DOWNLINK

R0114 (1) TTPI TIME OF THE TPI MANEUVER
R0115 (2) TIG TIME OF THE TPI MANEUVER
R0116 (3) ELEV DESIRED LOS ANGLE AT TPI
R0117 (4) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE DURING
R0118 TRANSFER FROM TPI TO TIME OF INTERCEPT
R0119 (5) DELVEET3 DELTA VELOCITY AT TPI - REFERENCE COORDINATES
R0120 (6) TPASS4 TIME OF INTERCEPT
R0121 COMMUNICATION TO THRUSTING PROGRAMS

R0122 (1) TIG TIME OF THE TPI MANEUVER
R0123 (2) RTARG OFFSET TARGET POSITION
R0124 (3) TPASS4 TIME OF INTERCEPT
R0125 (4) XDELVFLG RESET TO INDICATE LAMBERT (AIMPOINT) VG COMPUTATION

R0126 SUBROUTINES USED

R0127 AVFLAGA

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R0128 AVFLAGP
~~R0129 VNPODH~~
 R0130 DISPLAYE
 R0131 SELECTMU
 R0132 PRECSET
 R0133 S33/34.1
 R0134 ALARM
 R0135 BANKCALL
 R0136 GOF LASH
 R0137 GOTOPDDH
 R0138 TIMETHET
 R0139 S34/35.2
 R0140 PERIAPD1
 R0141 SHIFTRI
 R0142 S34/35.5
 R0143 VN1645

0144	REF	3	LAST	650	35,2000		SETLOC CSI/CDH	
0145					35,2545		BANK	
0146	REF	16	LAST	652	E7.1470		EBANK= SUBEXIT	
0147	REF	1					COUNT* \$\$\$/P3474	
0148	REF	3	LAST	627	35,2545	0 2347 0 P34	TC	AVFLAGA
0149	REF	1			35,2546	0 2550 0	TC	P34/P74A
0150	REF	3	LAST	627	35,2547	0 2354 1 P74	TC	AVFLAGP
0151	REF	4	LAST	652	35,2550	0 2361 1 P34/P74A	TC	P20FLGON
01515	REF	2	LAST	622	35,2551	3 3723 1	CAF	VO6N37
0152	REF	13	LAST	653	35,2552	0 3712 0	TC	VNPODH
01521					35,2553	0 0006 1	EXTEND	
01522	REF	1			35,2554	3 3746 1	DCA	130DEG
01523	REF	5	LAST	634	35,2555	53 621 1	DXCH	CENTANG
01528	REF	11	LAST	652	35,2556	3 2417 1	CAF	P30ZERO
01529	REF	5	LAST	636	35,2557	55 466 0	TS	NN
0153	REF	1			35,2560	0 3674 1	TC	DISPLAYE
0154	REF	74	LAST	657	35,2561	0 6037 0	TC	INTPRET
0155					35,2562	71214 0	CLEAR	DLOAD
0156	REF	2	LAST	69	35,2563	01270 0		ETPIFLAG
0157	REF	14	LAST	644	35,2564	03636 1		TTPI
0158	REF	15	LAST	652	35,2565	17442 0	STDDL	TIG
0159	REF	6	LAST	637	35,2566	02257 0		ELEV
0160					35,2567	43054 1	BZE	SET
0161	REF	1			35,2570	72572 1		P34/P74B
0162	REF	3	LAST	661	35,2571	01070 1		ETPIFLAG
0163					35,2572	77624 1	P34/P74B	CALL
0164	REF	3	LAST	627	35,2573	20000 0		SELECTMU
0165					0032		DELELO	EQUALS 26D
0166					35,2574	43145 0	P34/P74C	DLOAD
0167	REF	7	LAST	609	35,2575	06522 1		ZEROVECS
0168	REF	2	LAST	627	35,2576	03460 0		ITSWICH
0169					35,2577	43014 0	BON	CLEAR
0170	REF	4	LAST	661	35,2600	01310 1		ETPIFLAG

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0171	REF	1		35,2601	72603 1	SWCHSET		
0172	REF	3	LAST 661	35,2602	03660 1	ITSWICH		
0173	REF	4	LAST 628	35,2603	02317 0	SWCHSET	STORE	NOMTPI
0174				35,2604	43345 1	INTLOOP	DLOAD	DAD
0175	REF	15	LAST 661	35,2605	03636 1			TTPI
0176	REF	5	LAST 662	35,2606	02317 0			NOMTPI
0177	REF	26	LAST 655	35,2607	34041 0	STCALL		IDECL
0178	REF	3	LAST 642	35,2610	46360 0			PRECSET
0179				35,2611	77624 1	CALL		
0180	REF	2	LAST 627	35,2612	72764 1			S33/34.1
0181				35,2613	77454 1	BZE		EXIT
0182	REF	1		35,2614	72625 0			SWCHCLR
0183	REF	28	LAST 627	35,2615	0 5567 0	TC		ALARM
0184				35,2616	00611 1	OCT		611
0185	REF	3	LAST 627	35,2617	3 5006 1	CAF		V05N09
0186	REF	163	LAST 657	35,2620	0 4616 1	TC		BANKCALL
0187	REF	13	LAST 657	35,2621	20476 0	CADR		GOFFLASH
0188	REF	13	LAST 657	35,2622	0 6001 0	TC		GOTOPDOH
0189	REF	2	LAST 661	35,2623	0 2550 0	TC		P34/P74A
0190				35,2624	0 2615 1	TC		-7
								PROCEED V32
0191				35,2625	43014 0	SWCHCLR	BONCLR	BON
0192	REF	4	LAST 662	35,2626	03600 1			ITSWICH
0193	REF	1		35,2627	72604 0			INTLOOP
0194	REF	5	LAST 661	35,2630	01310 1			ETPIFLAG
0195	REF	1		35,2631	72635 1			P34/P74D
0196				35,2632	77776 1	EXIT		DISPLAY TTPI
0197	REF	2	LAST 661	35,2633	0 3674 1	TC	DISPAYE	DISPLAY ELEV AND CENTANG
0198	REF	1		35,2634	0 2640 1	TC	P34/P74E	
0199				35,2635	77776 1	P34/P74D	EXIT	
0200	REF	3	LAST 661	35,2636	3 3723 1	CAF	V06N37	TTPI
0201	REF	14	LAST 661	35,2637	0 3712 0	TC	VNPOOH	
0202	REF	75	LAST 661	35,2640	0 6037 0	P34/P74E	TC	INTPRET
0203				35,2641	71201 1	SETPD	DLOAD	
0204				35,2642	00001 0		OD	
0205	REF	6	LAST 652	35,2643	02777 1		RTX1	
0206	REF	12	LAST 648	35,2644	14047 1	STODL	X1	
0207	REF	6	LAST 661	35,2645	03621 1		CENTANG	
0208				35,2646	71406 0	PUSH	GBS	
0209	REF	4	LAST 647	35,2647	16732 0	STODL	CSTH	
0210				35,2650	77756 0	SIN		
0211	REF	6	LAST 647	35,2651	26730 1	STOVL	SMTH	
0212	REF	6	LAST 642	35,2652	03552 0		RPASS3	
0213				35,2653	77657 0	VSR*		
0214				35,2654	57176 0		0,2	
0215	REF	6	LAST 647	35,2655	26655 0	STOVL	RVEC	
0216	REF	3	LAST 642	35,2656	03560 1		VPASS3	
0217				35,2657	43057 1	VSR*	SET	
0218				35,2660	57176 0		0,2	
0219	REF	6	LAST 647	35,2661	03466 0		RVSW	

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0220	REF	7	LAST	647	35,2662	36744 0	STCALL	VVEC	
0221	REF	5	LAST	647	35,2663	24732 1		TIMETHET	
0222					35,2664	77745 1	DLOAD		
0223	REF	16	LAST	662	35,2665	03636 1		TTPI	
0224	REF	1			35,2666	03610 0	STORE	INTIME	FOR INITVEL
0225					35,2667	77615 0	DAD		
0226	REF	2	LAST	494	35,2670	00037 0		T	RENDEZVOUS TIME
0227	REF	5	LAST	652	35,2671	37631 1	STCALL	TPASS4	FOR INITVEL
0228	REF	1			35,2672	73306 0		S34/35.2	
0229					35,2673	51575 1	VLOAD	ABVAL	
0230	REF	4	LAST	653	35,2674	02366 0		DELVEET3	
0231	REF	6	LAST	315	35,2675	27576 0	STOVL	DELVTPI	
0232	REF	1			35,2676	03506 1		VPASS4	
0233					35,2677	51451 0	VSU	ABVAL	
0234	REF	1			35,2700	03566 1		VTPRIME	
0235	REF	3	LAST	315	35,2701	26350 0	STOVL	DELVTPI	
0236	REF	8	LAST	642	35,2702	03536 1		RACT3	
0237					35,2703	45115 0	PDVL	CALL	
0238	REF	2	LAST	653	35,2704	02337 1		VIPRIME	
0239	REF	4	LAST	653	35,2705	46316 1		PERIAP01	
0240					35,2706	77624 1	CALL		
0241	REF	10	LAST	653	35,2707	46426 0		SHIFTR1	
0242	REF	4	LAST	315	35,2710	17606 1	STOVL	POSTTPI	
0243	REF	17	LAST	663	35,2711	03636 1		TTPI	
0244	REF	16	LAST	661	35,2712	03442 0	STORE	TIG	
0245					35,2713	77776 1	EXIT		
0246	REF	1			35,2714	3 3725 1	CAF	V06N58	
0247	REF	15	LAST	662	35,2715	0 3712 0	TC	VNPOOH	
0248	REF	76	LAST	662	35,2716	0 6037 0	TC	INTPRET	
0249					35,2717	77624 1	CALL		
0250	REF	1			35,2720	73522 0		S34/35.5	
0251					35,2721	77624 1	CALL		
0252	REF	4	LAST	653	35,2722	73606 0		VN 645	
0253					35,2723	77650 1	GOTO		
0254	REF	1			35,2724	72574 1		P34/P74C	

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R0255 RENDEZVOUS MID-COURSE MANEUVER PROGRAMS (P35 AND P75)

R0256 MOD NO -1 LOG SECTION - P32-P35, P72-P75

R0257 MOD BY WHITE.P DATE 1JUNE67

R0258 PURPOSE

R0259 (1) TO CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL CONDITIONS
R0260 REQUIRED BY THE ACTIVE VEHICLE FOR EXECUTION OF THE NEXT
R0261 MIDCOURSE CORRECTION OF THE TRANSFER PHASE OF AN ACTIVE
R0262 VEHICLE RENDEZVOUS.

R0263 (2) TO DISPLAY TO THE ASTRONAUT AND THE GROUND CERTAIN DEPENDENT
R0264 VARIABLES ASSOCIATED WITH THE MANEUVER FOR APPROVAL BY THE
R0265 ASTRONAUT/GROUND.

R0266 (3) TO STORE THE TPM TARGET PARAMETERS FOR USE BY THE DESIRED
R0267 THRUSTING PROGRAM.

R0268 ASSUMPTIONS

R0269 (1) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R0270 (2) STATE VECTOR UPDATES BY P27 ARE DISALLOWED DURING AUTOMATIC
R0271 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION (3)).

R0272 (3) THE RENDEZVOUS RADAR IS ON AND IS LOCKED ON THE CSM. THIS WAS
R0273 DONE DURING PREVIOUS SELECTION OF P20. RADAR SIGHTING MARKS
R0274 WILL BE MADE AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN
R0275 ENABLED BY THE TRACK AND UPDATE FLAGS (SEE P20). THE
R0276 RENDEZVOUS TRACKING MARK COUNTER IS ZEROED BY THE SELECTION OF
R0277 P20 AND AFTER EACH THRUSTING MANEUVER.

R0278 (4) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R0279 ACTIVE VEHICLE FLAG -- DESIGNATES THE VEHICLE WHICH IS
R0280 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R0281 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R0282 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.

R0283 FINAL FLAG -- SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R0284 SELECTED THE FINAL MANEUVER COMPUTATION CYCLE.

R0285 EXTERNAL DELTA V FLAG -- DESIGNATES THE TYPE OF STEERING
R0286 REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE THRUSTING
R0287 PROGRAM SELECTED AFTER COMPLETION OF THIS PROGRAM.

R0288 (5) THE TIME OF INTERCEPT (T(INT)) WAS DEFINED BY PREVIOUS
R0289 COMPLETION OF THE TRANSFER PHASE INITIATION (TPI) PROGRAM
R0290 (P34/P74) AND IS PRESENTLY AVAILABLE IN STORAGE.

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R0291 (6) ONCE THE PARAMETERS REQUIRED FOR COMPUTATION OF THE MANEUVER
R0292 HAVE BEEN COMPLETELY SPECIFIED, THE VALUE OF THE ACTIVE
R0293 VEHICLE CENTRAL ANGLE OF TRANSFER IS COMPUTED AND STORED.
R0294 THIS NUMBER WILL BE AVAILABLE FOR DISPLAY TO THE ASTRONAUT
R0295 THROUGH THE USE OF V06N52.

R0296 THE ASTRONAUT WILL CALL THIS DISPLAY TO VERIFY THAT THE
R0297 CENTRAL ANGLE OF TRANSFER OF THE ACTIVE VEHICLE IS NOT WITHIN
R0298 170 TO 190 DEGREES. IF THE ANGLE IS WITHIN THIS ZONE THE
R0299 ASTRONAUT SHOULD REASSESS THE INPUT TARGETING PARAMETERS BASED
R0300 UPON DELTA V AND EXPECTED MANEUVER TIME.

R0301 (7) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTRY -

R0302 P35 IF THIS VEHICLE IS ACTIVE VEHICLE.

R0303 P75 IF THIS VEHICLE IS PASSIVE VEHICLE.

R0304 INPUT

R0305 (1) TPASS4 TIME OF INTERCEPT - SAVED FROM P34/P74

R0306 OUTPUT

R0307 (1) TRKMKCNT NUMBER OF MARKS

R0308 (2) TTOGO TIME TO GO

R0309 (3) +MGA MIDDLE GIMBAL ANGLE

R0310 (4) DVLOS DELTA VELOCITY AT MID - LINE OF SIGHT

R0311 (5) DELVLVC DELTA VELOCITY AT MID - LOCAL VERTICAL COORDINATES

R0312 DOWNLINK

R0325 (1) TIG TIME OF THE TPM MANEUVER

R0326 (2) DELVEET3 DELTA VELOCITY AT TPM - REFERENCE COORDINATES

R0327 (3) TPASS4 TIME OF INTERCEPT

R0328 COMMUNICATION TO THRUSTING PROGRAMS

R0329 (1) TIG TIME OF THE TPM MANEUVER

R0330 (2) RTARG OFFSET TARGET POSITION

R0331 (3) TPASS4 TIME OF INTERCEPT

R0332 (4) XDELVFLG RESET TO INDICATE LAMBERT (AIMPOINT) VG COMPUTATION

R0333 SUBROUTINES USED

R0334 AVFLAGA

R0335 AVFLAGP

R0336 LOADTIME

R0337 SELECTMU

R0338 PRECSET

R0339 S34/35.1

R0340 S34/35.2

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R0341 S34/35.5
R0342 VN1645

0343	REF	2	LAST	650 TO	652:	14	14*	COUNT* \$\$/P3575
0344	REF	1			E7,1575			EBANK= KT
0345	REF	4	LAST	661	35,2725	0	2347 0	P35 TC AVFLAGA
0346					35,2726	0	0006 1	EXTEND
0347	REF	3	LAST	387	35,2727	3	1401 0	DCA ATIGINC
0348	REF	1			35,2730	0	2734 0	TC P35/P75A
0349	REF	4	LAST	661	35,2731	0	2354 1	P75 TC AVFLAGP
0350					35,2732	0	0006 1	EXTEND
0351	REF	1			35,2733	3	1403 1	DCA PTIGINC
0352	REF	2	LAST	666	35,2734	53	576 0	P35/P75A DXCH KT
03525	REF	5	LAST	661	35,2735	0	2361 1	TC P20FLGON SET UPDATFLG, TRACKFLG
0353	REF	77	LAST	663	35,2736	0	6037 0	TC INTRET
0359					35,2737	77624	1	CALL
0360	REF	4	LAST	661	35,2740	20000	0	SELECTMU
0361					35,2741	77634	0	P35/P75B RTB
0362	REF	13	LAST	589	35,2742	21573	0	LOADTIME
03621	REF	2	LAST	283	35,2743	03612	1	STORE TSTRT
03622					35,2744	77615	0	DAD
03623	REF	3	LAST	666	35,2745	03576	0	KT
03624	REF	17	LAST	663	35,2746	03442	0	STORE TIG
0363	REF	2	LAST	663	35,2747	03610	0	STORE INTIME FOR INITVEL
0364	REF	27	LAST	662	35,2750	34041	0	STCALL TDEC1
0365	REF	4	LAST	662	35,2751	46360	0	PRECSET ADVANCE BOTH VEHICLES
0366					35,2752	77624	1	CALL
0367	REF	1			35,2753	73274	1	S34/35.1 GET NORM AND LOS FOR TRANSFORM
0368					35,2754	77624	1	CALL
0369	REF	2	LAST	663	35,2755	73306	0	S34/35.2 GET DELTA V(LV)
0370					35,2756	77624	1	CALL
0371	REF	2	LAST	663	35,2757	73522	0	S34/35.5
0372					35,2760	77624	1	CALL
0373	REF	5	LAST	663	35,2761	73606	0	VN1645
0379					35,2762	77650	1	GOTO
0380	REF	1			35,2763	72741	0	P35/P75B

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P0381 S33/34.1

0382				35,2764	66220 1	S33/34.1 STQ	SSP	
0383	REF	4	LAST	630	35,2765	03463 0	NORMEX	
0384	REF	1			35,2766	03614 1	TITER	
0385					35,2767	40000 0	OCT	40000
0386					35,2770	40345 1	DLOAD	SETPD
0387	REF	1			35,2771	33734 1		MAX250
0388					35,2772	00001 0		OD
0389	REF	1			35,2773	27574 1	STOVL	SECMAX
0390	REF	9	LAST	663	35,2774	03536 1		RACT3
0391	REF	1			35,2775	27500 1	STOVL	RAPREC
0392	REF	8	LAST	648	35,2776	03544 1		VACT3
0393	REF	1			35,2777	27506 1	STOVL	VAPREC
0394	REF	7	LAST	662	35,3000	03552 0		RPASS3
0395	REF	1			35,3001	27522 1	STOVL	RPPREC
0396	REF	4	LAST	662	35,3002	03560 1		VPASS3
0397	REF	1			35,3003	03530 1	STORE	VPPREC
0398					35,3004	77624 1	ELCALC	CALL
0399	REF	2	LAST	665	35,3005	73274 1		S34/35.1
0400					35,3006	63235 0	VXV	PDVL
0401	REF	10	LAST	667	35,3007	03536 1		RACT3
0402					35,3010	53515 0	PDVL	UNIT
0403	REF	11	LAST	667	35,3011	03536 1		RACT3
0404					35,3012	46315 1	PDVL	VPROJ
0405					35,3013	51352 1	VSL2	BVSU
0406	REF	1			35,3014	02311 0		ULOS
0407					35,3015	63256 0	UNIT	PDVL
0408					35,3016	63241 0	DOT	PDVL
0409					35,3017	00001 0		OD
0410					35,3020	75241 1	DOT	SIGN
0411	REF	2	LAST	667	35,3021	02311 0		ULOS
0412					35,3022	65552 0	SL1	ACOS
0413					35,3023	50315 0	PDVL	DOT
0414	REF	3	LAST	667	35,3024	02311 0		ULOS
0415	REF	12	LAST	667	35,3025	03536 1		RACT3
0416					35,3026	71244 0	BPL	DLOAD
0417	REF	1			35,3027	73032 1		TESTY
0418	REF	6	LAST	622	35,3030	06530 1		OPPOSMAX
0419					35,3031	41425 1	DSU	PUSH
0420					35,3032	71214 0	TESTY	BOFF
0421	REF	5	LAST	662	35,3033	03740 1		ITSWICH
0422	REF	1			35,3034	73261 0		ELEX
0423	REF	1			35,3035	03576 0		DELEL
0424	REF	1			35,3036	14033 1	STOVL	DELELO
0425					35,3037	77625 0	DSU	
0426	REF	7	LAST	661	35,3040	02257 0		ELEV
0427	REF	2	LAST	667	35,3041	03576 0	STORE	DELEL
0428					35,3042	45246 0	ABS	DSU
0429	REF	1			35,3043	33740 1		ELEPS

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0430			35,3044	77640 0	BMN		
0431	REF	1	35,3045	73271 1		TIMEX	COMMERCIALS EVERYWHERE
0432			35,3046	70535 0	FIGTIME	SLUAD	SR1
0433	REF	2	35,3047	03614 1		TITER	
0434			35,3050	72030 1	BHIZ	LXA,1	
0435	REF	5	35,3051	03463 0		NORMEX	TOO MANY ITERATIONS
0436	REF	280	35,3052	00154 1		MPAC	
0437			35,3053	77330 1	SXA,1	VLOAD	
0438	REF	3	35,3054	03613 0		TITER	
0439	REF	8	35,3055	03552 0		RPASS3	
0440			35,3056	65256 0	UNIT	PDDL	
0441			35,3057	00045 0		36D	
0442			35,3060	53515 0	PDVL	UNIT	
0443	REF	13	35,3061	03536 1		RACT3	
0444			35,3062	77725 1	PDDL		
0445			35,3063	41525 0	PDDL	PUSH	
0446			35,3064	00045 0		36D	
0447			35,3065	77621 1	BDSU		
0448			35,3066	00015 0		12D	
0449			35,3067	14037 0	STOOL	30D	RP - RA MAGNITUDES
0450	REF	8	35,3070	06520 0		DPHALF	
0451			35,3071	41425 1	DSU	PUSH	
0452	REF	8	35,3072	02257 0		ELEV	
0453			35,3073	50165 0	SIGN	BMN	
0454			35,3074	00037 0		30D	
0455	REF	6	35,3075	03463 0		NORMEX	
0456			35,3076	71545 0	DLUAD	CUS	
0457			35,3077	56205 0	DMP	DDV	
0458			35,3100	00017 1		14D	
0459			35,3101	00015 0		12D	
0460			35,3102	77676 0	DCOMP		SINCE COS(180-A)=-COS A
0461			35,3103	00035 1	STORE	28D	
0462			35,3104	44246 1	ABS	BDSU	
0463	REF	9	35,3105	06520 0		DPHALF	
0464			35,3106	77240 1	BMN	VLOAD	
0465	REF	7	35,3107	03463 0		NORMEX	
0466	REF	1	35,3110	02261 0		UNKM	
0467			35,3111	53435 0	VXV	UNIT	
0468			35,3112	00007 0		6D	UN*RA
0469			35,3113	41241 0	DOT	DMP	
0470	REF	9	35,3114	03544 1		VACT3	
0471			35,3115	00015 0		12D	
0472			35,3116	47315 0	PDVL	VXV	
0473			35,3117	00001 0		0D	
0474	REF	5	35,3120	03560 1		VPASS3	
0475			35,3121	53435 0	VXV	UNIT	
0476			35,3122	00001 0		0D	(RP*VP)*RP
0477			35,3123	41241 0	DOT	DMP	
0478	REF	6	35,3124	03560 1		VPASS3	
0479			35,3125	00017 1		14D	

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0480			35,3126	77621 1	BDSU		
0481			35,3127	63301 0	NORM	PDVL	NORMALIZED WA - WP 12D
0482	REF 13	LAST 662	35,3130	00047 1		X1	
0483			35,3131	00007 0		6D	
0484			35,3132	50235 0	VXV	DOT	
0485			35,3133	00001 0		0D	
0486	REF 2	LAST 668	35,3134	02261 0		UNRM	RA*RP.UN 14D
0487			35,3135	50315 0	PDVL	DOT	
0488			35,3136	00001 0		0D	
0489			35,3137	00007 0		6D	
0490			35,3140	65552 0	SL1	ACOS	
0491			35,3141	77765 0	SIGN		
0492			35,3142	43225 0	DSU	DAD	ALPHA PI
0493	REF 10	LAST 668	35,3143	06520 0		DPHALF	
0494	REF 9	LAST 668	35,3144	02257 0		ELEV	
0495			35,3145	65525 0	PDDL	ACUS	
0496			35,3146	00035 1		28D	
0497			35,3147	75221 1	BDSU	SIGN	
0498	REF 11	LAST 669	35,3150	06520 0		DPHALF	
0499			35,3151	00037 0		30D	CONTAINS RP-RA
0500			35,3152	77615 0	DAD		
0501			35,3153	56205 0	DMP	DDV	
0502	REF 4	LAST 644	35,3154	33732 1		TWOPI	
0503			35,3155	77605 1	DMP		
0504			35,3156	41257 1	SL*	DMP	
0505			35,3157	20176 0		0-3,1	
0506			35,3160	51406 1	PUSH	ABS	
0507			35,3161	50025 0	DSU	BMN	
0508	REF 2	LAST 667	35,3162	03574 1		SECMAX	
0509	REF 1		35,3163	73167 0		OKMAX	
0510			35,3164	75345 1	DLOAD	SIGN	REPLACE TIME WITH MAX TIME SIGNED
0511	REF 3	LAST 669	35,3165	03574 1		SECMAX	
0512			35,3166	77606 1	PUSH		
0513			35,3167	51135 1	OKMAX	SLOAD	BPL TEST FIRST ITERATION
0514	REF 4	LAST 668	35,3170	03614 1		TITER	
0515	REF 1		35,3171	73177 1		REPETE	
0516			35,3172	71331 0	SSP	DLOAD	
0517	REF 5	LAST 669	35,3173	03614 1		TITER	
0518			35,3174	37777 1	OCT	37777	
0519			35,3175	77650 1	GOTO		
0520	REF 1		35,3176	73235 1		STORDEL	
0521			35,3177	41345 0	REPETE	DLOAD	DMP
0522	REF 3	LAST 667	35,3200	03576 0		DELEL	
0523	REF 2	LAST 667	35,3201	00033 1		DELELO	
0524			35,3202	71244 0	BPL	DLOAD	
0525	REF 1		35,3203	73213 0		NEXTES	
0526	REF 4	LAST 669	35,3204	03574 1		SECMAX	
0527			35,3205	77605 1	DMP		
0528	REF 1		35,3206	33736 0		THIRD	
0529	REF 5	LAST 669	35,3207	17574 1	STUDL	SECMAX	

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0530			35,3210	70446 0	ABS	SRI	CROSSED OVER SOLUTION
0531			35,3211	52076 1	DCOMP	GOTO	DT=(-SIGN(DTO)//DT//)/2
0532	REF	1	35,3212	73223 0		RESIGN	
0533			35,3213	51545 1	NEXTES	DLOAD	ABS
0534	REF	4	LAST	669	35,3214	03576 0	DELEL
0535			35,3215	51525 1	PDDL	ABS	
0536	REF	3	LAST	669	35,3216	00033 1	DELELO
0537			35,3217	77625 0	DSU		
0538			35,3220	71240 1	BMN	DLOAD	
0539	REF	1	35,3221	73226 0		REVERS	WRONG DIRECTION
0540			35,3222	77646 0	ABS		
0541			35,3223	52165 1	RESIGN	SIGN	GOTO
0542	REF	1	35,3224	03606 1			DELTEED
0543	REF	2	LAST	669	35,3225	73235 1	STORDEL
0544			35,3226	57545 1	REVERS	DLOAD	DCOMP
0545	REF	2	LAST	670	35,3227	03606 1	DELTEED
0546			35,3230	70406 1	PUSH	SRI	
0547	REF	3	LAST	670	35,3231	03606 1	STORE
0548			35,3232	77615 0	DAD		
0549			35,3233	77650 1	GOTO		
0550	REF	1	35,3234	73236 1			ADTIME
0551	REF	4	LAST	670	35,3235	03606 1	STORDEL
0552			35,3236	77615 0	ADTIME	DAD	
0553	REF	6	LAST	662	35,3237	02317 0	NOMTPI
0554	REF	7	LAST	670	35,3240	02317 0	STORE
0555			35,3241	63375 0	VLOAD	PDVL	
0556	REF	2	LAST	667	35,3242	03506 1	VAPREC
0557	REF	2	LAST	667	35,3243	03500 1	RAPREC
0558			35,3244	77624 1	CALL		
0559	REF	1	35,3245	73462 0		GOINT	
0560			35,3246	77624 1	CALL		
0561	REF	3	LAST	637	35,3247	46402 0	ACTIVE
0562			35,3250	63375 0	VLOAD	PDVL	STORE NEW RACT3 VACT3
0563	REF	2	LAST	667	35,3251	03530 1	VPPREC
0564	REF	2	LAST	667	35,3252	03522 1	RPPREC
0565			35,3253	77624 1	CALL		
0566	REF	2	LAST	670	35,3254	73462 0	GOINT
0567			35,3255	77624 1	CALL		
0568	REF	3	LAST	627	35,3256	46412 1	PASSIVE
0569			35,3257	77650 1	GOTO		STORE NEW RPASS3 VPASS3
0570	REF	1	35,3260	73004 1		ELCALC	
0571			35,3261	43345 1	ELEX	DLOAD	DAD
0572	REF	18	LAST	663	35,3262	03636 1	TTPI
0573	REF	8	LAST	670	35,3263	02317 0	NOMTPI
0574	REF	19	LAST	670	35,3264	17636 1	STODL
0575			35,3265	77614 1	BON		
0576	REF	6	LAST	662	35,3266	01310 1	ETPIFLAG
0577	REF	2	LAST	668	35,3267	73271 1	TIMEX
0578	REF	10	LAST	669	35,3270	02257 0	STORE
0579			35,3271	52145 0	TIMEX	DLOAD	GOTO

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0580	REF	8	LAST	661	35,3272	06522 1
0581	REF	8	LAST	668	35,3273	03463 0

ZEROVECS
NORMEX

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P0582 S34/35.1

R0582 COMPUTE UNIT NORMAL AND LINE OF SIGHT VECTORS GIVEN THE ACTIVE AND

R0584 PASSIVE POS AND VEL AT TIME T3

0585				35,3274	52375 1	S34/35.1	VLOAD	VSU
0586	REF	9	LAST	668	35,3275	03552 0		RPASS3
0587	REF	14	LAST	668	35,3276	03536 1		RACT3
0588				35,3277	41456 0		UNIT	PUSH
0589	REF	4	LAST	667	35,3300	26311 0	STOVL	ULOS
0590	REF	15	LAST	672	35,3301	03536 1		RACT3
0591				35,3302	53435 0		VXV	UNIT
0592	REF	10	LAST	668	35,3303	03544 1		VACT3
0593	REF	3	LAST	669	35,3304	02261 0	STORE	UNRM
0594				35,3305	77616 0		RVQ	

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P0595 S34/35.2

P0596 ADVANCE PASSIVE VEH TO RENDEZVOUS TIME AND GET REQ VEL FROM LAMBERT

0597				35,3306	77220 1	S34/35.2 STQ	VLOAD	
0598	REF	17	LAST	661	35,3307	03470 1	SUBEXIT	
0599	REF	7	LAST	668	35,3310	03560 1	VPASS3	
0600				35,3311	65315 0		PDVL	PDDL
0601	REF	10	LAST	672	35,3312	03552 0		RPASS3
0602	REF	3	LAST	666	35,3313	03610 0		INTIME
0603				35,3314	65325 0		PDDL	PDDL
0604	REF	6	LAST	663	35,3315	03631 0		TPASS4
0605	REF	5	LAST	669	35,3316	33732 1		TWOPI
0606				35,3317	46125 0		PDDL	BHIZ
06061	REF	6	LAST	661	35,3320	03467 1		NN
06062	REF	1			35,3321	73325 1		S3435.23
06063					35,3322	77745 1		
06064					35,3323	41545 0		DLOAD
06065	REF	9	LAST	671	35,3324	06522 1		DLOAD
06066					35,3325	77624 1		PUSH
0607	REF	5	LAST	644	35,3326	73466 1		ZEROVECS
0608	REF	3	LAST	198	35,3327	27444 0		PRECISION
0609	REF	11	LAST	656	35,3330	00007 0		CALL
0610	REF	2	LAST	663	35,3331	27506 1		INTINT
0611	REF	4	LAST	673	35,3332	03444 0		GET TARGET VECTOR
0612							S3435.25	STOVL
0613								RTARG
0614	REF	16	LAST	672	35,3334	03536 1		VATT
0615					35,3335	41456 0		STOVL
0616					35,3336	50235 0		VPASS4
0617					35,3337	00001 0		RTARG
0618	REF	4	LAST	672	35,3340	02261 0		
0619					35,3341	77715 1		
0620					35,3342	72441 0		UNIT
0621					35,3343	00001 0		PDVL
0622					35,3344	75326 1		UNIT
0623					35,3345	43244 1		PUSH
0624	REF	1			35,3346	73350 0		UNIT RA
0625	REF	7	LAST	667	35,3347	06530 1		VXV
0626	REF	2	LAST	314	35,3350	15756 1		DOT
0627	REF	7	LAST	673	35,3351	03631 0		OD
0628					35,3352	77625 0		UNRM
0629	REF	4	LAST	673	35,3353	03610 0		RA*RP.U
0630	REF	4	LAST	652	35,3354	03452 1		
0631					35,3355	40335 0		PDVL
0632	REF	7	LAST	673	35,3356	03467 1		DOT
0633					35,3357	00001 0		SL1
06331					35,3360	63325 0		UNIT RA UNIT RP
06332	REF	1			35,3361	33744 0		OD
06333	REF	17	LAST	673	35,3362	03536 1		ACOS
06334	REF	2	LAST	652	35,3363	26323 1		BPL

REASONABLE TWO PI

NUMBER OF OFFSETS

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06335	REF	11	LAST	672	35,3364	03544 1	VACT3
06336	REF	2	LAST	652	35,3365	36331 0	STCALL VINIT
06337	REF	2	LAST	652	35,3366	22000 1	INITVEL
0634					35,3367	77624 1	CALL
0635	REF	1			35,3370	73447 1	LOMAT
0636					35,3371	64275 1	VLOAD MXV
0637	REF	5	LAST	663	35,3372	02366 0	DELVEET3
0638					35,3373	00001 0	UD
0639					35,3374	77772 0	VSL1
0640	REF	15	LAST	645	35,3375	37434 0	STCALL DELVLVC
0641	REF	18	LAST	673	35,3376	03470 1	SUBEXIT

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P0642 S34/35.3

0643				35,3377	45020 1	S34/35.3 STQ	CALL	
0644	REF	9	LAST	671	35,3400	03463 0	NORMEX	
0645	REF	2	LAST	674	35,3401	73447 1	LOMAT	GET MATRIX IN PUSH LIST
0646				35,3402	61375 1		VLOAD	VXV
0647	REF	16	LAST	674	35,3403	03434 1	DELVLVC	NEW DEL V TPI
0648				35,3404	00001 0		OD	
0649				35,3405	77772 0		VSL1	
0650	REF	6	LAST	674	35,3406	02366 0	STORE	DELVEET3
0651				35,3407	63255 0		VAD	PDVL
0652	REF	12	LAST	674	35,3410	03544 1		VACT3
0653	REF	18	LAST	673	35,3411	03536 1		RACT3
0654				35,3412	65325 0		PDDL	PDDL
0655	REF	18	LAST	666	35,3413	03442 0		TIG
0656	REF	8	LAST	673	35,3414	03631 0		TPASS4
0657				35,3415	41525 0		PDDL	PUSH
0658	REF	8	LAST	673	35,3416	06530 1		DPPOS MAX
0659				35,3417	77624 1		CALL	
0660	REF	6	LAST	673	35,3420	73466 1		INTINT
0661				35,3421	77775 1		VLOAD	
0662	REF	14	LAST	656	35,3422	00001 0		RATT
0663	REF	5	LAST	673	35,3423	03444 0	STORE	RTARG
0664				35,3424	41575 0	NOVRWRT	VLOAD	PUSH
0665	REF	5	LAST	672	35,3425	02311 0		ULOS
0666				35,3426	57435 1		VXV	VCOMP
0667	REF	5	LAST	673	35,3427	02261 0		UNRM
0668				35,3430	41456 0		UNIT	PUSH
0669				35,3431	76435 1		VXV	VSL1
0670	REF	6	LAST	675	35,3432	02311 0		ULOS
0671				35,3433	77715 1		PDVL	
0672				35,3434	64315 1		PDVL	MXV
0673	REF	7	LAST	675	35,3435	02366 0		DELVEET3
0674				35,3436	00001 0			OD
0675				35,3437	77772 0		VSL1	
0676	REF	5	LAST	315	35,3440	36303 1	STCALL	DVLOS
0677	REF	10	LAST	675	35,3441	03463 0		NORMEX

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P0678 S34/35.4

0579				35,3442	40220 0	S34/35.4 STQ	SETPD	NO ASTRONAUT-OVERWRITE
0580	REF	11	LAST	675	35,3443	03463 0	NORMEX	
0681					35,3444	00001 0	00	
0682					35,3445	77650 1	GOTO	
0683	REF	1			35,3446	73424 1	NOVRWRT	

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P0684 LOMAT

0685				35,3447	57575 1	LOMAT	VLOAD	VCOMP	
0686	REF	6	LAST	675	35,3450			UNRM	
0687				35,3451	24007 0		STOVL	6D	Y
0688	REF	19	LAST	675	35,3452			RACT3	
0689				35,3453	57456 1		UNIT	VCOMP	
0690				35,3454	00015 0		STORE	12D	
0691				35,3455	76435 1		VXV	VSL1	
0692	REF	7	LAST	677	35,3456			UNRM	Z*-Y
0693				35,3457	00001 0		STORE	0D	
0694				35,3460	43401 0		SETPD	RVQ	
0695				35,3461	00023 0			18D	
0696				35,3462	65325 0	GOINT	PDDL	PDDL	DO
0697	REF	10	LAST	673	35,3463			ZEROVECS	NOT
0698	REF	9	LAST	670	35,3464			NO1PI	
0699				35,3465	41406 0		PUSH	PUSH	ORDER OR INSERT BEFORE INTINT
0700				35,3466	45020 1	INTINT	STQ	CALL	
0701	REF	4	LAST	650	35,3467			RTRN	
0702	REF	19	LAST	655	35,3470			INTSTALL	
0703				35,3471	71214 0		CLEAR	DLOAD	
0704	REF	7	LAST	655	35,3472			INTYPFLG	
0705				35,3473	43054 1		BZE	SET	
0706				35,3474	73476 0			+2	
0707	REF	8	LAST	677	35,3475			INTYPFLG	
0708				35,3476	45545 1		DLOAD	STADR	
0709	REF	28	LAST	666	35,3477		STUDL	TDEC1	
0710				35,3500	73014 0		SET	LXA.2	
0711	REF	3	LAST	656	35,3501			MOONFLAG	
0712	REF	4	LAST	652	35,3502			RTX2	
0713				35,3503	43014 0		BON	CLEAR	
0714	REF	3	LAST	635	35,3504			CMOONFLG	
0715	REF	1			35,3505			ALLSET	
0716	REF	4	LAST	677	35,3506			MOONFLAG	
0717	REF	6	LAST	656	35,3507	ALLSET	STOVL	TET	
0718				35,3510	77657 0		VSR*		
0719				35,3511	57176 0			0,2	
0720	REF	6	LAST	655	35,3512		STOVL	RCV	
0721				35,3513	77657 0		VSR*		
0722				35,3514	57176 0			0,2	
0723	REF	5	LAST	656	35,3515		STCALL	VCV	
0724	REF	2	LAST	656	35,3516			INTEGRVS	
0725				35,3517	52175 0		VLOAD	GOTO	
0726	REF	15	LAST	675	35,3520			RATT	
0727	REF	5	LAST	677	35,3521			RTRN	

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P0728 S34/35.5
 R0729 SUBROUTINES USED

R0730 BANKCALL
 R0731 GOFLASH
 R0732 GOTOPDOH
 R0733 S34/35.3
 R0734 S34/35.4
 R0735 VNPOOH

0736				35,3522	43020 1	S34/35.5 STQ	BON		
0737	REF	19	LAST	674	35,3523	03470 1	SUBEXIT		
0738	REF	4	LAST	653	35,3524	01311 0	FINALFLG		
0739	REF	1			35,3525	73521 1	FLAGON		
0740					35,3526	52014 0	SET	GOTO	
0741	REF	10	LAST	652	35,3527	00470 1	UPDATFLG		
0742	REF	1			35,3530	73576 1	FLAGOFF		
0743					35,3531	77214 0	FLAGON	CLEAR	VLOAD
0744	REF	1			35,3532	03274 0			NTARGFLG
07441	REF	17	LAST	675	35,3533	03434 1			DELVLVC
07442	REF	2	LAST	105	35,3534	01237 0	STORE	GDT/2	
07443					35,3535	77776 1	EXIT		
0745	REF	3	LAST	653	35,3536	3 3727 0	+5	CAF	V06N81
0746	REF	164	LAST	662	35,3537	0 4616 1		TC	BANKCALL
0747	REF	14	LAST	662	35,3540	20476 0		CAD	GOFLASH
0748	REF	14	LAST	662	35,3541	0 6001 0		TC	GOTOPDOH
0749					35,3542	0 3544 1		TC	+2
0750	REF	2	LAST	678	35,3543	0 3536 1		TC	FLAGON +5
0751	REF	3	LAST	518	35,3544	3 5016 0	+2	CA	EBANK7
07511	REF	19	LAST	520	35,3545	54 003 0		TS	EBANK
									TO BE SURE
07512					35,3546	22 007 0		ZL	
07513	REF	14	LAST	608	35,3547	3 4756 1		CA	FIVE
07514	REF	181	LAST	612	35,3550	54 002 1	NTARGCHK	TS	Q
07515	REF	182	LAST	678	35,3551	50 002 0		INDEX	Q
07516	REF	18	LAST	678	35,3552	4 1433 0		CS	DELVLVC
07517	REF	183	LAST	678	35,3553	50 002 0		INDEX	Q
07518	REF	3	LAST	678	35,3554	6 1236 1		AD	GDT/2
07519	REF	92	LAST	613	35,3555	26 001 1		ADS	L
0752	REF	184	LAST	678	35,3556	10 002 1		CCS	Q
07521	REF	1			35,3557	1 3550 0		TCF	NTARGCHK
07522	REF	215	LAST	612	35,3560	22 000 1		LXCH	A
07523					35,3561	0 0006 1		EXTEND	
07524					35,3562	1 3565 0		BZF	+3
07525	REF	37	LAST	629	35,3563	0 5504 0		TC	UPFLAG
0753	REF	2	LAST	678	35,3564	00146 1		ADRES	NTARGFLG
0754	REF	78	LAST	666	35,3565	0 6037 0		TC	INTPRET
0755					35,3566	45014 0		BOFF	CALL
0756	REF	3	LAST	678	35,3567	03354 0			NTARGFLG

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0757	REF	1		35,3570	73572 0			NOCHG
0758	REF	1		35,3571	73377 0			S34/35.3
0759				35,3572	77214 0	NOCHG	CLEAR	VLOAD
0760	REF	4	LAST 653	35,3573	01267 0			XDELVFLG
0761	REF	8	LAST 675	35,3574	02366 0			DELVEET3
0762	REF	10	LAST 653	35,3575	03656 1		STORE	DELVSIN
0763				35,3576	77624 1	FLAGOFF	CALL	
0764	REF	1		35,3577	73442 1			S34/35.4
0765				35,3600	77776 1		EXIT	
0766	REF	1		35,3601	3 3726 1		CAF	V06N59
0767	REF	16	LAST 663	35,3602	0 3712 0		IC	VNPOOH
0768	REF	79	LAST 678	35,3603	0 6037 0		TC	INTPRET
0769				35,3604	77650 1		GOTO	
0770	REF	20	LAST 678	35,3605	03470 1			SUBEXIT

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P0771 VN1645

R0772 SUBROUTINES USED

R0773 P3XURP7X
 R0774 GET+MGA
 R0775 BANKCALL
 R0776 DELAYJOB
 R0777 COMPTGO
 R0778 GDFLASHR
 R0779 GOTDPOOH
 R0780 FLAGUP

0781				35,3606	71220 1	VN1645	STQ	DLOAD	
0782	REF	21	LAST 679	35,3607	03470 1			SUBEXIT	
0783	REF	1		35,3610	33742 0			OP-.01	
0784	REF	3	LAST 614	35,3611	02253 1		STORE	+MGA	MGA = -.01
0785				35,3612	71214 0		BOFF	DLOAD	
0786	REF	5	LAST 678	35,3613	01351 1			FINALFLG	
0787	REF	1		35,3614	73634 1			GET45	
0788	REF	2	LAST 680	35,3615	33742 0			OP-.01	
0789				35,3616	77615 0		DAD		
0790	REF	3	LAST 680	35,3617	33742 0			OP-.01	
0791	REF	4	LAST 680	35,3620	02253 1		STORE	+MGA	MGA = -.02
0792				35,3621	77414 0		BOFF	EXIT	
0793	REF	1		35,3622	01742 1			FLPSHFLG	
0794	REF	2	LAST 680	35,3623	73634 1			GET45	
0795	REF	1		35,3624	0 3704 1		TC	P3XURP7X	
0796				35,3625	0 3627 1		TC	+2	P3X
0797	REF	3	LAST 680	35,3626	0 3635 1		TC	GET45 +1	P7X
0798	REF	80	LAST 679	35,3627	0 6037 0		TC	INTPRET	
0799				35,3630	41575 0		VLOAD	PUSH	
0800	REF	11	LAST 679	35,3631	03656 1			DELVSIN	
0801				35,3632	77624 1		CALL		COMPUTE MGA
0802	REF	1		35,3633	15717 1			GET+MGA	
0803				35,3634	77776 1	GET45	EXIT		
0804	REF	1		35,3635	0 2432 0		TC	COMPTGO	INITIATE TASK TO UPDATE TTOGO
0805	REF	22	LAST 680	35,3636	3 1470 0		CA	SUBEXIT	
0806	REF	1		35,3637	551464 1		TS	FLAVED	
0807	REF	6	LAST 604	35,3640	3 4777 1		CAF	ISEC	
0808	REF	165	LAST 678	35,3641	0 4616 1		TC	BANKCALL	
0809	PLF	11	LAST 516	35,3642	01735 1		CADR	DELAYJOB	
0810	REF	1		35,3643	3 3730 0		CAF	V1645	TERMINATE, TTOGO, +MGA
0811	PLF	166	LAST 680	35,3644	0 4616 1		TC	BANKCALL	
0812	REF	15	LAST 678	35,3645	20476 0		CADR	OLFLASH	
0813	REF	1		35,3646	0 3651 0		TC	KILLOCK	TERMINATE
0814	REF	1		35,3647	0 3654 0		TC	N45PRIC	PROCEED
0815	REF	1		35,3650	0 3664 0		TC	CLUPDATE	RECYCLE - RETURN FOR INITIAL COMPUTATION
0816	REF	13	LAST 430	35,3651	3 0005 1	KILLOCK	CA	/	
0817	REF	3	LAST 650	35,3652	55163 0		TS	OTSPDEX	

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0818	REF 15	LAST 678	35,3653	0 6001 0	TC	GOTUPDUM	
0819	REF 17	LAST 604	35,3654	4 0076 1	CS	FLAGWRD2	
0820	REF 38	LAST 556	35,3655	7 4746 1	MASK	BIT6	
0821			35,3656	0 0006 1	EXTEND		
0822	REF 2	LAST 680	35,3657	1 3651 1	BZF	KILCLOCK	FINALFLG IS SET-FLASH V37-AWAIT NEW-PGM
0823	REF 26	LAST 519	35,3660	0 5353 1	TC	PHASCHNG	
0824			35,3661	04024 0	OCT	04024	
0825	REF 38	LAST 678	35,3662	0 5504 0	TC	UPFLAG	SET
0826	REF 6	LAST 680	35,3663	00047 1	ADRES	FINALFLG	FINALFLG
0827	REF 14	LAST 680	35,3664	3 0005 1	CLUPDATE CA	Z	
0828	REF 4	LAST 680	35,3665	55'163 0	TS	DISPDEX	
0829	REF 27	LAST 681	35,3666	0 5353 1	TC	PHASCHNG	
0830			35,3667	04024 0	OCT	04024	
0831	REF 81	LAST 680	35,3670	0 6037 0	TC	INTPRET	
0832			35,3671	52014 0	CLEAR	GOTO	
0833	REF 11	LAST 678	35,3672	00670 0		UPDATEFLG	
0834	REF 2	LAST 680	35,3673	03464 1		LSAVED	

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P0835 DISPLAYE

R0836 SUBROUTINES USED

R0837 BANKCALL
R0838 GOF LASHR
R0839 GOTOPDGM
R0840 BLANKET
R0841 END OF JOB

0842				35,3674	0 0006 1	DISPLAYE	EXTEND	
0843	REF	12	LAST	676	35,3675	23 463 1	QXCH	HURFEX
0844	REF	2	LAST	622	35,3676	3 3724 0	CAF	VO6455
0845	REF	167	LAST	680	35,3677	0 4616 1	TCH	BANKCALL
0846	REF	16	LAST	680	35,3700	20476 0	CADP	GOF LASH
0847	REF	16	LAST	681	35,3701	1 6001 1	TCH	GOTOPDGM
0848	REF	13	LAST	682	35,3702	0 1463 1	TC	NORMEX
0849				35,3703	1 3676 1		TCH	-5

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P0853 P3XORP7X

0854	REF	2	LAST	246	35,3704	3 7744 1	P3XORP7X	CAP	HIGH9
0855	REF	11	LAST	497	35,3705	7 1011 1		MASK	MODREG
0856					35,3706	0 0006 1		EXTEND	
0857					35,3707	1 3711 1		BZF	+2
0858	REF	185	LAST	678	35,3710	24 002 0		INCR	Q
0859					35,3711	0 0002 0		RETURN	

R0860 VNPOOH

R0861 SUBROUTINES USED

R0862	BANKCALL
R0863	GOF LASH
R0864	GOTUPOOH

0865					35,3712	0 0006 1	VNPOOH	EXTEND	
0866	REF	6	LAST	677	35,3713	23 465 1		QXCH	RTRN
0867	REF	3	LAST	630	35,3714	55 615 0		TS	VERBNDUN
0868	REF	4	LAST	683	35,3715	3 1615 1		CA	VERBNDUN
0869	REF	168	LAST	682	35,3716	0 4616 1		TCR	BANKCALL
0870	REF	17	LAST	682	35,3717	20476 0		CADR	GOF LASH
0871	REF	17	LAST	682	35,3720	1 6001 1		TCF	GOTUPOOH
0872	REF	7	LAST	683	35,3721	0 1465 1		TC	RTRN
0873					35,3722	1 3715 0		TCF	-5

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P0874 CONSTANTS

0875	35,3723	01445 0	V06N37	VN	0637	
0876	35,3724	01467 0	V06N55	VN	0655	
0877	35,3725	01472 1	V06N58	VN	0658	
0878	35,3726	01473 0	V06N59	VN	0659	
0879	35,3727	01521 0	V06N81	VN	0681	
0880	35,3730	04055 0	V16N45	VN	1645	
0881	35,3731	14441 0	TWOP1	2DEC	6.283185307	8-4
0881	35,3732	37325 1				
0882	35,3733	00001 0	MAX250	2DEC	25	E3
0882	35,3734	20650 0				
0883	35,3735	12525 0	THIRD	2DEC	.333333333	
0883	35,3736	12525 0				
0884	35,3737	00004 0	ELEPS	2DEC	.27777777	E-3
0884	35,3740	21505 1				
0886	35,3741	77777 0	DP-.01	OCT	77777	CONSTANTS
0887	35,3742	61337 1		OCT	61337	ADJACENT
08871	35,3743	01252 0	EPSFOUR	2DEC	.0416666666	-.01 FOR HGA DSP
08871	35,3744	25253 1				
08872	35,3745	13434 0	130DEG	2DEC	.3611111111	
08872	35,3746	16162 0				

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P0888 INITVEL

R0889 MOD NO -1 LOG SECTION - P34-P35, P74-P75

R0890 MOD BY WHITE.P DATE 21NOV67

R0891 FUNCTIONAL DESCRIPTION

R0892 THIS SUBROUTINE COMPUTES THE REQUIRED INITIAL VELOCITY VECTOR FOR
 R0893 A TRAJECTORY OF SPECIFIED TRANSFER TIME BETWEEN SPECIFIED INITIAL
 R0894 AND TARGET POSITIONS. THE TRAJECTORY MAY BE EITHER CONIC OR
 R0895 PRECISION DEPENDING ON AN INPUT PARAMETER (NAMELY, NUMBER OF
 R0896 OFFSETS). IN ADDITION, IN THE PRECISION TRAJECTORY CASE, THE
 R0897 SUBROUTINE ALSO COMPUTES AN OFFSET TARGET VECTOR, TO BE USED
 R0898 DURING PURE-CONIC CROSS-PRODUCT STEERING. THE OFFSET TARGET
 R0899 VECTOR IS THE TERMINAL POSITION VECTOR OF A CONIC TRAJECTORY WHICH
 R0900 HAS THE SAME INITIAL STATE AS A PRECISION TRAJECTORY WHOSE
 R0901 TERMINAL POSITION VECTOR IS THE SPECIFIED TARGET VECTOR.

R0902 IN ORDER TO AVOID THE INHERENT SINGULARITIES IN THE 180 DEGREE
 R0903 TRANSFER CASE WHEN THE (TRUE OR OFFSET) TARGET VECTOR MAY BE
 R0904 SLIGHTLY OUT OF THE ORBITAL PLANE, THIS SUBROUTINE ROTATES THIS
 R0905 VECTOR INTO A PLANE DEFINED BY THE INPUT INITIAL POSITION VECTOR
 R0906 AND ANOTHER INPUT VECTOR (USUALLY THE INITIAL VELOCITY VECTOR).
 R0907 WHENEVER THE INPUT TARGET VECTOR LIES INSIDE A CONE WHOSE VERTEX
 R0908 IS THE ORIGIN OF COORDINATES, WHOSE AXIS IS THE 180 DEGREE
 R0909 TRANSFER DIRECTION, AND WHOSE CONE ANGLE IS SPECIFIED BY THE USER.

R0910 THE LAMBERT SUBROUTINE IS UTILIZED FOR THE CONIC COMPUTATIONS AND
 R0911 THE COASTING INTEGRATION SUBROUTINE IS UTILIZED FOR THE PRECISION
 R0912 TRAJECTORY COMPUTATIONS.

R0913 CALLING SEQUENCE

R0914	L	CALL
R0915	L+1	INITVEL
R0916	L+2	(RETURN - ALWAYS)

R0917 INPUT

R0918	(1) RINIT	INITIAL POSITION RADIUS VECTOR
R0919	(2) VINIT	INITIAL POSITION VELOCITY VECTOR
R0920	(3) RTARG	TARGET POSITION RADIUS VECTOR
R0921	(4) DELLT4	DESIRED TIME OF FLIGHT FROM RINIT TO RTARG
R0922	(5) INTIME	TIME OF RINIT
R0923	(6) OD	NUMBER OF ITERATIONS OF LAMBERT/INTCORVS
R0924	(7) 2D	ANGLE TO 180 DEGREES WHEN ROTATION STARTS
R0925	(8) RTX1	-2 FOR EARTH, -100 FOR LUNAR
R09251	(9) RTX2	COORDINATE SYSTEM ORIGIN - 0 FOR EARTH, 2 FOR LUNAR
R0926		PUSHLOC SET AT 4D

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R0927 OUTPUT

R0928 (1) RTARG OFFSET TARGET POSITION VECTOR
 R0929 (2) VIPRIME MANEUVER VELOCITY REQUIRED
 R0930 (3) VTPRIME VELOCITY AT TARGET AFTER MANEUVER
 R0931 (4) DELVEET3 DELTA-VELOCITY REQUIRED FOR MANEUVER

R0932 SUBROUTINES USED

R0933 LAMBERT
 R0934 INTSTALL
 R0935 INTEGRVS

0936	REF	1		11.2000		SETLOC INITVEL	
0937				11.2000		BANK	
0938	REF	1				COUNT* SS/INITV	
0958				11.2000	77614-1	INITVEL SET	COGA GUESS NOT AVAILABLE
0959	REF	1		11.2001	00475-1		GUESSW
0960				11.2002	44175-1	HAVEGUES VLOAD	STQ
0961	REF	6	LAST 675	11.2003	03444-0		RTARG
0962	REF	14	LAST 682	11.2004	03463-0		RTARG
0963	REF	1		11.2005	03472-0	STORE	RTARG1
09631				11.2006	77646-0	ABVAL	
09632	REF	2	LAST 143	11.2007	03723-1	STORE	RTHAG
0964				11.2010	46135-1	SLOAD	BHIZ
0965	REF	5	LAST 677	11.2011	03000-1		RTX2
0967	REF	1		11.2012	22026-0		INITVEL1
0968				11.2013	72575-0	VLOAD	VSL2
0969	REF	3	LAST 673	11.2014	02323-1		RINIT
0970	REF	4	LAST 686	11.2015	26323-1	STOVL	RINIT
0971	REF	3	LAST 674	11.2016	02331-1		VINIT
0972				11.2017	77752-1	VSL2	
0973	REF	4	LAST 686	11.2020	26331-1	STOVL	VINIT
0974	REF	2	LAST 686	11.2021	03472-0		RTARG1
0975				11.2022	77752-1	VSL2	
0976	REF	3	LAST 686	11.2023	03472-0	STORE	RTARG1
09761				11.2024	77646-0	ABVAL	
09762	REF	3	LAST 686	11.2025	03723-1	STORE	RTHAG
R0977			INITIALIZATION				
0978				11.2026	71331-0	INITVEL1 SSP	DLOAD
0979	REF	1		11.2027	03617-1		ITCTH
0980				11.2030	77776-1		0-1
0981				11.2031	70546-1	COSINE	SR1
0982	REF	1		11.2032	17667-0	STOVL	COZY4
0983				11.2033	67154-0	LXA,2	SXA,2
0984	REF	281	LAST 668	11.2034	00154-1		MPAC
0985	REF	2	LAST 125	11.2035	02701-0		VTARGTAG
0986				11.2036	77775-1	VLOAD	

SET ITCTH TO -1, LOAD MPAC WITH 16 (PI 10)
 CALCULATE COSINE (E4) (+2)
 SET COZY4 TO COSINE (E4) (PI 10)
 SET VTARGTAG TO 00 (SPI)

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0987	REF	5	LAST	686	11.2037	02323	1		RINIT		
0988	REF	3	LAST	125	11.2040	26655	0	STOVL	R1VEC	R1VEC EQ RINIT	
0989	REF	4	LAST	686	11.2041	03472	0		RTARG1		
0990	REF	2	LAST	125	11.2042	16663	0	STOVL	R2VEC	R2VEC EQ RTARG	
0991	REF	5	LAST	673	11.2043	03452	1		DELL14		
0992	REF	2	LAST	125	11.2044	02671	0	STORE	TDESIREC	TDESIREC EQ DELL14	
0993					11.2045	77201	1	SETPD	VLOAD		
0994					11.2046	00001	0		DE	INITIALIZE PL TO 00	
0995	REF	6	LAST	687	11.2047	02323	1		RINIT	MPAC EQ RINIT (+29)	
0996					11.2050	41456	0	UNIT	PUSH	UNIT(R1) (+1)	(PL 60)
0997					11.2051	53435	0	VXV	UNIT		
0998	REF	5	LAST	686	11.2052	02331	1		VINIT	MPAC EQ UNIT(R1) X VI (+8)	
0999	REF	2	LAST	125	11.2053	26674	0	STOVL	UN		
1000	REF	5	LAST	687	11.2054	03472	0		RTARG1		
1001					11.2055	50256	0	UNIT	OUT	TEMP=URT.URT (+2)	(PL 00)
1002					11.2056	43015	1	DAD	CLEAR		
1003	REF	2	LAST	686	11.2057	03667	0		COZY4		
1004	REF	1			11.2060	03665	1		NORMSW		
1005	REF	3	LAST	687	11.2061	03667	0	STORE	COZY4		
1006					11.2062	43044	0	INITVEL2 BPL	SET		
1007	REF	1			11.2063	22105	0		INITVEL3	UN CALCULATED IN LAMBERT	
1008	REF	2	LAST	687	11.2064	03465	0		NORMSW		
R1009	ROTATE RC INTO YC PLANE - SET UNIT NORMAL TO YC										
1010					11.2065	41575	0	VLOAD	PUSH		(PL 60)
1011	REF	3	LAST	687	11.2066	02663	0		R2VEC	RC TO 6D (+29)	
1012					11.2067	63246	1	ABVAL	PDVL	RC TO MPAC, ABVAL(RC) (+29) TO 0D (PL 20)	
1013					11.2070	46206	1	PUSH	VPRUJ		(PL 80)
1014	REF	3	LAST	687	11.2071	02674	0		UN		
1015					11.2072	51352	1	VSL2	BVSU		
1016					11.2073	74256	0	UNIT	VXSC		(PL 00)
1017					11.2074	77772	0	VSL1			
1018	REF	4	LAST	687	11.2075	02663	0	STORE	R2VEC		
1019					11.2076	67351	1	TLOAD	SLDAD		
1020	REF	2	LAST	37	11.2077	24007	0		ZERUVEC		
1021	REF	2	LAST	686	11.2100	03617	1		ITCTR		
1022					11.2101	77244	0	BPL	VLOAD		
1023	REF	2	LAST	687	11.2102	22105	0		INITVEL3		
1024	REF	5	LAST	687	11.2103	02663	0		R2VEC		
1025	REF	6	LAST	687	11.2104	03472	0	STORE	RTARG1		
1026					11.2105	63345	0	INITVEL3 DLOAD	PDVL		(PL 20)
1027	REF	1			11.2106	26007	1		RUEARTH	POSITIVE VALUE	
1028	REF	6	LAST	687	11.2107	02663	0		R2VEC		
102802					11.2110	63256	0	UNIT	PDVL	2D = UNIT(R2VEC)	(PL 80)
102804	REF	4	LAST	687	11.2111	02655	0		R1VEC		
102806					11.2112	41456	0	UNIT	PUSH	8D = UNIT(R1VEC)	(PL 140)
102808					11.2113	57435	1	VXV	VCOMP	-N = UNIT(R2VEC) X UNIT(R1VEC)	
10281					11.2114	00003	1		2D		
10282					11.2115	77606	1	PUSH			(PL 200)
10283					11.2116	71350	1	LXA,1	DLOAD		

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10284	REF 7 LAST 662	11,2117	02776 0		FTX1	
10285		11,2120	00023 0		18D	
10286		11,2121	62040 1	BMH	INCR.1	
10287		11,2122	22124 0		+2	
10288		11,2123	77767 1	DEC	-8	
10289		11,2124	67310 1	INCR.1	SLOAD	
1029		11,2125	00012 1		10D	
10291	REF 14 LAST 669	11,2126	00047 1		X1	
10292		11,2127	77230 0	BHIZ	VLOAD	(PL140)
10293		11,2130	22132 1		+2	
10294		11,2131	41476 1	VCOMP	PUSH	(PL200)
10295		11,2132	77775 1	VLOAD		(PL140)
10296		11,2133	50235 0	VXV	DOT	(PL 20)
1032		11,2134	71244 0	BPL	VLOAD	(PL 20)
1033	REF 1	11,2135	22137 1		INITVEL4	
1034		11,2136	41476 1	VCOMP	PUSH	(PL 20)
1035		11,2137	67154 0	INITVEL4	LXA.2	SXA.2
1036		11,2140	00000 1		UD	
1037	REF 2 LAST 125	11,2141	02672 0		GEORGE	
R1038	SET INPUTS UP FOR LAMBERT					

1039		11,2142	45150 1	LXA.1	CALL
1040	REF 8 LAST 688	11,2143	02776 0		FTX1
R1041	OPERATE THE LAMBERT CONIC ROUTINE (COASTFLT SUBROUTINE)				

1042	*REF 1	11,2144	23765 1	SETITC4	GO TO END OF BANK TO SET ITERR - BEFORE
A1043	*				CALLING LAMBERT (FOR REMANUFACTURE ONLY)

R1044 ARRIVED AT SOLUTION IS GOOD ENOUGH ACCORDING TO SLIGHTLY WIDER BOUNDS.

1045		11,2145	77214 0	CLEAR	VLOAD
1046	REF 2 LAST 686	11,2146	00675 0		GUESSW
1047	REF 8 LAST 663	11,2147	02744 1		VVER
R1048	STOKE CALCULATED INITIAL VELOCITY REQUIRED IN VIPRIME				
R1049					
1050	REF 3 LAST 663	11,2150	16337 1	STOKE	VIPRIME
R1051					INITIAL VELOCITY REQUIRED (+7)
R1052	IF NUMIT IS ZERO, CONTINUE AT INITVEL8, OTHERWISE				
R1053	SET UP INPUTS FOR ENCKE INTEGRATION (INTEGRVS).				

1054	REF 3 LAST 686	11,2151	02702 0		VTARGETAG
1055		11,2152	45030 0	BHIZ	CALL
1056	REF 1	11,2153	22230 0		INITVEL7
1057	REF 20 LAST 677	11,2154	27414 0		INTSTALL
1061		11,2155	43135 1	SLOAD	CLEAR
1062	REF 6 LAST 686	11,2156	03000 1		RTA2
1063	REF 5 LAST 677	11,2157	00263 0		MOONFLAG
1064		11,2160	43030 0	BHIZ	SET
1065	REF 1	11,2161	22163 0		INITVEL5

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1066	REF	6	LAST	688	11,2162	00063 1		MOONFLAG	
1067					11,2163	77775 1	INITVEL5	VLOAD	
1068	REF	7	LAST	687	11,2164	02323 1		RINIT	
1069	REF	5	LAST	687	11,2165	02655 0	STORE	R1VEC	
1070	REF	7	LAST	677	11,2166	25535 0	STOVL	RCV	
1071	REF	4	LAST	688	11,2167	02337 1		VIPRIME	
1072	REF	6	LAST	677	11,2170	15543 1	STOOL	VCV	
1073	REF	5	LAST	673	11,2171	03610 0		INTIME	
1074	REF	7	LAST	677	11,2172	01517 0	STORE	TET	
1075					11,2173	43015 1	DAD	CLEAR	
1076	REF	6	LAST	687	11,2174	03452 1		DELLT4	
1077	REF	9	LAST	677	11,2175	01673 1		INTYPELG	
1078	REF	29	LAST	677	11,2176	84041 0	STCALL	TDEC1	
1079	REF	3	LAST	677	11,2177	27107 1		INTEGRYS	
1080					11,2200	77775 1	VLOAD		
1081	REF	8	LAST	656	11,2201	00025 0		V-TTL	
1082	REF	2	LAST	125	11,2202	02703 1	STORE	VTARGET	
R1083	IF ITERATION COUNTER (ITCTR) EQ NO. ITERATIONS (NUMIT), CONTINUE AT								
R1084	INITVELC. OTHERWISE REITERATE LAMBERT AND ENCKE								
1085					11,2203	63154 1	LXA,2	INCR,2	
1086	REF	3	LAST	687	11,2204	03616 0		ITCTR	
1087					11,2205	00001 0		IN	INCREMENT ITCTR
1088					11,2206	55134 1	SXA,2	XSU,2	
1089	REF	4	LAST	689	11,2207	03616 0		ITCTR	
1090	REF	4	LAST	688	11,2210	02701 0		VTARGET	
1091					11,2211	46135 1	SLOAD	BHIZ	IF SP (MPAC) EQ 0, CONTINUE AT INITVELC
1092	REF	9	LAST	656	11,2212	00050 1		X2	
1093	REF	1			11,2213	22225 1		INITVEL6	
R1094									
R1095	OFFSET CONIC TARGET VECTOR								
1096					11,2214	52375 1	VLOAD	VSU	
1097	REF	7	LAST	687	11,2215	03472 0		R1A61	
1098	REF	5	LAST	656	11,2216	00017 1		RATT1	
1099					11,2217	77655 1	VAD		
1100	REF	7	LAST	687	11,2220	02663 0		R2VEC	
1101	REF	8	LAST	689	11,2221	16663 0	STOVL	R2VEC	
1102	REF	4	LAST	687	11,2222	03667 0		CDZY4	
1103					11,2223	77656 1	GO TO		
1104	REF	1			11,2224	22062 0		INITVEL2	CONTINUE ITERATING AT INITVEL2
R1105	COMPUTE THE DELTA-VELOCITY								
1106					11,2225	77775 1	INITVEL6	VLOAD	
1107	REF	9	LAST	689	11,2226	02663 0		R2VEC	
1108	REF	8	LAST	689	11,2227	03472 0	STORE	R1A61	
1109					11,2230	52375 1	INITVEL7	VLOAD	
1110	REF	5	LAST	689	11,2231	02337 1		VIPRIME	
1111	REF	6	LAST	687	11,2232	02331 1		VINIT	
1112	REF	9	LAST	679	11,2233	26366 0	STOVL	DELVEET3	DELVEET3 = VIPRIME-VINIT (+7)

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1113	REF	3	LAST	689	11.2234	02703	1		VTARGET
1114	REF	2	LAST	663	11.2235	03566	1	STORE	VTPRIME
1115					11.2236	46135	1	SLOAD	BHIZ
1116	REF	7	LAST	636	11.2237	03000	1		RTX2
1117	REF	1			11.2240	22255	0		INITVELX
11171					11.2241	70575	1	VLOAD	VSR2
11172	REF	3	LAST	690	11.2242	03566	1		VTPRIME
1118	REF	4	LAST	690	11.2243	27566	1	STOVL	VTPRIME
1119	REF	6	LAST	689	11.2244	02337	1		VIPRIME
1120					11.2245	77742	0	VSR2	
1121	REF	7	LAST	690	11.2246	26337	1	STOVL	VIPRIME
1122	REF	9	LAST	689	11.2247	03472	0		RTARG1
1123					11.2250	77742	0	VSR2	
1124	REF	10	LAST	690	11.2251	27472	0	STOVL	RTARG1
1125	REF	10	LAST	689	11.2252	02366	0		DELVEET3
1126					11.2253	77742	0	VSR2	
1127	REF	11	LAST	690	11.2254	02366	0	STORE	DELVEET3
1128					11.2255	70750	1	INITVELX	LXA,1
11281	REF	9	LAST	688	11.2256	02776	0		BLOAD*
11282	REF	1			11.2257	10003	0		RTX1
112825					11.2260	41206	0	PUSH	NOTABLE -2.1
11283	REF	3	LAST	648	11.2261	02742	1		DMP
11284					11.2262	56342	1	SR1	RTA
11285	REF	4	LAST	648	11.2263	00041	1		DDV
11286	REF	2	LAST	143	11.2264	17721	0		R1
11287					11.2265	77661	0	STORE	RTA/A
112871					11.2266	20607	1	SR	
112875	REF	2	LAST	143	11.2267	03717	0		6
11288					11.2270	77201	1	STORE	HUASTEER
1129					11.2271	00001	0	SETPD	VLOAD
1130	REF	11	LAST	690	11.2272	03472	0		OD
1131	REF	7	LAST	686	11.2273	37444	1		RTARG1
1134	REF	15	LAST	686	11.2274	03463	0	STCALL	RTARG
R1135									NORMEX
R1136 END OF INITVEL ROUTINE								

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P1137 MIDGIM

R1138 MOD NO. 0. BY WILLMAN, SUBROUTINE RENDGUID, LOG P34-P35, P74-P75

P1139 REVISION 03. 17 FEB 67

R1140 IF THE ACTIVE VEHICLE IS DOING THE COMPUTATION, MIDGIM COMPUTES
 R1141 THE POSITIVE MIDDLE GIMBAL ANGLE OF THE ACTIVE VEHICLE TO THE INPUT
 R1142 DELTA VELOCITY VECTOR (OD IN PUSH LIST), OTHERWISE
 P1143 MIDGIM CONVERTS THE INPUT DELTA VELOCITY VECTOR FROM INERTIAL COORDIN-
 R1144 ATES TO LOCAL VERTICAL COORDINATES OF THE ACTIVE VEHICLE.

R1145 .. INPUTS ..

R1146	NAME	MEANING	UNITS/SCALING/MODE
R1147	AVFLAG	INT FLAG - 0 IS CSM ACTIVE, 1 IS LEM ACTIVE	BIT
R1149	RINIT	ACTIVE VEHICLE RADIUS VECTOR	METERS/CSEC (+7) VT
R1150	VINIT	ACTIVE VEHICLE VELOCITY VECTOR	METERS/CSEC (+7) VT
R1151	OD (PL)	ACTIVE VEHICLE DELTA VELOCITY VECTOR	METERS/CSEC (+7) VT

R1152 .. OUTPUTS ..

R1153	NAME	MEANING	UNITS/SCALING/MODE
R1154	+MGA	+ MIDDLE GIMBAL ANGLE	REVOLUTIONS (+0) DP
R1155	DELVLVC	DELTA VELOCITY VECTOR IN LV COORD.	METERS/CSEC (+7) VT
R1156	MGLVFLAG	INT FLAG - 0 IS +MGA COMPUTED, 1 IS DELVLVC COMP.	BIT

R1157 .. CALLING SEQUENCE ..

R1158	L	CALL
R1159	L+1	MIDGIM
R1160	L+2	(RETURN - ALWAYS)

R1161 .. NO SUBROUTINES CALLED ..

R1162 .. DEBRIS - ERASEABLE TEMPORARY USAGE

R1163 A.O.L. PUSH LIST, MPAC.

R1164 .. ALARMS - NONE ..

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P1165 MIDDLE GIMBAL ANGLE COMPUTATION.

1166	REF	1		06.2000		SETLOC MIDDGIM		
1167				06.3715		BANK		
1168	REF	1				COUNT# 11/PIDG		
1169				06.3715	20000 0	HALFREV	2DEC	1 0-1
1169				06.3716	00000 1			
1176				06.3717	53575 0	GET+MGA	VLOAD	UNIT (PL 00) V (+7) TO MPAC, UNITIZE UV (+1)
11765				06.3720	77656 1		UNIT	
1177				06.3721	72441 0	DOT	SL1	DOT-UV WITH Y(STABLE-MEMBER) AND RESCALE
1178	REF	16	LAST	592	06.3722	01742 1	PERSAMAT +6	FROM +2 TO +1 FOR ASIN ROUTINE
1179				06.3723	51136 1	ARCSIN	BPL	
1180	REF	1		06.3724	15730 1	SETMGA		
1181				06.3725	43215 0	DAD	DAD	CONVERT +MGA TO -MGA BY
1182	REF	1		06.3726	15716 0	HALFREV		ADDING ONE REVOLUTION
1183	REF	2	LAST	692	06.3727	15716 0	HALFREV	
1184	REF	5	LAST	680	06.3730	02253 1	SETMGA	
1185				06.3731	43414 1	STORE	+MGA	
1186	REF	1		06.3732	02675 1	CLR	RVD	CLEAR MGLVFLAG TO INDICATE +MGA CALC
1191				06.3733	53575 0	GET.LVC	VLOAD	UNIT AND EXIT
1192	REF	6	LAST	689	06.3734	02323 1	RINIT	(PL 60) R (+29) IN MPAC, UNITIZE R
1193				06.3735	77676 0	VCOMP		U(-R)
1194				06.3736	00023 0	STORE	180	U(-R) TO 180
1195				06.3737	53435 0	VXV	UNIT	U(-R)*V EQ V*U(R), U(V*-R)
1196	REF	7	LAST	689	06.3740	02331 1	VINIT	
1197				06.3741	00015 0	STORE	120	U(V*R) TO 120
1198				06.3742	53435 0	VXV	UNIT	U(V*R)*U(-R), U((V*R)*(-R))
1199				06.3743	00023 0		180	
1200				06.3744	24007 0	STOVL	00	TRANSFORMATION MATRIX IS IN 60 (+1)
1201				06.3745	00001 0		00	DELTA V (+7) IN 60
1202				06.3746	76521 0	MXV	VSL1	CONVERT FROM INER COOR TO LV COOR (+1)
1203				06.3747	00007 0		AD	AND SCALE +7 IN MPAC
1204	REF	19	LAST	678	06.3750	03434 1	STORE	DELVLVC STORE IN DELVLVC (+7)
1205				06.3751	43414 1	SET	RVD	SET MGLVFLAG TO INDICATE LVC CALC
1206	REF	2	LAST	692	06.3752	02475 0	MGLVFLAG	AND EXIT
R1207							 END OF MIDDGIM ROUTINE

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Address	Operation	Count	Time	Value	Label	Comment
1208						
12082			10,2000		BANK	10
12084	REF	1	10,2000		SETLOC	SLCTMU
12086			10,2000		BANK	
12088	REF	1			COUNT*	11/MIDG
1209			10,2000	77160 0	SELECTMU	AXC,1 AXT,2
1210			10,2001	00002 0		20
1211			10,2002	00000 1		00
1212			10,2003	77614 1	BOFF	
1213	REF	4	10,2004	04343 1		C40CNFL6
1214	REF	1	10,2005	20011 0		SETMUER
1215			10,2006	77160 0	AXC,1	AXT,2
1216			10,2007	00012 1		100
1217			10,2010	00002 0		20
1218			10,2011	66143 1	SETMUER	DLOAD* SXA,1
1219	REF	2	10,2012	10011 0		MUTABLE +4,1
1220	REF	10	10,2013	02776 0		RTX1
1221	REF	4	10,2014	22317 1	STODL*	RTSK1/MU
1222	REF	3	10,2015	10003 0		MUTABLE -2,1
1223			10,2016	54214 1	BOFF	SR
1224	REF	5	10,2017	04343 1		C40CNFL6
1225	REF	1	10,2020	20022 0		RTRNMU
1226			10,2021	20607 1		60
1227	REF	4	10,2022	02321 0	RTRNMU	STORE RTMU
1228			10,2023	43134 0		SXA.2 CLEAR
1229	REF	8	10,2024	02777 1		RTX2
1230	REF	7	10,2025	01271 1		FINALFL6
1234			10,2026	77650 1	GOTO	
1235	REF	6	10,2027	73606 0		VN1645

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P1236 PERIAPD

R1237 MOD NO -1 LOG SECTION - P34-P35, P74-P75

R1238 MOD BY WHITE.P DATE 18JAN68

R1239 FUNCTIONAL DESCRIPTION

R1240 THIS SUBROUTINE COMPUTES THE TWO BODY APOCENTER AND PERICENTER
 R1241 ALTITUDES GIVEN THE POSITION AND VELOCITY VECTORS FOR A POINT ON
 R1242 THE TRAJECTORY AND THE PRIMARY BODY.

R1243 SETRAD IS CALLED TO DETERMINE THE RADIUS OF THE PRIMARY BODY.

R1244 APSIDES IS CALLED TO SOLVE FOR THE TWO BODY RADII OF APOCENTER AND
 R1245 PERICENTER AND THE ECCENTRICITY OF THE TRAJECTORY.

R1246 CALLING SEQUENCE

R1247 L CALL
 R1248 L+1 PERIAPD
 R1249 L+2 (RETURN - ALWAYS)

R1250 INPUT

R1251 (1) RVEC POSITION VECTOR IN METERS
 R1252 SCALE FACTOR - EARTH +29, MOON +27
 R1253 (2) VVEC VELOCITY VECTOR IN METERS/CENTISECOND
 R1254 SCALE FACTOR - EARTH +7, MOON +5
 R1255 (3) X1 PRIMARY BODY INDICATOR
 R1256 EARTH -2, MOON -10

R1257 OUTPUT

R1258 (1) 20 APOCENTER RADIUS IN METERS
 R1259 SCALE FACTOR - EARTH +29, MOON +27
 R1260 (2) 40 APOCENTER ALTITUDE IN METERS
 R1261 SCALE FACTOR - EARTH +29, MOON +27
 R1262 (3) 60 PERICENTER RADIUS IN METERS
 R1263 SCALE FACTOR - EARTH +29, MOON +27
 R1264 (4) 80 PERICENTER ALTITUDE IN METERS
 R1265 SCALE FACTOR - EARTH +29, MOON +27
 R1266 (5) ECC ECCENTRICITY OF CONIC TRAJECTORY
 R1267 SCALE FACTOR - +3
 R1268 (6) XXXALT RADIUS OF THE PRIMARY BODY IN METERS
 R1269 SCALE FACTOR - EARTH +29, MOON +27
 R1270 (7) PUSHLOC EQUALS 100

R1271 SUBROUTINES USED

R1272 SETRAD

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R1273 APSIDES

1274 REF 1 23,2000
1275 23,2314

SETLOC APDPERI
BANK

1276 REF 1

COUNT* 11/PERAP

1277 23,2314 00302 0 HPAD
1277 23,2315 17755 0

ZDFC 6373336 B-29 STANDARD RADIUS OF PAD 37-B.

R1278

= 20 909 901.57 FT

1279 23,2316 53754 1 PERIAPD LXA,2 VSR*

1280 REF 9 LAST 693 23,2317 02777 1 RTX2

1281 23,2320 57176 0 0.2

1282 REF 9 LAST 688 23,2321 26744 1 STOVL VVEC

1283 23,2322 53750 0 LXA,1 VSR*

1284 REF 11 LAST 693 23,2323 02776 0 RTX1

1285 23,2324 57176 0 0.2

1286 REF 7 LAST 662 23,2325 02655 0 STORE RVEC

1287 23,2326 45020 1 PERIAPD STQ CALL

1288 REF 16 LAST 690 23,2327 03463 0 NORHEX

1289 REF 1 23,2330 46344 0 SETRAD

1290 REF 2 LAST 142 23,2331 37671 0 STCALL XXXALT

1291 REF 1 23,2332 25674 0 APSIDES

1292 23,2333 41401 1 SETPD PUSH

1293 23,2334 00003 1 20

1294 23,2335 65225 1 DSU FDDI

1295 REF 3 LAST 695 23,2336 03671 1 XXXALT

1296 23,2337 00001 0 UP

1297 23,2340 45206 1 PUSH DSU

1298 REF 4 LAST 695 23,2341 03671 1 XXXALT

1299 23,2342 52006 0 PUSH GOTO

1300 REF 17 LAST 695 23,2343 03463 0 NORHEX

20 = APCENTER RADIUS -B29 DR B17

40 = APOGEE ALTITUDE -B29 DR B27

60 = PERICENTER RADIUS -B29 DR B27

80 = PERIGEE ALTITUDE -B29 DR B27

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P1301	SETRAD								
1302				23,2344	41545 0	SETRAD	DLOAD	PUSH	
1303	REF	1		23,2345	06315 0			PPAD	
1304				23,2346	63130 0		SXA+1	INCR+2	
1305	REF	10	LAST	23,2347	00047 1			XZ	
1306				23,2350	00002 0			20	
1307				23,2351	46135 1		SLOAD	BNIZ	
1308	REF	11	LAST	23,2352	00050 1			XZ	
1309	REF	1		23,2353	46357 1			SETRADIX	
1310				23,2354	51575 1		VLOAD	ABVAL	
1311	REF	3	LAST	23,2355	02023 1			FLS	
1312				23,2356	77725 1		PULL		
1313				23,2357	43545 1	SETRADIX	DLOAD	RVQ	

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P1314	PRECSET								
1315					23,2360	77620 0	PRELSET	STQ	
1316	REF	18	LAST	695	23,2361	03463 0			NORPEX
1317	REF	2	LAST	622	23,2362	37574 0		STCALL	TDEC2
1318	REF	5	LAST	652	23,2363	27057 0			LENPREC
1319					23,2364	77624 1		CALL	
1320	REF	1			23,2365	46376 1			LENSTORE
1321					23,2366	77745 1		DLOAD	
1322	REF	3	LAST	697	23,2367	03574 1			TDEC2
1323	REF	30	LAST	689	23,2370	34041 0		STCALL	TDEC1
1324	REF	3	LAST	207	23,2371	27043 0			CSMPREC
1325					23,2372	77624 1		CALL	
1326	REF	1			23,2373	46406 1			CSMSTORE
1327					23,2374	77650 1		GOTO	
1328	REF	19	LAST	697	23,2375	03463 0			NORMEX
1329					23,2376	43175 0	LEMSTORE	VLOAD	BOFF
1330	REF	16	LAST	677	23,2377	00001 0			RATT
1331	REF	3	LAST	629	23,2400	01352 1			AVFLAG
1332	REF	4	LAST	670	23,2401	46412 1			PASSIVE
1333	REF	20	LAST	677	23,2402	27536 1	ACTIVE	STOVL	PACT3
1334	REF	12	LAST	673	23,2403	00007 0			VATT
1335	REF	13	LAST	675	23,2404	03544 1		STORE	VACT3
1336					23,2405	77616 0		RVQ	
1337					23,2406	43175 0	CSMSTORE	VLOAD	BOFF
1338	REF	17	LAST	697	23,2407	00001 0			RATT
1339	REF	4	LAST	697	23,2410	01352 1			AVFLAG
1340	REF	4	LAST	670	23,2411	46402 0			ACTIVE
1341	REF	11	LAST	673	23,2412	27552 0	PASSIVE	STOVL	HPASS3
1342	REF	13	LAST	697	23,2413	00007 0			VATT
1343	REF	8	LAST	673	23,2414	03560 1		STORE	VPASS3
1344					23,2415	77616 0		RVQ	

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P1345	VECSHIFT						
1346				23,2416	55754 1	VECSHIFT LXA.2	VSR*
1347	REF 10 LAST 695			23,2417	02777 1		ATX.
1348				23,2420	57176 0		0.2
1349				23,2421	63350 1	LXA.1	PDVL
1350	REF 12 LAST 695			23,2422	02776 0		ATX1
1351				23,2423	63257 1	VSR*	PDVL
1352				23,2424	57176 0		0.2
1353				23,2425	77616 0	RVO	

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P1354	SHIFTR1						
1355		23,2426	53754 1	SHIFTR1	LXA,2	SL*	
1356	REF 11 LAST 698	23,2427	02777 1			PIX2	
1357		23,2430	57576 1			0.2	
1358		23,2431	77616 0		PVW		

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P1359 PROGRAM DESCRIPTION
 R1360 SUBROUTINE NAME R36 OUT-OF-PLANE RENDEZVOUS ROUTINE
 R1361 MOD NO. 0 DATE 22 DECEMBER 67
 R1362 MOD BY N.M. NEVILLE LOG SECTION EXTENDED VE-85
 R1363 FUNCTIONAL DESCRIPTION

R1364 TO DISPLAY AT ASTRONAUT REQUEST LOG CALCULATED RENDEZVOUS
 R1365 OUT-OF-PLANE PARAMETERS (Y, YDOT, PSI). (REQUESTED BY DSKY).

R1366 CALLING SEQUENCE

R1367 ASTRONAUT REQUEST THROUGH DSKY V 90 E

R1368 SUBROUTINES CALLED

R1369 EXDSPRET
 R1370 GUMARKE
 R1371 CSMPREC
 R1372 LEMPREC
 R1373 SGNAGREE
 R1374 LOADTIME

R1375 NORMAL EXIT MODES

R1376 ASTRONAUT REQUEST THROUGH DSKY TO TERMINATE PROGRAM V 34 E

R1377 ALARM OR ABORT EXIT MODES

R1378 NONE

R1379 OUTPUT

R1380 DECIMAL DISPLAY OF TIME, Y, YDOT AND PSI

R1381 DISPLAYED VALUES Y, YDOT, AND PSI ARE STORED IN ERASABLE
 R1382 REGISTERS RANGE, RRATE AND RTHETA RESPECTIVELY.

R1383 ERASABLE INITIALIZATION REQUIRED

R1384 CSM AND LEM STATE VECTORS

R1385 DEBRIS

R1386 CENTRALS A.Q.L

R1387 OTHER THOSE USED BY THE ABOVE LISTED SUBROUTINES

1308		20,2115	BANK 20
1389	REF 1	04,2000	SETLOG R36EH
1390		04,2656	BANK

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1391	REF	3	LAST	284	E4.1606		EBANK= RPASS36
1392	REF	1					LCOUNT= 317516
1393					04.2656	22 007 0	R36
1394	REF	128	LAST	650	04.2657	3 4755 1	
1395	REF	6	LAST	305	04.2660	53 052 0	
1396	REF	1			04.2661	3 3011 1	
1397	REF	169	LAST	683	04.2662	0 4616 1	
1398	REF	9	LAST	278	04.2663	20334 1	
1399	REF	36	LAST	609	04.2664	1 5472 1	
1400					04.2665	1 2667 0	
1401					04.2666	1 2661 0	
1402	REF	7	LAST	701	04.2667	53 052 0	
1403					04.2670	0 0006 1	
1404	REF	1			04.2671	1 3000 0	
1405	REF	282	LAST	686	04.2672	52 155 1	ASTRO TIME
1406	REF	82	LAST	681	04.2673	0 6037 0	
1407					04.2674	77634 0	
1408	REF	1			04.2675	21716 1	
1409	REF	31	LAST	697	04.2676	34041 0	R36INT
1410	REF	1			04.2677	27043 0	
1411					04.2700	63375 0	
1412	REF	14	LAST	697	04.2701	00007 0	
1413	REF	18	LAST	697	04.2702	00001 0	
1414	REF	4	LAST	701	04.2703	02207 0	
1415					04.2704	63256 0	
1416					04.2705	53435 0	
1417					04.2706	77626 0	
1418	REF	1			04.2707	61562 1	
1419	REF	9	LAST	657	04.2710	00015 0	
1420	REF	32	LAST	701	04.2711	34041 0	
1421	REF	1			04.2712	27057 0	
1422					04.2713	63375 0	
1423	REF	15	LAST	701	04.2714	00007 0	
1424	REF	19	LAST	701	04.2715	00001 0	
1425					04.2716	77725 1	
1426	REF	10	LAST	701	04.2717	00015 0	
1427					04.2720	24037 0	
1428					04.2721	41406 0	
1429					04.2722	63245 1	
1430	REF	5	LAST	701	04.2723	02207 0	
1431					04.2724	72441 0	
1432	REF	2	LAST	701	04.2725	02215 0	
1433	REF	9	LAST	317	04.2726	26201 0	
1434					04.2727	00001 0	
1435					04.2730	72441 0	
1436	REF	3	LAST	701	04.2731	02215 0	
1437	REF	5	LAST	317	04.2732	26203 1	
1438					04.2733	00007 0	

ZL			
CAF	7PR	SET TIME OF EVENT	ZERO FOR FIRST
DXCH	DSPTMX	DISPLAY	
CAF	VO6N16N		
TC	BANKCALL		
CAOP	COMARK		
TEF	EMEXT	TERMINATE	
TEF	+2	PROCEED	
TEF	-5	RECYCLE FOR ASTROHAUT INPUT TIME	
DXCH	DSPTMX		
EXTEND			
BZF	L-REG	A-REG ZERO GOT? CHECK L-REG FOR ZERO	
DXCH	EMEXT	A-REG NON-ZERO, TIME = ASTRO INPUT TIME	
TC	INTPRET		
RTB			
	OPRAME		
STCALL	TDECI		
	OTH-REL		
VLOAD	PDVL		
	VATT		
	RATT		
STORE	RPASS36		
UNIT	PDVL		
VXV	UNIT		
STADR			
STOVL	PDVL		
	TAT		
STCALL	TDECI		
	THISPREC		
VLOAD	PDVL		
	VATT	VELOCITY VECTOR	V
	RATT		A
PDDL			
	TAT	SAVE TIME IN LOCATION FOR F R REG PLAY	
STOVL	PDVL		
PUSH	PUSH	POSITION VECTOR	R IN 06D AND 12D
PVSU	PDVL		A
	RPASS36	LINE OF SIGHT VECTOR	R R 12D
UNIT	SLI		P A
	ORP36		
STOVL	PATGE	Y = U . R	
	GOO		A
UNIT	SLI		
	ORP36		
STOVL	RRATE	Y = U . V	
	GOO		A

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1439			04.2734	41456 0	UNIT	PUSH	U = UNIT(R)	180
1440			04.2735	47235 0	VXV	VXV	RA A	
1441			04.2736	00001 0		000		
1442			04.2737	00023 0		180	(U XV XU =U	
1443			04.2740	53552 0	VSL2	UNIT	RA A RA A	
144305			04.2741	77656 1	UNIT			
1444			04.2742	24001 0	STOVL	000	UNIT HORIZONTAL IN FORWARD DIR.	
1445			04.2743	00023 0		180		
1446			04.2744	74241 0	DOT	VXSC		
1447			04.2745	00015 0		120	U	
1448			04.2746	77752 1	VSL2		L	
1449			04.2747	53445 1	BVSU	UNIT		
144905			04.2750	77656 1	UNIT			
1450			04.2751	50206 0	PUSH	000	LOS PROJECTED INTO HORIZONTAL PLANE	120
1451			04.2752	00001 0		000		
1452			04.2753	65552 0	SL1	ARCCOS		
1453	REF	5	LAST	317	STOVL	ETHETA	PSI= ARCCOS(U .U)	
1454			04.2755	50235 0	VXV	000	A L	
1455			04.2756	00001 0		000		
1456			04.2757	71244 0	BPL	DLOAD		
1457	REF	1				R36TAG2		
1458	REF	2	LAST	57		100000		
1459			04.2762	77625 0	BSG			
1460	REF	6	LAST	702		ETHETA		
1461	REF	7	LAST	702		ETHETA		
1462			04.2765	47145 1	R36TAG2	DLOAD	ETH	
1463			04.2766	00037 0		000		
1464	REF	2	LAST	376		SGNAGREE		
1465	REF	8	LAST	701		DSPTMPX		
1466			04.2771	77776 1	STORE			
1467	REF	1			EXIT			
1468	REF	170	LAST	701	CAP	V06N90N	DISPLAY Y , YDOT , AND PSI	
1469	REF	10	LAST	701	TC	BARFCALL		
1470	REF	37	LAST	701	CADR	GOMARKF		
1471	REF	38	LAST	702	TCF	ENDEXT	TERMINATE	
1472	REF	2	LAST	284	TCF	ENDEXT	PROCEED , END OF PROGRAM	
1473	REF	93	LAST	678	TCF	R36 +2	REDISPLAY OUTPUT	
1474			04.3001	0 0006 1	LREGCHK	XCH	L	
1475	REF	1				EXTEND		
1476	REF	94	LAST	702	BZF	ENTTIME	L-REG ZERO .SET TIME = PRESENT TIME	
1477	REF	1			XCH	L	L-REG NON ZERO. TIME = ALTO INPUT TIME	
1478	REF	83	LAST	701	TCF	ASTRTIME		
1479			04.3006	52034 1	TC	INTPRET		
1480	REF	14	LAST	666	PTB	LOADTIME		
1481	REF	1				R36INT		
1482			04.3011	01420 0	V06N16N	VN	00616	
1483			04.3012	01532 1	V06N90N	VN	00690	

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REF	LAST	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE
P0001									
0002				40,3674		BANK	40		
0003	REF	1		40,2000		SETLOC	R31LOC		
0004				40,3674		BANK			
U0005	REF	1				COUNT*	84/R31		
0006	REF	9	LAST	260	40,3674	3 5015 0	R31CALL	CAF	PRID3
0007	REF	24	LAST	592	40,3675	0 5105 0		TC	FINDVAC
0008	REF	23	LAST	680	E7,1470			EBANK=	SUBEXIT
0009	REF	1			40,3676	03121 0		2CADR	V83CALL
0009	REF	1			40,3677	76067 1			
0010	REF	10	LAST	561	40,3700	0 5221 0	DSPDELAY	TC	FIXDELAY
0011					40,3701	00144 0		DEC	100
0012	REF	9	LAST	488	40,3702	3 1044 0		CA	EXTVBACT
0013	REF	25	LAST	597	40,3703	7 4740 1		MASK	BIT12
0014					40,3704	0 0006 1		EXTEND	
0015	REF	1			40,3705	1 3700 1		BZF	DSPDELAY
0016	REF	5	LAST	488	40,3706	3 5017 1		CAF	PRID5
0017	REF	14	LAST	605	40,3707	0 5072 1		TC	NOVAC
0018	REF	3	LAST	666	E7,1611			EBANK=	TSTRT
0019	REF	1			40,3710	03113 1		2CADR	DISPN5X
0019	REF	1			40,3711	76067 1			
0020	REF	30	LAST	605	40,3712	1 5261 0		TCF	TASKOVER
00202					37,3113			BANK	37
00204	REF	1			37,2000			SETLOC	R31
00206					37,3113			BANK	
00208	REF	1						COUNT*	84/R31
0021	REF	1			37,3113	3 3407 1	DISPN5X	CAF	V16N54
0022	REF	171	LAST	702	37,3114	0 4616 1		TC	BANKCALL
0023	REF	11	LAST	702	37,3115	20334 1		CADR	GOMARKE
0024	REF	6	LAST	489	37,3116	0 5563 1		TC	B5UFF
0025	REF	7	LAST	703	37,3117	0 5563 1		TC	B5UFF
0026	REF	2	LAST	703	37,3120	1 3113 0		TCF	DISPN5X
0027	REF	4	LAST	280	37,3121	4 0103 1	V83CALL	CS	FLAGWRD7
0028	REF	2	LAST	186	37,3122	7 4747 0		MASK	AVEGFBIT
0029					37,3123	0 0006 1		EXTEND	
0030	REF	1			37,3124	1 3377 0		BZF	HUNC?
0031	REF	7	LAST	539	37,3125	4 0104 0		CS	FLAGWRD8
0032	REF	6	LAST	539	37,3126	7 4744 0		MASK	SURFFBIT
0033					37,3127	0 0006 1		EXTEND	
0034	REF	1			37,3130	1 3403 1		BZF	OPEBASE
0035	REF	84	LAST	702	37,3131	0 6037 0		TC	INTERP
0036					37,3132	77634 0		RTB	

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0037	REF	15	LAST	702	37,3133	21573 0		LOADTIME	
0038	REF	33	LAST	701	37,3134	34041 0	STCALL	TDECI	
0039	REF	6	LAST	697	37,3135	27057 0		LEMPREC	PRECISION BASE VECTOR FOR LM
0040					37,3136	77775 1	VLOAD		
0041	REF	6	LAST	689	37,3137	00017 1		RATTI	
0042	REF	1			37,3140	26170 0	STOVL	BASETHP	
0043	REF	9	LAST	689	37,3141	00025 0		VATTI	
0044	REF	1			37,3142	16105 1	STOOL	BASETHV	
0045	REF	11	LAST	701	37,3143	00015 0		TAT	
0046	REF	1			37,3144	02114 1	DOCHBASE STORE	BASETIME	PRECISION BASE VECTOR FOR CM
0047	REF	34	LAST	704	37,3145	34041 0	STCALL	TDECI	
0048	REF	4	LAST	697	37,3146	27043 0		CSMPREC	
0049					37,3147	77775 1	VLOAD		
0050	REF	7	LAST	704	37,3150	00017 1		RATTI	
0051	REF	1			37,3151	26140 0	STOVL	BASETHP	
0052	REF	10	LAST	704	37,3152	00025 0		VATTI	
0053	REF	1			37,3153	02120 0	STORE	BASETHV	
0054					37,3154	77776 1	EXIT		
0055	REF	5	LAST	703	37,3155	4 0103 1	FFV83 CS	FLAGWRD7	
0056	REF	3	LAST	703	37,3156	7 4747 0	MASK	AVEGFBIT	
0057					37,3157	0 0006 1	EXTEND		
0058	REF	1			37,3160	1 3326 1	BZF	GETEVN	IF AVEGFLAG SET, USE RN,VN
0059	REF	8	LAST	703	37,3161	4 0104 0	CS	FLAGWRD8	
0060	REF	7	LAST	703	37,3162	7 4744 0	MASK	CURFEBIT	
0061					37,3163	0 0006 1	EXTEND		
0062	REF	1			37,3164	1 3370 1	BZF	R31SURF	IF ON SURFACE, USE LEMARK
0063	REF	85	LAST	703	37,3165	0 6037 0	TL	INTPRET	DO CONIC EXTRAPOLATION FOR BOTH VERTICES
0064					37,3166	77634 0	RTB		
0065	REF	16	LAST	704	37,3167	21573 0		LOADTIME	
0066	REF	35	LAST	704	37,3170	34041 0	STCALL	TDECI	
0067	REF	21	LAST	688	37,3171	27414 0		INTSTALL	
0068					37,3172	43175 0	VLOAD	CLEAR	
0069	REF	2	LAST	704	37,3173	02170 0		BASETHP	
0070	REF	7	LAST	689	37,3174	00263 0		MOONFLAG	
0071	REF	8	LAST	689	37,3175	25535 0	STOVI	KCV	
0072	REF	2	LAST	704	37,3176	02105 1		BASETHV	
0073	REF	7	LAST	689	37,3177	15543 1	STOOL	VCV	
0074	REF	2	LAST	704	37,3200	02114 1		BASETIME	
0075					37,3201	43014 0	BOF	SET	GET APPROPRIATE MOONFLAG SETTING
0076	REF	2	LAST	297	37,3202	04344 0		MOONTHIS	
0077					37,3203	77205 0		+2	
0078	REF	8	LAST	704	37,3204	00063 1		MOONFLAG	
0079					37,3205	77614 1	SET		
0080	REF	10	LAST	689	37,3206	01473 0		INTYPELG	CONIC EXTRAP.
0081	REF	8	LAST	689	37,3207	35517 1	STCALL	TET	
0082	REF	4	LAST	689	37,3210	27107 1		INTERGRVS	INTEGRATION --- AT LAST---
0083					37,3211	77775 1	OTHCONIC VLOAD		

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0084	REF	20	LAST	701	37,3212	00001 0		RATT	
0085	REF	7	LAST	339	37,3213	26207 0	STOVL	RONE	
0086	REF	16	LAST	701	37,3214	00007 0		VATT	
0087	REF	1			37,3215	36215 1	STCALL	VONE	GET SET FOR CONIC EXTRAP., OTHER.
0088	REF	22	LAST	704	37,3216	27414 0		INTSTALL	
0089					37,3217	71214 0	SET	DLOAD	
0090	REF	11	LAST	704	37,3220	01473 0		INTYPELG	
0091	REF	12	LAST	704	37,3221	00015 0		TAT	
0092	REF	36	LAST	704	37,3222	00041 1	OTHINT STORE	TDEC1	
0093					37,3223	43175 0	VLOAD	CLEAR	
0094	REF	2	LAST	704	37,3224	02140 0		BASEDTP	
0095	REF	9	LAST	704	37,3225	00263 0		MOONFLAG	
0096	REF	9	LAST	704	37,3226	25535 0	STOVL	RCV	
0097	REF	2	LAST	704	37,3227	02120 0		BASEDTP	
0098	REF	8	LAST	704	37,3230	15543 1	STOVL	VCV	
0099	REF	3	LAST	704	37,3231	02114 1		BASETIME	
0100					37,3232	43014 0	BOF	SET	
0101	REF	3	LAST	704	37,3233	04344 0		MOONTHIS	
0102					37,3234	77236 0		+2	
0103	REF	10	LAST	705	37,3235	00063 1		MOONFLAG	
0104	REF	9	LAST	704	37,3236	35517 1	STCALL	TET	
0105	REF	5	LAST	704	37,3237	27107 1		INTEGRVS	
0106					37,3240	52375 1	COMPDISP VLOAD	VSU	
0107	REF	21	LAST	705	37,3241	00001 0		RATT	
0108	REF	8	LAST	705	37,3242	02207 0		RONE	
0109					37,3243	65234 1	RTB	POOL	
0110	REF	2	LAST	585	37,3244	21724 0		NORMUNX1	UNIT(RANGE) TO PD 0-5
0111					37,3245	00045 0		-60	
0112					37,3246	77657 0	SL+		RESCALE AFTER NORMUNIT
0113					37,3247	20201 0		0.1	
0114	REF	10	LAST	701	37,3250	26201 0	STOVL	RANGE	SCALED-2(29)M
0115	REF	17	LAST	705	37,3251	00007 0		VATT	
0116					37,3252	50251 1	VSU	DUT	(VCM- VLM).UNIT(LOS). PD=0
0117	REF	2	LAST	705	37,3253	02215 0		VONE	
0118					37,3254	77752 1	SL1		SCALED-2(7)M/CS
0119	REF	6	LAST	701	37,3255	26203 1	STOVL	RRATE	
0120	REF	9	LAST	705	37,3256	02207 0		RONE	
0121					37,3257	63256 0	UNIT	PDVL	UNIT(R) TO PD 0-5
0122	REF	6	LAST	580	37,3260	06514 1		UNITZ	
0123					37,3261	77624 1	CALL		
0124	REF	1			37,3262	47661 0		CDJNBBSM	
0125					37,3263	41505 1	VXM	PUSH	UNIT (Z)/4 TO PD 6-11
0126	REF	17	LAST	692	37,3264	01734 0		REFSMAT	
0127					37,3265	72431 1	VPROJ	VSL2	UNIT(P)-UNIT(UZ)-(UZ)PROJ(UR)
0128					37,3266	00001 0		UD	
0129					37,3267	53445 1	BVSU	UNIT	
0130					37,3270	00007 0		6D	
0131					37,3271	47315 0	PDVL	VXV	UNIT(P) TO PD 12-17
0132					37,3272	00001 0		6D	UNIT(RL)
0133	REF	3	LAST	705	37,3273	02215 0		VONE	

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0134				37.3274	50255 0	VXV	DOT	(UR * VL) - UR * U(P)
0135				37.3275	00001 0		OD	
0136				37.3276	00015 0		12D	
0137				37.3277	77715 1	PDVL		SIGN TO 12-13, LOAD DIF
0138				37.3300	75241 1	DOT	SIGN	
0139				37.3301	00007 0		6D	
0140				37.3302	00015 0		12D	
0141				37.3303	65512 1	SL2	ACCS	AFCCDS(UP.UZ(SIGN))
0142	REF	8	LAST	702	37.3304	STOVL	RTHETA	
0143				37.3305	00001 0		0D	
0144				37.3306	51041 0	DOT	BPL	IF UR.UZ NEG,
0145				37.3307	00007 0		6D	RTHETA = 1 - RTHETA
0146				37.3310	77315 0		+5	
0147				37.3311	45345 1	DLOAD	DSU	
0148	REF	9	LAST	675	37.3312		DPPOSMAX	
0149	REF	9	LAST	706	37.3313		RTHETA	
0150	REF	10	LAST	706	37.3314	STORE	RTHETA	
0151				37.3315	77776 1	EXIT		
0152	REF	28	LAST	613	37.3316	CA	R175	
0153	REF	10	LAST	703	37.3317	MASK	EXTVBACT	
0154				37.3320	0 0006 1	EXTEND		IF ANSWERED,
0155	REF	39	LAST	702	37.3321	BZF	ENDERT	TERMINATE
0156	REF	11	LAST	706	37.3322	CS	EXTVBACT	
0157	REF	26	LAST	703	37.3323	MASK	R172	
0158	REF	12	LAST	706	37.3324	ADS	EXTVBACT	SET-BIT-12
0159	REF	1			37.3325	TCF	REVO4	AND START AGAIN.
0160	REF	3	LAST	534	37.3326	GETVNI	CA	PRI022
0161	REF	10	LAST	496	37.3327		TC	PRI0CHNG
0162	REF	86	LAST	704	37.3330		TC	INTPRET
0163				37.3331	40375 1	VLOAD	SETPD	
0164	REF	5	LAST	320	37.3332		RD	LM STATE VECTOR IN RN.VN
0165				37.3333	00001 0		0	
0166	REF	10	LAST	705	37.3334	STOVL	RONE	
0167	REF	5	LAST	320	37.3335		VS	
0168	REF	4	LAST	705	37.3336	STOVL	VONI	LOAD R(CSM).V(CSM) IN CASE MUNFLAG SET
0169	REF	2	LAST	598	37.3337		VICM4	(TO INSURE TIME COMPATABILITY)
0170				37.3340	65315 0	PDVL	PDDL	
0171	REF	2	LAST	598	37.3341		R(CSM)	
0172	REF	5	LAST	597	37.3342		PIPTIME	
0173				37.3343	77776 1	EXIT		
0174	REF	10	LAST	703	37.3344	CA	PRI03	
0175	REF	11	LAST	706	37.3345	TC	PRI0CHNG	
0176	REF	87	LAST	706	37.3346	TC	INTPRET	
0177				37.3347	77214 0	BOFF	VLOAD	
0178	REF	2	LAST	229	37.3350		MUNFLAG	
0179	REF	1			37.3351		GETVNI2	IF MUNFLAG RESET, DO ON DELTA PRECISION

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0180				37,3352	60505 1	VAM	VSR4	CHANGE TO REFERENCE SYSTEM AND REFSCALE
0181	REF	18	LAST	705	37,3353	01734 0	REFSHMAT	
0182				37,3354	77715 1	PDVL		R TO PD 0-5
0183				37,3355	76505 0	VAM	VSL1	
0184	REF	19	LAST	707	37,3356	01734 0	REFSHMAT	
0185				37,3357	40206 1	PUSH	SETPD	V TO PD 5-11
0186				37,3360	00001 0			
0187				37,3361	77650 1	GOTO		
0188	REF	1			37,3362	77240 1	COMPDISP	

0189				37,3363	77624 1	GETRVN2	CALL	
0190	REF	23	LAST	705	37,3364	27414 0		INTSTALL
0191				37,3365	52014 0	CLEAR	GOTO	
0192	REF	12	LAST	705	37,3366	01673 1		INTYPEFLG
0193	REF	1			37,3367	77222 0		INTHINT
0194	REF	88	LAST	706	37,3370	0 6037 0	R31SURF	TC
0195				37,3371	77634 0		RTB	INTPRET
0196	REF	17	LAST	704	37,3372	21573 0		LOADTIME
0197	REF	37	LAST	705	37,3373	34041 0	STCALL	IDECL
0198	REF	7	LAST	704	37,3374	27057 0		LEMPREC
0199				37,3375	77650 1	GOTO		LM IS ON SURFACE, 50 PRECISION
0200	REF	1			37,3376	77211 0		INTEGRATION USES PLANETARY IDENTIFICATION
0201	REF	2	LAST	186	37,3377	4 0102 0	MUNG?	CS
0202	REF	2	LAST	186	37,3400	7 4744 0		FLAGWRD6
0203				37,3401	0 0006 1		EXTEND	ORIENTATION SUBROUTINE
0204	REF	2	LAST	704	37,3402	1 3326 1	BZF	GETRVN
								IF MUNFLAG SET, CSM BASE NOT NEEDED
0205	REF	89	LAST	707	37,3403	0 6037 0	ONEBASE	TC
0206				37,3404	52034 1		RTB	INTPRET
0207	REF	18	LAST	707	37,3405	21573 0		GOTO
0208	REF	1			37,3406	77144 0		LOADTIME
								DECOMBASE
0209				37,3407	04056 0	V16M54	VN	1654

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P5000 1) PROGRAM NAME - TARGET DELTA V PROGRAM (P76).
 R5001 2) FUNCTIONAL DESCRIPTION - UPON ENTRY BY ASTRONAUT ACTION, P76 FLASHES DSKY REQUESTS FOR THE ASTRONAUT
 R5003 TO PROVIDE VIA DSKY (1) THE DELTA V TO BE APPLIED TO THE OTHER VEHICLE STATE VECTOR AND (2) THE
 R5005 TIME (TIG) AT WHICH THE OTHER VEHICLE VELOCITY WAS CHANGED BY EXECUTION OF A THROUSTING MANEUVER. THE
 R5007 OTHER VEHICLE STATE VECTOR IS INTEGRATED TO TIG AND UPDATED BY THE ADDITION OF DELTA V (DELTA V HAVING
 R5009 BEEN TRANSFORMED FROM LV TO REF COSYS). USING INTEGVS, THE PROGRAM THEN INTEGRATES THE OTHER
 R5011 VEHICLE STATE VECTOR TO THE STATE VECTOR OF THIS VEHICLE, THUS INSURING THAT THE W-MATRIX AND BOTH VEHICLE
 R5013 STATES CORRESPOND TO THE SAME TIME.
 R5014 3) ERASABLE-INITIALIZATION-REQUIRED - NONE.
 R5015 4) CALLING SEQUENCES AND EXIT MODES - CALLED BY ASTRONAUT REQUEST THRU DSKY V 37 E 76 E.
 R5017 EXITS BY TCF ENDOFJOB.
 R5018 5) OUTPUT - OTHER VEHICLE STATE VECTOR INTEGRATED TO TIG AND INCREMENTED BY DELTA V IN REF COSYS.
 R5020 THE PUSHLIST CONTAINS THE MATRIX BY WHICH THE INPUT DELTA V MUST BE POST-MULTIPLIED TO CONVERT FROM LV
 R5022 TO REF COSYS.
 R5023 6) DEBRIS - OTHER VEHICLE STATE VECTOR.
 R5024 7) SUBROUTINES CALLED - BANKCALL, GOXSPF, CSMPREC (OF LEAPREC), ATEPCH (OF ATPLC), INTTALL, INTWAKE, PHASCHN,
 R5026 INTPRET, INTEGVS, AND MINIRECT.

R5027 8) FLAG USE - MOONFLAG, CMOONFLAG, INTYPELG, RA5FLAG, AND MAPACTN.

5028					30,2061				BANK	50	
5029	REF	1			13,2000				SETLOC	P76LOC	
5030					13,2207				BANK		
5031	REF	1							COUNT*	33/P76	
5032	REF	19	LAST	675	E7,1441				FBANK	TIG	
5033	REF	39	LAST	681	13,2207	0 5504 0	P76		TC	MOFLAG	
5034	REF	6	LAST	629	13,2210	00031 0			ADRES	MOONFLAG	
50341	REF	90	LAST	707	13,2211	0 6037 0			TC	INTPRET	
50342					13,2212	77775 1			VLOAD		
50343	REF	20	LAST	692	13,2213	03434 1				DELVEV	
50344	REF	4	LAST	316	13,2214	02223 0			STORE	DELMOV	
50345					13,2215	77776 1			EXIT		
5035	REF	1			13,2216	3 2336 0			CAP	MOONB4	FLASH LAST DELTA V,
5040	REF	172	LAST	703	13,2217	0 4616 1			TC	BANKCALL	AND WAIT FOR KEYBOARD ACTION.
5041	REF	18	LAST	683	13,2220	20476 0			CAP	GOFLASH	
5042	REF	1			13,2221	1 2333 1			TCF	ENDP76	
5043					13,2222	0 2224 1			TC	+2	PROCEED
5044					13,2223	0 2216 0			TC	-5	STORE DATA AND REPEAT FLASHING
5045	REF	2	LAST	709	13,2224	3 2337 1			CAP	MOONB4 +1	FLASH VERR 06 HOUR 33, DISPLAY LAST VERR
5046	REF	173	LAST	709	13,2225	0 4616 1			TC	BANKCALL	AND WAIT FOR KEYBOARD ACTION.
5047	REF	19	LAST	709	13,2226	20476 0			CAP	GOFLASH	
5048	REF	2	LAST	709	13,2227	1 2333 1			TCF	ENDP76	
5049					13,2230	0 2232 0			TC	+2	
5050					13,2231	0 2224 1			TC	-5	
5051	REF	91	LAST	709	13,2232	0 6037 0			TC	INTPRET	RETURN TO INTERPRETIVE CODE

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5052				13.2233	77745 1	DLOAD		SET DIMPACI=TIG IN CSEC 828
5053	REF	20	LAST	709	13.2234	03442 0	TIG	
5054	REF	38	LAST	707	13.2235	34041 0	STCALL	TDECI
5055	REF	2	LAST	701	13.2236	27043 0		SET TDECI=TIG FOR ORBITAL INTEGRATION
5056				13.2237	53575 0	COMPHAT	VLOAD	UNIT
5057	REF	22	LAST	705	13.2240	00001 0		FATT
5058				13.2241	77676 0	VCOMP		U(-R)
5059				13.2242	00031 0	STORE	24D	U(-R) TO 24D
5060				13.2243	53435 0	VXV	UNIT	U(-R)XV = U(VXR)
5061	REF	18	LAST	705	13.2244	00007 0		
5062				13.2245	00023 0	STORE	18D	
5063				13.2246	53435 0	VXV	UNIT	U(VXR)XU(-R) = U((XV)XU(-R))
5064				13.2247	00031 0		24D	
5065				13.2250	24015 0	STOVL	12D	
5066	REF	5	LAST	709	13.2251	02223 0		DELVOV
5067				13.2252	76505 0	VXM	VSL1	VIMPACI=DELTA V IN REFCSYS
5068				13.2253	00015 0		12D	
5069				13.2254	77655 1	VAD		
5070	REF	19	LAST	710	13.2255	00007 0		VATT
5071				13.2256	00007 0	STORE	6	V(PD6)=VATT + DELTA V
5072				13.2257	77624 1	CALL		PREVENT WOULD-BE USER OF ORBITAL
5073	REF	24	LAST	707	13.2260	27414 0		INTSTALL
5074				13.2261	77624 1	CALL		INTEG FROM INTERFERING WITH OPERATING
5075	REF	1			13.2262	26340 1		P76SUB1
5076				13.2263	53775 1	VLOAD	VSR*	
5077				13.2264	00007 0		6	
5078				13.2265	57176 0		0.2	
5079	REF	9	LAST	705	13.2266	25543 1	STOVL	VCV
5080	REF	23	LAST	710	13.2267	00001 0		RATT
5081				13.2270	77657 0	VSR*		
5082				13.2271	57176 0		0.2	
5083	REF	10	LAST	705	13.2272	15535 0	STOVL	RCV
5084	REF	21	LAST	710	13.2273	03442 0		TIG
5085	REF	10	LAST	705	13.2274	01517 0	STORE	TET
5086				13.2275	71214 0	CLEAR	DLOAD	
5087	REF	13	LAST	707	13.2276	01673 1		INTYPFLG
5088	REF	1			13.2277	01643 1		TETTHIS
5089	REF	39	LAST	710	13.2300	34041 0	INTOTHIS	STCALL
5090	REF	6	LAST	705	13.2301	27107 1		TDECI
5091				13.2302	77624 1	CALL		INTEGRVS
5093	REF	25	LAST	710	13.2303	27414 0		INTTALL
5094				13.2304	77775 1	VLOAD		
5095	REF	8	LAST	704	13.2305	00017 1		RATT1
5096	REF	3	LAST	495	13.2306	01503 0	STORE	RRECT
5097	REF	11	LAST	710	13.2307	15535 0	STOVL	RCV
5098	REF	13	LAST	705	13.2310	00015 0		TAT
5099	REF	11	LAST	710	13.2311	25517 0	STOVL	TET
5100	REF	11	LAST	704	13.2312	00025 0		VATT1
5101				13.2313	77624 1	CALL		
5102	REF	2	LAST	495	13.2314	23455 1		RRECT

L P76

5103				13,2315	77776 1	EXIT	
5104	REF	28	LAST	681	13,2316 0 5353 1	TC	PHASCHNG
5105					13,2317 04024 0	OCT	04024
5106	REF	40	LAST	709	13,2320 0 5504 0	TC	UPFLAG
5107	REF	1			13,2321 00236 0	ADRES	REINTFLG
5109	REF	92	LAST	709	13,2322 0 6037 0	TC	INTERET
5110					13,2323 77624 1	CALL	
5111	REF	1			13,2324 26661 1		ATOPPTH
5116					13,2325 77531 0	SSP	EXIT
5117	REF	3	LAST	610	13,2326 00053 1		QPRET
5118	REF	1			13,2327 26332 1		OUT
5119	REF	174	LAST	709	13,2330 0 4616 1	TC	BANKCALL
5120	REF	1			13,2331 27445 1	CADR	INTWAKE1
5121					13,2332 77776 1	EXIT	
5125	REF	129	LAST	701	13,2333 3 4755 1	ENDP76	CAP
5126	REF	5	LAST	585	13,2334 55 462 1	TS	BANKCTP
5129	REF	18	LAST	683	13,2335 1 6001 1	TCF	GOTOPDUH
5130					13,2336 01524 0	VC6N84	NV
5131					13,2337 01441 1		NV
5132					13,2340 43174 1	P76SUB1	AXT,2
5133					13,2341 00002 0		2
5134	REF	11	LAST	705	13,2342 00063 1		MOONFLAG
5135					13,2343 77014 1	BON	AXT,2
5136	REF	6	LAST	693	13,2344 04303 0		CMOONFLG
5137	REF	4	LAST	711	13,2345 00052 0		QPRET
5138					13,2346 00000 1		0
5139					13,2347 43414 1	CLEAR	RVD
5140	REF	12	LAST	711	13,2350 00263 0		MOONFLAG

PERMIT USE OF ORBITAL INTEGRATION

CLEAR RR TRACKING MARK COUNTER

SET MEANS MOON IS SPHERE OF INFLUENCE.

SET MEANS PERM CM STATE IN LUNAR SPHERE.

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P0001 SUBROUTINE NAME: VB2CALL

R0002 MOD NO: -0

R0004 MOD BY: RR BAIRNSFATHER

R0006 MOD NO: 1 MOD BY: RR BAIRNSFATHER

R0008 MOD NO: 2 MOD BY ALONSO

R0010 MOD NO: 3 MOD BY ALONSO

R0012 NEW FUNCTIONAL DESCRIPTION: CALLED BY VERB 82 ENTER. PRIORITY 10

R0013 USED THROUGHOUT. CALCULATE AND DISPLAY ORBITAL PARAMETERS

DATE: 16-FEB-67

LOG-SECTION: R30

SR30.1 CHANGED TO ALLOW MONITOR TPER

VB82 PROGRAM REWRITTEN

PROG MOD TO HANDLE DIF EARTH/MOON SCALE

R0014 1. IF AVERAGE G IS OFF:

R0015 FLASH DISPLAY V04N06. R2 INDICATES WHICH SHIP'S STATE VECTOR IS

R0016 TO BE UPDATED. INITIAL CHOICE IS THIS SHIP (R2=1). ASTRONAUT

R0017 CAN CHANGE TO OTHER SHIP BY V22EXE, WHERE X NOT EQ 1.

R0018 SELECTED STATE VECTOR UPDATED BY THISPREC (OTHPREC).

R0019 CALLS SR30.1 (WHICH CALLS TFFCONMU + TFFRP/RA) TO CALCULATE

R0020 RPER (PERIGEE RADIUS), RAPO (APOGEE RADIUS), HPER (PERIGEE

R0021 HEIGHT ABOVE LAUNCH PAD OR LUNAR LANDING SITE), HAPO (APOGEE

R0022 HEIGHT AS ABOVE), TPER (TIME TO PERIGEE), TFF (TIME TO

R0023 INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).

R0024 FLASH MONITOR V16N44 (HAPO, HPER, TFF). TFF IS -59M59S IF IT WAS

R0025 NOT COMPUTABLE, OTHERWISE IT INCREMENTS ONCE PER SECOND.

R0026 ASTRONAUT HAS OPTION TO MONITOR TPER BY KEYING IN 0 32 8.

R0027 DISPLAY IS IN HMS. IS NEGATIVE (AS WAS TFF). AND INCREMENTS

R0028 ONCE PER SECOND ONLY IF TFF DISPLAY WAS -59M59S.

R0029 2. IF AVERAGE G IS ON:

R0030 CALLS SR30.1 APPROX EVERY TWO SECS. STATE VECTOR IS ALWAYS

R0031 FOR THIS VEHICLE. VB2 DOES NOT DISTURB STATE VECTOR. RESULTS

R0032 OF SR30.1 ARE RAPO, RPER, HAPO, HPER, TPER, TFF.

R0033 FLASH MONITOR V16N44 (HAPO, HPER, TFF).

R0036 ADDENDUM: HAPO AND HPER SHOULD BE CHANGED TO READ HAPOX AND HPERX IN THE

R0037 ABOVE REMARKS.

R0038 CALLING SEQUENCE: VERB 82 ENTER.

R0039 SUBROUTINES CALLED: SR30.1, GOXDSPF

R0040 MAYBE - THISPREC, OTHPREC, LOADTIME, DELRSPL

R0041 NORMAL EXIT MODES: TC ENDEXT

R0042 ALARMS: NONE

R0043 OUTPUT: HAPOX (-29) M

R0044 HPERX (-29) M

R0045 RAPO (-29) M EARTH

R0046 (-27) M MOON

R0047 RPER (-29) M EARTH

R0048 (-27) M MOON

R0049 TFF (-28) CS CONTAINS NEGATIVE QUANTITY

R0050 -TPER (-28) CS CONTAINS NEGATIVE QUANTITY

L R30

R0051

R0052 ERASABLE INITIALIZATION REQUIRED: STATE VECTOR.

R0053

DEBRIS: QPRET, RONE, VONE, TFF/RTMU, HPERMIN, RPADTEM, V8ZEMFLG.

R0054

MAYBE: TSIART82, V8ZFLAGS, TDEC1.

0055 REF 3 LAST 314 E4.1517

0056 31.2144

0057 REF 2 LAST 44 22.2000

0058 22.3242

0059 REF 2 LAST 44 TO 44: 4 4*

EBANK= HAPDX

BANK 31

SETLOC #50000

BANK

COUNT* 11/730

0060 REF 93 LAST 711 22.3242 0 6037 0 V8ZCALL TC INTERPRET

0061 22.3243 52014 0 BON GOTO

0062 REF 2 LAST 228 22.3244 03712 0 AVEGFLAG

0063 REF 1 22.3245 45465 1 V8ZGON IF AVERAGE G ON

0064 REF 1 22.3246 45247 1 V8ZGOFF IF AVERAGE G OFF

0065 22.3247 77776 1 V8ZGOFF EXIT ALLOW ASTRONAUT TO SELECT VEHICLE

0066 REF 37 LAST 563 22.3250 3 4752 0 CAF TFF DESIGNED FOR ORBITAL PARAMETERS

0067 REF 11 LAST 339 22.3251 55'051 0 TS OPTIONX CALCULATION AND DISPLAY.

0068 REF 81 LAST 695 22.3252 3 4753 1 CAF ONE

0069 REF 12 LAST 713 22.3253 55'052 0 TS OPTIONX +1

0070 REF 1 22.3254 3 3316 0 CAF OPTIONVN V-04-N-06

0071 REF 175 LAST 711 22.3255 0 4616 1 TC BANKCALL

0072 REF 8 LAST 608 22.3256 20334 1 CADR GDXSPF

0073 REF 40 LAST 706 22.3257 0 5472 0 TC ENDEXT TERMINATE

0074 22.3260 0 3262 1 TC +2 PROCEED

0075 22.3261 0 3254 1 TC -5 DATA IN. OPTIONI+1 = 1 FOR THIS VEHICLE.
UNEO 1 FOR OTHER VEHICLE.

A0076

0077 REF 28 LAST 604 22.3262 3 4750 1 CAF BIT4 80 MS

0078 REF 30 LAST 650 22.3263 0 5203 0 TC WAITLIST

0079 REF 3 LAST 314 E4.1540 EBANK= TFF

0080 REF 1 22.3264 03430 0 2CADR TICKTEST

0080 REF 1 22.3265 44064 0

0081 22.3266 0 0003 1 RELINT

0082 REF 1 22.3267 3 3320 0 V8ZGFLP CAF TFFBANK MAJOR RECYCLE LOOP ENTRY

0083 REF 20 LAST 678 22.3270 54 003 0 TS EBANK

0084 REF 130 LAST 711 22.3271 3 4755 1 CAF ZERO

0085 REF 2 LAST 115 22.3272 55'537 0 TS V8ZFLAGS ZERO FLAG FOR TICKTEST. INHIBITS
DECREMENTING OF TFF AND TPER.

A0086

0087 REF 6 LAST 292 22.3273 3 5021 1 CAF PRI07

0088 REF 25 LAST 703 22.3274 0 5105 0 TC FINDVAL V8ZGOFF1 WILL EXECUTE STATE VECTOR

0089 REF 4 LAST 712 E4.1540 EBANK= TFF UPDATE AND ORBIT CALCULATIONS FOR

0090 REF 1 22.3275 03321 1 2CADR V8ZGOFF1 SELECTED VEHICLE ABOUT PROPER BODY.

0090 REF 1 22.3276 44064 0

0091 22.3277 0 0003 1 RELINT

0092 REF 20 LAST 601 22.3300 3 6245 1 V8ZSTALI CAF THREE STALL IN THIS LOOP AND WITHOLD * 10 * 44

L	R30								USER'S PAGE NO.	
0093	REF 3	LAST	713	22,3301	7 1537 0		MASK	V62FLAGS		UNTIL STATE VECTOR UPDATE SETS ONE
0094	REF 216	LAST	678	22,3302	10 000 0		CCS	A		OUR FLAG BITS.
0095	REF 1			22,3303	0 3310 0		TC	FLAGGON		EXIT FROM STALL LOOP.
0096	REF 7	LAST	680	22,3304	3 4777 1		CAP	1 SEC		
0097	REF 176	LAST	713	22,3305	0 4616 1		TC	BANKCALL		
0098	REF 12	LAST	680	22,3306	01735 1		CADR	DELAYJOB		
0099	REF 1			22,3307	0 3300 1		TC	V62STALL		
0100	REF 1			22,3310	3 3317 1	FLAGGON	CAP	V16N44		MONITOR HARDWARE, TFF.
0101	REF 177	LAST	714	22,3311	0 4616 1		TC	BANKCALL		
0102	REF 9	LAST	713	22,3312	20334 1		CADR	GOXDSPP		
0103	REF 8	LAST	703	22,3313	0 5563 1		TC	B5OFF		TERM THIS TELLS TICKTEST TO KILL ITSELF
0104	REF 9	LAST	714	22,3314	0 5563 1		TC	B5OFF		PROCEED DITTO
0105	REF 1			22,3315	0 3267 1		TC	V62GOFLP		RECYCLE RECOMPUTE STATE VECT + DISPLAY
0106				22,3316	01014 0	OPTIONVN	VN	412		
0107				22,3317	04054 1	V16N44	VN	1644		
0108	REF 5	LAST	713	22,3320	02140 0	TFFBANK	ECADR	TFF		
0109	REF 94	LAST	713	22,3321	0 6037 0	V62GOFF1	TC	INTERP		
0110				22,3322	77634 0		RTB			
0111	REF 19	LAST	707	22,3323	21573 0			LOADTIME		
0112	REF 40	LAST	710	22,3324	00041 1		STORE	VDEC1		TIME FOR STATE VECTOR UPDATE.
0113	REF 3	LAST	339	22,3325	02205 1		STORE	TSTART62		TIME FOR INTERNAL USE.
0114				22,3326	77776 1		EXIT			
0115	REF 13	LAST	713	22,3327	4 1052 0		CS	OPTIONX +1		1 FOR THIS VEHICLE, NOT 1 FOR OTHER.
0116	REF 82	LAST	713	22,3330	6 4753 1		AD	ONE		
0117				22,3331	0 0006 1		EXTEND			
0118	REF 1			22,3332	1 3356 0		BZF	THISHIP		
0119	REF 95	LAST	714	22,3333	0 6037 0	OTHSHIP	TC	INTERP		
0120				22,3334	77624 1		CALL			CALL STATE VECTOR UPDATE FOR OTHER SHIP.
0121	REF 3	LAST	710	22,3335	27043 0			OTHEREC		
0122				22,3336	77775 1	OTHSHIP	VLOAD			MOVE RESULTS INTO TFFCONIC STORAGE AREA.
0123	REF 24	LAST	710	22,3337	00001 0			PATT		TO BE CALLED BY SR30.1.
0124	REF 11	LAST	706	22,3340	26207 0		STOVL	R0VF		PATT AT (-24)M FOR EARTH OR MOON.
0125	REF 20	LAST	710	22,3341	00007 0			VATT		
0126	REF 5	LAST	706	22,3342	02215 0		STORE	VONT		VATT AT (-7)M/CS FOR EARTH OR MOON.
0127				22,3343	77743 1		DLOAD*			
0128	REF 1			22,3344	73774 1			1/RTMUE,2		X2 IS 0 FOR EARTH CENTERED STATE VEC
0129	REF 1			22,3345	00037 0		STORE	TFF/RTM		X2 IS 2 FOR MOON
0130				22,3346	77743 1		DLOAD*			AS LEFT BY THISPREC OR OTHPREC.
0131	REF 1			22,3347	72411 0			RTNPERF,2		
0132	REF 2	LAST	115	22,3350	02201 0		STORE	HPERMIN		TFFRTM, HPERMIN AND RPADTOM ARE ALL
0133				22,3351	46135 1		SLOAD	BHIZ		EARTH/MOON-PARAMETERS AS SET-HERE.
0134	REF 12	LAST	696	22,3352	00050 1			X2		
0135	REF 1			22,3353	45367 1			EARTH PAD		
0136				22,3354	77650 1		GOTO			
0137	REF 1			22,3355	45373 1			MOON PAD		

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0138 REF 96 LAST 714 22,3356 0 6037 0 THISSHIP TC INTERP
 0139 22,3357 77624 1 CALL CALL STATE VECTOR UPDATE FOR THIS SHIP.
 0140 REF 2 LAST 701 22,3360 27057 0 THISPREC
 0141 22,3361 77650 1 GOTO
 0142 REF 1 22,3362 45336 0 BOTHSHIP

R0143 THE FOLLOWING CONSTANTS ARE PAIRWISE INDEXED. DO NOT SEPARATE PAIRS.

0146 22,3363 00001 0 MINPERH 2DEC 10668 E-27 35 KFT MIN PERIGEE HEIGHT FOR MOON (-71)
 0146 22,3364 11530 1
 0147 22,3365 00002 0 MINPERE 2DEC 91440 E-29 300 KFT (-29)M FOR EARTH
 0147 22,3366 31230 1

0148 22,3367 43145 0 EARTH PAD DLOAD CARGO PAD 37-B RADIUS. SCALED AT (-29)M.
 0149 REF 2 LAST 696 22,3370 06315 0 PRAD
 0150 REF 1 22,3371 03635 1 V82EPL6 INDICATE EARTH SCALING FOR SR30.1
 0151 REF 1 22,3372 45377 0 BOTHPAD

0152 22,3373 51575 1 MOONPAD VLOAD ABVAL COMPUTE MOON PAD RADIUS FROM REF VECTOR.
 0153 REF 4 LAST 696 22,3374 02023 1 RLS SCALED AT (-27)M.
 0154 22,3375 77614 1 SET

0155 REF 2 LAST 715 22,3376 03475 1 V82EPL6 INDICATE MOON SCALING FOR SR30.1

0156 REF 2 LAST 115 22,3377 36203 0 BOTHPAD STCALL RPADTEM
 0157 REF 1 22,3400 45551 1 SR30.1 CALCULATE ORBITAL PARAMETERS

0158 22,3401 45234 0 RTB DSU
 0159 REF 20 LAST 714 22,3402 21573 0 LOADTIME
 0160 REF 4 LAST 714 22,3403 02205 1 TSTART2 PRESENT TIME - TIME V82GUPF1 BEG
 0161 REF 5 LAST 715 22,3404 02205 1 STORE TSTART2 SAVE IT

0162 22,3405 53145 1 DLOAD BZE SR30.1 SETS -TPER=0 IF HPER L/
 0163 REF 2 LAST 306 22,3406 02143 0 -TPER HPERMIN (300 OR 35) KFT.
 0164 REF 1 22,3407 45420 0 TICKTFF (-TPER = 0)
 0165 22,3410 43345 1 TICKTPER DLOAD DAD (-TPER NON ZERO) TFF WAS NOT COMPUTED.
 0166 REF 3 LAST 715 22,3411 02143 0 -TPER NOT WAS SET TO 54659S. DONT TICK TFF. IF
 0167 REF 6 LAST 715 22,3412 02205 1 TSTART2 TICK -TPER. DISPLAY BOTH.
 0168 REF 4 LAST 715 22,3413 02143 0 STORE -TPER -TPER CORRECTED FOR TIME SINCE V82GUPF1
 0169 22,3414 77776 1 EXIT BEGAN.

0170 REF 34 LAST 612 22,3415 3 4753 1 CAF BIT1
 0171 REF 4 LAST 714 22,3416 55 537 0 TS V82FLAS INFORMS TICKTEST TO INCREMENT ONLY -TPER
 0172 REF 103 LAST 607 22,3417 0 5155 0 TC ENDOFJOB

0173 22,3420 43345 1 TICKTFF DLOAD DAD (-TPER=0) TFF WAS COMPUTED. TICK TFF.
 0174 REF 6 LAST 714 22,3421 02141 1 TFF DO NOT TICK -TPER. DISPLAY TFF, BUT NOT
 0175 REF 7 LAST 715 22,3422 02205 1 TSTART2 -TPER.
 0176 REF 7 LAST 715 22,3423 02141 1 STORE TFF TFF CORRECTED FOR TIME SINCE V82GUPF1
 0177 22,3424 77776 1 EXIT BEGAN.
 0178 REF 37 LAST 655 22,3425 3 4752 0 CAF BIT2
 0179 REF 5 LAST 715 22,3426 55 537 0 TS V82FLAS INFORMS TICKTEST TO INCREMENT ONLY TFF.
 0180 REF 104 LAST 715 22,3427 0 5155 0 TC ENDOFJOB

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0181	REF 29	LAST 706	22,3430	3 4747 1	TICKTEST	CAF	BIT5	THIS WAITLIST PROGRAM PERPETUATES ITSELF
0182	REF 13	LAST 706	22,3431	7 1044 1		MASK	EXTVBACT	ONCE A SEC UNTIL BIT 5 OF EXTVBACT = 0.
0183	REF 217	LAST 714	22,3432	10 000 0		CCS	"	
0184	REF 1		22,3433	0 3441 0		TC	DOTICK	
0185	REF 3	LAST 592	22,3434	3 7713 0		CAF	PRIG25	
0186	REF 15	LAST 703	22,3435	0 5072 1		TC	NOVAC	TERMINATE V-82.CANT CALL ENDEXT IN RPT.
0187	REF 14	LAST 716	1044			EBANK	EXTVBACT	
0188	REF 41	LAST 713	22,3436	05472 0		ZCADR	ENDEXT	
0188			22,3437	04062 1				
0189	REF 31	LAST 703	22,3440	0 5261 1		TC	TASKOVER	
0190	REF 8	LAST 714	22,3441	3 4777 1	DOTICK	CAF	1SEC	RE-REQUEST TICKTEST.
0191	REF 31	LAST 713	22,3442	0 5203 0		TC	WAITLIST	
0192	REF 8	LAST 715	64,1540			EBANK	TFF	
0193	REF 2	LAST 713	22,3443	03430 0		ZCADR	TICKTEST	
0193			22,3444	44064 0				
0194	REF 21	LAST 713	22,3445	3 6245 1		CAF	THREE	
0195	REF 6	LAST 715	22,3446	7 1537 0		MASK	V82FLAGS	
0196	REF 218	LAST 716	22,3447	50 000 1		INDEX	"	
0197			22,3450	0 3451 1		TC	+1	
0198	REF 32	LAST 716	22,3451	0 5261 1		TC	TASKOVER	IF NO FLAGBITS SET DONT CHANGE TFF OR
A0199								-TPER, BUT CONTINUE LOOP.
0200	REF 1		22,3452	0 3460 0		TC	TPERTICK	ONLY BIT 1 SET. INCR -TFF BY 1 SEC.
0201	REF 9	LAST 716	22,3453	3 4777 1	TFFTICK	CAF	1SEC	ONLY BIT 2 SET. INCR TFF BY 1 SEC.
0202	REF 95	LAST 702	22,3454	54 001 1		TS	1	
0203	REF 131	LAST 713	22,3455	3 4755 1		CAF	ZERO	
0204	REF 9	LAST 716	22,3456	21 541 1		DAS	TFF	
0205	REF 33	LAST 716	22,3457	0 5261 1		TC	TASKOVER	
0206	REF 10	LAST 716	22,3460	3 4777 1	TPERTICK	CAF	1SEC	
0207	REF 96	LAST 716	22,3461	54 001 1		TS	1	
0208	REF 132	LAST 716	22,3462	3 4755 1		CAF	ZERO	
0209	REF 5	LAST 715	22,3463	21 543 0		DAS	-TPER	
0210	REF 34	LAST 716	22,3464	0 5261 1		TC	TASKOVER	

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0211					22,3465	77776 1	V82GON	EXIT		AVERAGE G ON. USE CURRENT STATE VECTOR FOR ORBITAL PARAMETER CALCULATIONS.
A0212										LESS THAN LAMBERT
0213	REF	7	LAST	713	22,3466	3 5021 1		CAF	PRI07	V82GON1 WILL PERFORM ORBIT CALCULATIONS ABOUT PROPER BODY APPROX-ONCE PER SEC.
0214	REF	26	LAST	713	22,3467	0 5105 0		TC	FINVAL	
0215	REF	10	LAST	716	E4,1540			EBANK	TFF	
0216	REF	1			22,3470	03503 1		2CADR	V82GON1	
0216	REF	1			22,3471	44064 0				
0217					22,3472	0 0003 1		RELINT		
0218	REF	4	LAST	552	22,3473	10 067 1		CCS	NEWJOB	WITHOLD V16 444 UNTIL FIRST ORBIT CALC IS DONE. NOTE: V82GON1 (PRI07, FINOVAC JOB) IS COMPLETED BEFORE V82GON (PRI07, NOVAC JOB).
0219	REF	3	LAST	552	22,3474	0 5122 0		TC	CHANG1	MONITOR HARD, HPER, TFF
A0220										
A0221										
0222	REF	2	LAST	714	22,3475	3 3317 1	V82REDSP	CAF	V16444	
0223	REF	178	LAST	714	22,3476	0 4616 1		TC	BANKCALL	
0224	REF	10	LAST	714	22,3477	20334 1		CADR	GUXDSP	
0225	REF	10	LAST	714	22,3500	0 5563 1		TC	B5OFF	TEFF THIS TELLS V82GON1 TO KILL IT-ELF.
0226	REF	11	LAST	717	22,3501	0 5563 1		TC	B5OFF	PROC-DITTO.
0227	REF	1			22,3502	0 3475 1		TC	V82KEDSP	RECYCLE
0228	REF	97	LAST	715	22,3503	0 6037 0	V82GON1	TC	INTPRET	THIS EXEC PROGRAM PERPETUATES ITSELF ONCE-A-SEC UNTIL BIT-5 OF EXTVBACT=0.
A0229										
0230					22,3504	52175 0		VLOAD	GOTO	HOLDS OFF CCS NEWJOB BETWEEN RN-AND
0231	REF	6	LAST	706	22,3505	01221 1			RN	VN-FETCH-SD-RN. VN-ARE FROM SAME
0232	REF	1			22,3506	45507 1			NEXTLINE	STATE VECTOR UPDATE.
0233	REF	12	LAST	714	22,3507	26207 0	NEXTLINE	STOVL	RONE	RN-AT (-29)M-FOR-EARTH-OR-MOON
0234	REF	6	LAST	706	22,3510	01227 1			VN	
0235	REF	6	LAST	714	22,3511	02215 0		STORE	VONE	VN-AT (-7)M/CS-FOR-EARTH-OR-MOON
0236					22,3512	52014 0		BON	GOTO	
0237	REF	4	LAST	709	22,3513	04304 1			MOONTHIS	FLAG INDICATES BODY ABOUT WHICH ORBITAL
0238	REF	1			22,3514	45516 1			MOONGON	CALCULATIONS ARE TO BE PERFORMED.
0239	REF	1			22,3515	45527 0			EARTHGON	IF-SET-MOON, IF-RESET-EARTH.
0240					22,3516	71214 0	MOONGON	SET	DLOAD	
0241	REF	3	LAST	715	22,3517	03475 1			V82EMFLD	INDICATE MOON-SCALING-FOR-SR30.1
0242	REF	1			22,3520	04001 1			1/RTMU	LUNAR-PARAMETERS-LOADED-HERE-FOR-SR30.1
0243	REF	2	LAST	714	22,3521	14037 0		STOVL	TEFF/RTMU	
0244	REF	1			22,3522	05364 0			MINPERM	
0245	REF	3	LAST	714	22,3523	26201 0		STOVL	HPERMIN	
0246	REF	5	LAST	715	22,3524	02023 1			SL5	SCALED AT (-27)M.
0247					22,3525	52046 1		ARVAL	GOTO	
0248	REF	1			22,3526	45536 0			V82GON2	
0249					22,3527	71214 0	EARTHGON	CLEAR	DLOAD	
0250	REF	4	LAST	717	22,3530	03675 0			V82EMFLG	INDICATE EARTH-SCALING-FOR-SR30.1
0251	REF	2	LAST	714	22,3531	04003 0			1/RTMU	EARTH-PARAMETERS-LOADED-HERE-FOR-SR30.1
0252	REF	3	LAST	717	22,3532	14037 0		STOVL	TEFF/RTMU	
0253	REF	2	LAST	714	22,3533	05366 1			MINPERM	
0254	REF	4	LAST	717	22,3534	16201 0		STOVL	HPERMIN	
0255	REF	3	LAST	715	22,3535	06315 0			KPAD	
0256	REF	3	LAST	715	22,3536	36203 0	V82GON2	STCALL	KPADTEM	COMMON-CODE-FOR-EARTH-&-MOON.
0257	REF	2	LAST	715	22,3537	45551 1			SR30.1	

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0258					22,3540	77776 1		EXIT		
0259	REF	30	LAST	716	22,3541	3 4747 1	VB2GON3	CAF	BIT5	
0260	REF	15	LAST	716	22,3542	7 1044 1		MASK	EXTVBACT	SEE IF ASTRONAUT HAS SIGNALLED TERMINATE
0261					22,3543	0 0006 1		EXTEND		
0262	REF	42	LAST	716	22,3544	1 5472 1		BZF	ENDEXT	YES, TERMINATE VM 22 LOOP
0263	REF	11	LAST	716	22,3545	3 4777 1		CAF	ISEL	
0264	REF	179	LAST	717	22,3546	0 4616 1		TC	BANKCALL	WAIT ONE SECOND BEFORE REPEATING
0265	REF	13	LAST	714	22,3547	01735 1		CAOR	DELAYJOB	ORBITAL PARAMETER COMPUTATION.
0266	REF	2	LAST	717	22,3550	0 3503 1		TC	VB2GON1	
0267	REF	1			22,3541		SPLRET	=	VB2GON3	

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P0268 SUBROUTINE NAME: SR30.1

R0269 MOD NO: 0

R0271 MOD BY: RR BAIRNSFATHER

R0273 MOD NO: 1 MOD BY: RR BAIRNSFATHER

R0275 MOD NO: 2 MOD BY: RR BAIRNSFATHER

R0277 MOD NO: 3 MOD BY: ALONSO

R0279 MOD NO: 4 MOD BY: ALONSO

R0281 MOD NO: 5 MOD BY: RR BAIRNSFATHER

R0283

DATE: 16 FEB 67

LOG SECTION: R32

SR30.1 CHANGED TO ALLOW MONITOR OPER

ADD DVFL CK FOR HAPG

SUBROUTINE REWRITTEN

PRGM MOD TO HANDLE BIF EARTH/MOON SCALE

DVFL CK FOR HAPG & HPER. VOIDS MOD #2.

R0284 NEW FUNCTIONAL DESCRIPTION: ORBITAL PARAMETERS DISPLAY FOR MOONS 32 AND 44.

R0286 SR30.1 CALLS TFFCONMU AND TFFRP/RA TO CALCULATE RPER (PERIGEE RADIUS).

R0287 RAPO (APOGEE RADIUS). HPER (PERIGEE HEIGHT ABOVE LAUNCH PAD OR LUNAR

R0288 LANDING SITE). HAPO (APOGEE HEIGHT AS ABOVE). TPER (TIME TO PERIGEE).

R0289 TFF (TIME TO INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).

R0290 IF HPER IS GREATER THAN OR EQUAL TO HPERMIN, CALCULATES TPER AND STORES

R0291 NEGATIVE IN -TPER. OTHERWISE STORES +0 IN -TPER. WHENEVER TPER IS

R0292 CALCULATED, TFF IS NOT COMPUTABLE AND DEFAULTS TO -59MIN-59SEC. IF HAPO

R0293 WOULD EXCEED 9999.9 NM, IT IS LIMITED TO THAT VALUE FOR DISPLAY.

R0294 ADDENDUM: HAPO AND HPER SHOULD BE CHANGED TO READ HAPOX AND HPERX IN THE

R0295 ABOVE REMARKS.

R0296 CALLING SEQUENCE: CALL

R0297 SR30.1

R0298 SUBROUTINES CALLED: TFFCONMU, TFFRP/RA, CALCTPER, CALCTFF

R0299 NORMAL EXIT MODE: CALLING LINE +1 (STILL IN INTERPRETIVE MODE)

R0300 ALARMS: NONE

R0301 OUTPUT: RAPO (-29) M EARTH APOGEE RADIUS EARTH CENTERED COORD.

R0302 (-27) M MOON MOON-CENTERED COORD.

R0303 RPER (-29) M EARTH PERIGEE RADIUS EARTH CENTERED COORD.

R0304 (-27) M MOON MOON-CENTERED COORD.

R0305 HAPOX (-29) M APOGEE ALTITUDE ABOVE PAD OR LAND. SITE MAX VALUE LIMITED TO 9999.9 NM.

R0307 HPERX (-29) M PERIGEE ALT. ABOVE PAD OR LAND. SITE MAX VALUE LIMITED TO 9999.9 NM.

R0309 TFF (-28) CS TIME TO 300KFT OR 35KFT ALTITUDE

R0310 -TPER (-28) CS TIME TO PERIGEE

R0311 ERASABLE INITIALIZATION REQUIRED-

R0312 TFF/RTMU (+17) EARTH RECIPROCAL OF PROPER GRAY CONSTANT FOR

R0313 (+14) MOON EARTH OR MOON = 1/SQRT(MU).

R0314 RONE (-29) M STATE VECTOR

R0315 VONE (-7) M/CS STATE VECTOR

R0316 RPADTEM (-29) M EARTH RADIUS OF LAUNCH PAD OR LUNAR LANDING

R0317 (-27) M MOON SITE.

R0318 HPERMIN (-29) M EARTH (300 OR 35)KFT MINIMUM PERIGEE ALTITUDE

R0319 (-27) M MOON ABOVE LAUNCH PAD OR LUNAR LANDING SITE.

R0320 VBZEMFLG (INT SW BIT) RESET FOR EARTH, SET FOR MOON.

R0321 DEBRIS: QPRET, PDL, S2

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0322	REF	1				COUNT*	\$/SR305	
0323				22,3551	44001 0	SE30.1	SETPD	STQ
0324				22,3552	00001 0			
0325	REF	7	LAST	610	22,3553	00051 0		S2
A0326								
A0327								
A0328								
A0329								
A0330								
A0331								
A0332								
A0333								
A0334								
A0335								
0336				22,3554	77214 0		BOFF	VLOAD
0337	REF	5	LAST	717	22,3555	03755 0		V82EHFLG
0338	REF	1			22,3556	45565 0		TFFCALLS
0339	REF	13	LAST	717	22,3557	02207 0		RONE
0340				22,3560	77752 1		VSL2	
0341	REF	14	LAST	720	22,3561	26207 0		STOVL
0342	REF	7	LAST	717	22,3562	02215 0		VONE
0343				22,3563	77752 1		VSL2	
0344	REF	8	LAST	720	22,3564	02215 0		STORE
0345				22,3565	77624 1		TFFCALLS	CALL
0346	REF	1			22,3566	57361 1		TFFCONMU
0347				22,3567	77624 1		CALL	
0348	REF	1			22,3570	57427 1		TFFRP/RA
A0349								
0350				22,3571	77625 0		DSU	
0351	REF	4	LAST	717	22,3572	02203 1		PRADTER
0352				22,3573	64414 1		BOFF	SR2R
A0353								
A0354								
0355	REF	6	LAST	720	22,3574	03755 0		V82EHFLG
0356				22,3575	45576 1			+1
0357				22,3576	77624 1		CALL	
0358	REF	5	LAST	653	22,3577	45636 0		MAXCHK
0359	REF	4	LAST	713	22,3600	16120 0	STORHAPD	STOVL
0360	REF	1			22,3601	00017 1		RPER
0361				22,3602	77625 0		DSU	
0362	REF	5	LAST	720	22,3603	02203 1		PRADTER
0363	REF	283	LAST	701	22,3604	00161 1	STORE	RPER +4
0364				22,3605	64414 1		BOFF	SR2R
A0365								
A0366								
0367	REF	7	LAST	720	22,3606	03755 0		V82EHFLG
0368				22,3607	45610 1			+1
0369				22,3610	77624 1		CALL	
0370	REF	6	LAST	720	22,3611	45636 0		MAXCHK

INITIALIZE PUSHDOWN LIST.

SR30.1 INPUT: RONE AT (-29)M EARTH/MOON
VONE AT (-7)M/CSTFFCONMU, TFFRP/RA, CALCTPER AND CALCTFF
CALLS REQUIRE:

EARTH CENTERED (NO RESCALING REQUIRED)

RONE SCALED TO B-29 M

VONE SCALED TO B-7 M/CS

MOON CENTERED (RESCALING REQUIRED)

RONE SCALED TO B-27 M

VONE SCALED TO B-5 M/CS

OFF FOR EARTH, ON FOR MOON.

TFFRP/RA COMPUTES RAPD, RPER.

RETURNS WITH RAPD IN DIMPAC).

NEED HAPD AT (-29)M FOR DISPLAY.

IF MOON CENTERED, RESCALE FROM (-7)M.

IF EARTH CENTERED ALREADY AT (-29)M.

OFF FOR EARTH, ON FOR MOON.

IF HAPD > MAXNM, SET HAPD = 9999.9 NM.

OTHERWISE STORE (RAPD-PRADTER) IN HAPD.

GIVES HPER AT (-29)M EARTH, (-7)M MOON.

SAVE THIS FOR COMPARISON TO HPERM.

NEED HPER AT (-29)M FOR DISPLAY.

IF MOON CENTERED, RESCALE FROM (-27)M.

IF EARTH CENTERED ALREADY AT (-29)M.

OFF FOR EARTH, ON FOR MOON.

IF HPER > MAXNM, SET HPER = 9999.9 NM.

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0371	REF	2	LAST	314	22,3612	16122	1	STORHPER	STODI	HPERX	STORE (RPER - RPADTEM) INTO HPERX.
0372	REF	284	LAST	720	22,3613	00161	1			MPAC +4	
0373					22,3614	51025	1		DSU	BPL	HPERMIN AT (-29)M FOR EARTH, (-27)M MOON.
0374	REF	5	LAST	717	22,3615	02201	0			HPERMIN	IF HPER L/ HPERMIN (30) OF 45)FT.
0375	REF	1			22,3616	45622	0			DOTPER	THEN ZERO INTO -TPER.
0376					22,3617	52145	0		LLUAD	GGIO	OTHERWISE CALCULATE TPER.
0377	REF	4	LAST	593	22,3620	06522	1			HI6ZEROS	
0378	REF	1			22,3621	45626	1			SKIPTPER	
0379					22,3622	45145	0	DOTPER	DLOAD	CALL	
0380	REF	2	LAST	720	22,3623	00017	1			RPER	
0381	REF	1			22,3624	57465	1			CALCTPER	
0382					22,3625	77676	0		DCOMP		TPER IS PUT NEG INTO -TPER.
0383	REF	6	LAST	716	22,3626	16143	0	SKIPTPER	STODI	-TPER	
0384	REF	6	LAST	721	22,3627	02201	0			HPERMIN	HPERMIN AT (-29)M FOR EARTH, (-27)M MOON
0385					22,3630	45015	1		DAD	CALL	
0386	REF	6	LAST	720	22,3631	02205	1			RPADTEM	RPADTEM AT (-29)M FOR EARTH, (-27)M MOON
0387	REF	1			22,3632	57470	0			CALCTFF	GIVES -59M59S FOR TFF IF RPER 6/
0388					22,3633	77676	0		DCOMP		HPERMIN + RPADTEM. (TPER WAS NON ZERO)
0389	REF	11	LAST	717	22,3634	36141	0		STCALL	TFF	OTHERWISE COMPUTES TFF. (GGIO)
0390	REF	8	LAST	720	22,3635	00051	0			S2	
0391					22,3636	51025	1	MAXCHR	DSU	BPL	IF C(MPAC) > 9999.9 NM. MPAC = 9999.9 NM
0392	REF	1			22,3637	05646	0			MAXIN	
0393					22,3640	45643	1			+3	OTHERWISE C(MPAC) = B(MPAC).
0394					22,3641	43415	0		DAD	RVD	
0395	REF	2	LAST	721	22,3642	05646	0			MAXIN	
0396					22,3643	43545	1	+3	LLUAD	RVD	(USED BY P30 - P37 ALSO)
0397	REF	3	LAST	721	22,3644	05646	0			MAXIN	
0398					22,3645	01065	0	MAXNM	ZOOT	01065 05603	
0398					22,3646	05603	1				

GAP: ASSEMBLE REVISION 001 OF AGC PROGRAM LMY99 BY NASA 2021112-061

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R0001 STABLE ORBIT RENDEZVOUS PROGRAMS (P38 AND P78)

R0002 MOD NO -1 LOG SECTION - STABLE ORBIT - P38-P39

R0003 MOD BY RUDNICKI.S DATE 25JAN68

R0004 FUNCTIONAL DESCRIPTION

R0005 P38 AND P78 CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL
R0006 CONDITIONS REQUIRED BY THE AGC TO (1) PUT THE ACTIVE VEHICLE
R0007 ON A TRANSFER TRAJECTORY THAT INTERCEPTS THE PASSIVE VEHICLE
R0008 ORBIT A GIVEN DISTANCE, DELTA R, EITHER AHEAD OF OR BEHIND THE
R0009 PASSIVE VEHICLE AND (2) ACTUALLY PLACE THE ACTIVE VEHICLE IN THE
R0010 PASSIVE VEHICLE ORBIT WITH A DELTA P SEPARATION BETWEEN THE TWO
R0011 VEHICLES

R0012 CALLING SEQUENCE

R0013 ASTRONAUT REQUEST THRU DSKY

R0014 V37E38E IF THIS VEHICLE IS ACTIVE VEHICLE

R0015 V37E78E IF OTHER VEHICLE IS ACTIVE VEHICLE

R0016 INPUT

R0017 (1) SOI MANEUVER

R0018 (A) TIG TIME OF SOI MANEUVER
R0019 (B) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE
R0020 DURING TRANSFER FROM TIG TO TIME OF INTERCEPT
R0021 (C) DELTAR THE DESIRED SEPARATION OF THE TWO VEHICLES
R0022 SPECIFIED AS A DISTANCE ALONG THE PASSIVE VEHICLE
R0023 ORBIT
R0024 (D) OPTION EQUALS 1 FOR SOI

R0025 (2) SOR MANEUVER

R0026 (A) TIG TIME OF SOR MANEUVER
R0027 (B) CENTANG AN OPTIONAL RESPECIFICATION OF 1 (B) ABOVE
R0028 (C) OPTION EQUALS 2 FOR SOR
R0029 (D) DELTTIME THE TIME REQUIRED TO TRAVERSE DELTA R WHEN
R0030 TRAVELING AT A VELOCITY EQUAL TO THE HORIZONTAL
R0031 VELOCITY OF THE PASSIVE VEHICLE - SAVED FROM
R0032 SOI PHASE
R0033 (E) TINT TIME OF INTERCEPT (SOI) - SAVED FROM SOI PHASE

R0034 OUTPUT

R0035 (1) TRKMKONT NUMBER OF MARKS
R0036 (2) TTGO TIME TO GO
R0037 (3) +MGA MIDDLE GIMBAL ANGLE

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R0038 (4) DSPTM1 TIME OF INTERCEPT OF PASSIVE VEHICLE ORBIT
 R0039 (FOR SOI ONLY)
 R0040 (5) POSTTPI PERIGEE ALTITUDE OF ACTIVE VEHICLE ORBIT AFTER
 R0041 THE SOI (SOR) MANEUVER
 R0042 (6) DELVTPI MAGNITUDE OF DELTA V AT SOI (SOR) TIME
 R0043 (7) DELVTPF MAGNITUDE OF DELTA V AT INTERCEPT TIME
 R0044 (8) DELVLVC DELTA VELOCITY AT SOI (AND SOR) - LOCAL VERTICAL
 R0045 COORDINATES

R0046 SUBROUTINES USED

R0047 AVFLAGA
 R0048 AVFLAGP
 R0049 VNDSPLY
 R0050 BANKCALL
 R00502 GUFLASHR
 R00504 GOTOPDOH
 R00506 BLANKET
 R00508 ENDOFJOB
 R0051 PREC/TT
 R0052 SELECTHU
 R0053 INTRPVP
 R0054 MAINRTNE

0055 04,3013
 0056 REF 1 34,2000
 0057 34,3271

BANK 04
 SETLOC STBLEORB
 BANK

0058 REF 24 LAST 703 07,1470
 0059 REF 1

EBANK= SUBEXIT
 COUNT* 31/P+879

0060 REF 180 LAST 718 34,3271 0 4616 1 P38
 0061 REF 5 LAST 666 34,3272 72347-1
 0062 34,3273 0 3276 1
 0063 REF 181 LAST 724 34,3274 0 4616 1 P78
 0064 REF 5 LAST 666 34,3275 72354 0
 00645 REF 182 LAST 724 34,3276 0 4616 1
 00646 REF 6 LAST 666 34,3277 72361 0
 00648 REF 1 34,3300 3 3641 1
 00649 REF 8 LAST 673 34,3301 55 466 0
 0065 REF 1 34,3302 3 3632 0
 0066 REF 1 34,3303 0 3621 1
 0067 REF 1 34,3304 3 3633 1
 0068 REF 183 LAST 724 34,3305 0 4616 1
 0069 REF 1 34,3306 20635 0
 00694 REF 19 LAST 711 34,3307 1 6001 1
 00696 34,3310 1 3315 1
 00698 34,3311 1 3304 1
 0070 REF 22 LAST 716 34,3312 3 6245 1
 00702 REF 9 LAST 489 34,3313 0 5464 1

TC BANKCALL
 CADR AVFLAGA THIS VEHICLE ACTIVE
 TC +3
 TC BANKCALL
 CADR AVFLAGP OTHER VEHICLE ACTIVE
 TC BANKCALL
 CADR P20FLODN SET UPDATEFLG, TRACKFLG
 CAF DECTWO
 TS NH
 CAF V06433SF DISPLAY TIG
 TC VNDSPLY
 CAF V06455SF DISPLAY CENTANG
 TCR BANKCALL
 CADR GUFLASHR
 TCF GOTOPDOH TERMINATE
 TCF +5 PROCEED
 TCF -5 RECYCLE
 CAF THREE IMMEDIATE RETURN - BLANK 61, 62
 TCR BLANKET

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00704	REF 105	LAST 715	34,3314	1 5155 1	TCF	ENDOFJOB	
0071	REF 15	LAST 678	34,3315	3 4756 1	CAF	FIVE	
0072	REF 2	LAST 305	34,3316	55 144 0	TS	OPTION1	
0073	REF 83	LAST 714	34,3317	3 4753 1	CAF	ONE	
0074	REF 6	LAST 656	34,3320	55 145 1	TS	OPTION2	OPTION CODE IS SET TO 1
00742	REF 1		34,3321	3 3634 0	CAF	V04N06SR	DISPLAY OPTION CODE - 1 = SOI, 2 = SOR
00744	REF 184	LAST 724	34,3322	0 4616 1	TCR	BANKCALL	
00746	REF 2	LAST 724	34,3323	20635 0	CADR	GUFASHR	
00748	REF 20	LAST 724	34,3324	1 6001 1	TCF	GOTOPDOH	TERMINATE
0075			34,3325	1 3332 1	TCF	+5	PROCEED
00752			34,3326	1 3321 0	TCF	-5	RECYCLE
0076	REF 30	LAST 613	34,3327	3 4751 0	CAF	BIT3	IMMEDIATE RETURN - BLANK R3
0077	REF 10	LAST 724	34,3330	0 5464 1	TCR	BLANKET	
0078	REF 106	LAST 725	34,3331	1 5155 1	TCF	ENDOFJOB	
0079	REF 98	LAST 717	34,3332	0 6037 0	TC	INTERPRET	
0080			34,3333	70535 0	SLOAD	SR1	
0081	REF 7	LAST 725	34,3334	01146 0		OPTION2	
0082			34,3335	71230 0	BH12	GLOAD	
0083	REF 1		34,3336	71344 1		OPTN1	
0084	REF 1		34,3337	03631 0		TINT	
0085	REF 1		34,3340	02303 0	STORE	TINTSOI	STORE FOR SOR PHASE
0086			34,3341	77614 1	CLRGD		
0087	REF 1		34,3342	01230 1		OPTNSW	OPTNSW: ON = SOI, OFF = SOR
0088	REF 1		34,3343	71375 0		JUNCTN1	
0089			34,3344	43014 0	OPTN1 SET	CLEAR	SOI
0090	REF 2	LAST 725	34,3345	01070 1		OPTNSW	
00901	REF 12	LAST 681	34,3346	00670 0		UPDATFLG	
00902			34,3347	77624 1	CALL		
0091	REF 1		34,3350	71554 0		PREC/TT	
0092			34,3351	43015 1	DAD	SET	
0093	REF 22	LAST 710	34,3352	03442 0		TIG	
00931	REF 13	LAST 725	34,3353	00470 1		UPDATFLG	
0094	REF 2	LAST 725	34,3354	03631 0	STORE	TINT	TI = TIG + TF
0096			34,3355	77776 1	EXIT		
00962	REF 1		34,3356	3 3635 1	CAF	V06N57SR	DISPLAY DELTA R
00964	REF 185	LAST 725	34,3357	0 4616 1	TCR	BANKCALL	
00966	REF 3	LAST 725	34,3360	20635 0	CADR	GUFASHR	
00968	REF 21	LAST 725	34,3361	1 6001 1	TCF	GOTOPDOH	TERMINATE
0097			34,3362	1 3367 1	TCF	+5	PROCEED
00972			34,3363	1 3356 0	TCF	-5	RECYCLE
0098	REF 15	LAST 592	34,3364	3 6242 0	CAF	SIX	IMMEDIATE RETURN - BLANK R2, R3
0099	REF 11	LAST 725	34,3365	0 5464 1	TCR	BLANKET	
0100	REF 107	LAST 725	34,3366	1 5155 1	TCF	ENDOFJOB	
01001			34,3367	0 0006 1	EXTEND		
01002	REF 3	LAST 725	34,3370	3 1631 1	DCA	TINT	
01003	REF 25	LAST 657	34,3371	53 046 0	DXCH	DSPTFM1	FOR DISPLAY
0101	REF 1		34,3372	3 3636 1	CAF	V06N34SR	DISPLAY TIME OF INTERCEPT
0102	REF 2	LAST 724	34,3373	0 3621 1	TC	VNDSPLY	
0103	REF 99	LAST 725	34,3374	0 6037 0	TC	INTERPRET	
0104			34,3375	45014 0	JUNCTN1 CLEAR	CALL	

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0105	REF	1		34,3376	04266 1		P39/79SW	
0106	REF	5	LAST	666	34,3377	20000 0	SELECTED	SELECT RU, CLEAR FINALFLO, GO TO VN 645
0107				34,3400	77624 1	RECYCLE	CALL	
0108	REF	2	LAST	725	34,3401	71554 0		PREC/TT
0109				34,3402	71214 0		BOFF	DLOAD
0110	REF	3	LAST	725	34,3403	01350 0		OPTNSW
0111	REF	1		34,3404	71424 0			OPTN2
0112	REF	4	LAST	725	34,3405	03631 0		TINT
0113	REF	41	LAST	714	34,3406	34041 0	STCALL	IDECL
0114	REF	1		34,3407	71605 1			INTRPVP
0115				34,3410	53575 0		VLOAD	UNIT
0116	REF	25	LAST	714	34,3411	00001 0		FATT
0117				34,3412	47315 0		PDVL	VXV
0118	REF	21	LAST	714	34,3413	00007 0		VATT
0119				34,3414	60246 1		ABVAL	NORM
0120	REF	15	LAST	688	34,3415	00047 1		XI
0121				34,3416	56325 0		FOOL	DDV
0122	REF	5	LAST	315	34,3417	02303 0		DELTAR
0123				34,3420	77657 0		SL*	DELTA R / (VP X RP/VP)
0124				34,3421	20172 1			0 - 7.1
0125	REF	2	LAST	117	34,3422	36305 1	STCALL	DELTTIME
0126	REF	1		34,3423	71430 0			JUNCTN2
0127				34,3424	43345 1	OPTN2	DLOAD	DAD
0128	REF	2	LAST	725	34,3425	02303 0		TINTSUI
0129	REF	3	LAST	663	34,3426	00037 0		T
0130	REF	5	LAST	726	34,3427	03631 0	STORE	TINT
0131				34,3430	45345 1	JUNCTN2	DLOAD	OSU
0132	REF	6	LAST	726	34,3431	03631 0		TINT
0133	REF	3	LAST	726	34,3432	02305 0		DELTTIME
0134	REF	1		34,3433	02307 1		STOPE	TARGETIME
0135	.... MAINRTNE							
0136	SUBROUTINES USED							
0137	S3435.25							
0138	PERIAPDI							
0139	SHIFTRI							
0140	VNDSPY							
0141	BANKCALL							
0142	GOFLASH							
0143	GOTOPDOH							
0145	VN1645							
0146	REF	42	LAST	726	34,3434	34041 0	MAINRTNE	STCALL
0147	REF	2	LAST	726	34,3435	71605 1		IDECL
0148				34,3436	77745 1		DLOAD	INTRPVP
0149	REF	23	LAST	725	34,3437	03442 0		TIG
0150	REF	6	LAST	689	34,3440	03610 0	STORE	INTIME
0151				34,3441	77331 0		SSP	VLOAD
0152	REF	25	LAST	724	34,3442	03471 0		SUBEXIT
0153	REF	1		34,3443	71447 0			TEST3979

L STABLE ORBIT - P38-P39

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0154	REF	26	LAST	726	34,3444	00001 0		RATT	
0155					34,3445	77624 1	CALL		
0156	REF	1			34,3446	73327 0		S3435.25	
0157					34,3447	43014 0	TEST3979	BUFF	BON
0158	REF	2	LAST	726	34,3450	04346 1		P39/79SW	
0159	REF	1			34,3451	71460 0		MAINRTN1	
0160	REF	8	LAST	693	34,3452	01311 0		FINALFLG	
0161	REF	1			34,3453	71456 0		P39P79	
0162					34,3454	77614 1	SET		
0163	REF	14	LAST	725	34,3455	00470 1		UPDATFLG	
0164					34,3456	77776 1	P39P79	EXIT	
01645	REF	1			34,3457	0 3505 1	TC	DSPLY81	FOR P39 AND P79
0165					34,3460	51575 1	MAINRTN1	VLQAD	ABVAL
0166	REF	12	LAST	690	34,3461	02366 0		DELVEET3	
0167	REF	7	LAST	663	34,3462	27576 0	STOVL	DELVTPI	DELTA-V
0168	REF	3	LAST	673	34,3463	03506 1		VPASS4	
0169					34,3464	51451 0	VSU	ABVAL	
0170	REF	5	LAST	690	34,3465	03566 1		VTPRIME	
0171	REF	4	LAST	663	34,3466	26350 0	STOVL	DELVTPE	DELTA-V (FINAL) = VIT - VT
0172	REF	21	LAST	697	34,3467	03536 1		RACT3	
0173					34,3470	45115 0	POVL	CALL	
0174	REF	8	LAST	690	34,3471	02337 1		VTPRIME	
0175	REF	5	LAST	663	34,3472	46316 1		PERIAPCI	GET PERIGEE ALTITUDE
0176					34,3473	77624 1	CALL		
0177	REF	11	LAST	663	34,3474	46426 0		SHIFT81	
0178	REF	5	LAST	663	34,3475	03606 1	STORE	POST81	
0179					34,3476	43014 0	BON	SET	
0180	REF	9	LAST	727	34,3477	01311 0		FINALFLG	
0181	REF	1			34,3500	71502 0		DSPLY88	
0182	REF	15	LAST	727	34,3501	00470 1		UPDATFLG	
0183					34,3502	77776 1	DSPLY58	EXIT	
0184	REF	1			34,3503	3 3637 0	CAF	VCON85F	DISPLAY HP, DELTA V, DELTA V (FINAL)
0185	REF	3	LAST	725	34,3504	0 3621 1	TC	VNDSPY	
0186	REF	1			34,3505	3 3640 0	DSPLY81	CAF	VCON81SF
0187	REF	4	LAST	727	34,3506	0 3621 1	TC	VNDSPY	DISPLAY DELTA V (LV)
0188	REF	100	LAST	725	34,3507	0 6037 0	TC	INTPRET	
0189					34,3510	77214 0	CLEAR	VLQAD	
0204	REF	5	LAST	679	34,3511	01267 0		XDELVFLG	
0205	REF	13	LAST	727	34,3512	02366 0		DELVEET3	
0206	REF	12	LAST	680	34,3513	37656 0	STCALL	DELVSIN	
0207	REF	7	LAST	692	34,3514	73606 0		VN1645	DISPLAY TRKMACT, TTGO, +MCA
0208					34,3515	52014 0	BON	GOTO	
0209	REF	3	LAST	727	34,3516	04306 0		P39/79SW	
0210	REF	1			34,3517	71541 1		P39/P79B	
0211	REF	1			34,3520	71400 0		RECYCLE	

R0212 STABLE ORBIT MIDCOURSE PROGRAM (P39 AND P79)

R0213 MOD NO -1 LOG SECTION - STABLE ORBIT - P38-P39
 R0214 MOD BY RUDNICKI.S DATE 25JAN68

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R0215 FUNCTIONAL DESCRIPTION

R0216 P39 AND P79 CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL
 R0217 CONDITIONS REQUIRED BY THE AGC TO MAKE A MIDCOURSE CORRECTION
 R0218 MANEUVER AFTER COMPLETING THE SOI MANEUVER BUT BEFORE MAKING
 R0219 THE SOI MANEUVER

R0220 CALLING SEQUENCE

R0221 ASTRONAUT REQUEST THRU DSKY

R0222 V37E39E IF THIS VEHICLE IS ACTIVE VEHICLE
 R0223 V37E79E IF OTHER VEHICLE IS ACTIVE VEHICLE

R0224 INPUT

R0225 (1) TPASS4 TIME OF INTERCEPT - SAVED FROM P38/P78
 R0226 (2) TARGTIME TIME THAT PASSIVE VEHICLE IS AT INTERCEPT POINT -
 R0227 SAVED FROM P38/P78

R0228 OUTPUT

R0229 (1) TRMKCNT NUMBER OF MARKS
 R0230 (2) TTOGO TIME TO GO
 R0231 (3) +MGA MIDDLE GIMBAL ANGLE
 R0232 (4) DELVLVC DELTA VELOCITY AT MID - LOCAL VERTICAL COORDINATES

R0233 SUBROUTINES USED

R0234 AVFLAGA
 R0235 AVFLAGP
 R0236 LOADTIME
 R0237 SELECTMU
 R0238 PRECSET
 R0239 S34/35.1
 R0240 MAINRTNE

0241	REF 186	LAST 725	34,3521	0 4616 1	P39	TC	BANKCALL	
0242	REF 6	LAST 724	34,3522	72347 1		CADR	AVFLAGA	THIS VEHICLE ACTIVE
0243			34,3523	0 0006 1		EXTEND		
0244	REF 4	LAST 666	34,3524	3 1401 0		DCA	PTISINC	
0245	REF 1		34,3525	0 3532 0		TC	P39/P79A	
0246	REF 187	LAST 728	34,3526	0 4616 1	P79	TC	BANKCALL	
0247	REF 6	LAST 724	34,3527	72354 0		CADR	AVFLAGP	OTHER VEHICLE ACTIVE
0248			34,3530	0 0006 1		EXTEND		
0249	REF 2	LAST 666	34,3531	3 1403 1		DCA	PTISINC	
0250	REF 4	LAST 666	34,3532	53 576 0	P39/P79A	DXCH	KT	TIME TO PREPARE FOR BURN
02505	REF 188	LAST 728	34,3533	0 4616 1		TC	BANKCALL	
02506	REF 7	LAST 724	34,3534	72361 0		CADR	P20FLGON	SET UPDATEFLG, TRACKFLG
0251	REF 101	LAST 727	34,3535	0 6037 0		TC	INTPRET	

L STABLE ORBIT - P38-P39

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0255				34,3536	45014 0	SET	CALL	
02555	REF	4	LAST	727	34,3537		P39/795W	
0256	REF	6	LAST	726	34,3540		SELECTMU	SELECT MU, CLEAR FINALFLG, GO TO VN1645
0257				34,3541	43234 0	P39/P798 RTB	DAD	
0258	REF	21	LAST	715	34,3542		LOADTIME	
0259	REF	5	LAST	728	34,3543		RT	
02595	REF	24	LAST	726	34,3544		STORE TIG	TIG = T (PRESENT) + PREPARATION TIME
0260	REF	43	LAST	726	34,3545		STCALL TDEC1	PRECISION UPDATE ACTIVE AND PASSIVE
0261	REF	5	LAST	666	34,3546		PRECSET	VEHICLES TO TIG
0262				34,3547	77624 1	CALL		
0263	REF	3	LAST	667	34,3550		S34/35.1	GET UNIT NORMAL
0264				34,3551	52145 0	DLOAD	GOTU	
0265	REF	2	LAST	726	34,3552		TARGETIME	
0266	REF	1			34,3553		MAINRTNE	CALCULATE DELTA V AND DELTA V (LV)

R0272 PREC/TT

R0273 SUBROUTINES USED

R0274 PRECSET
 R0275 TIMETHET
 R0276 S34/35.1

0277				34,3554	71220 1	PREC/TT	STQ	DLOAD
0278	REF	8	LAST	683	34,3555			RTRN
0279	REF	25	LAST	729	34,3556			TIG
0280	REF	44	LAST	729	34,3557		STCALL TDEC1	PRECISION UPDATE ACTIVE AND PASSIVE
0281	REF	6	LAST	729	34,3560		PRECSET	VEHICLES TO TIG
0282				34,3561	53775 1	VLOAD	VSR*	
0283	REF	12	LAST	697	34,3562			KPASS3
0284				34,3563	57176 0			0.2
0285	REF	8	LAST	695	34,3564		STOUL	KVEC
0286	REF	7	LAST	662	34,3565			CENTANG
0287				34,3566	71406 0	PUSH	CUS	
0288	REF	5	LAST	662	34,3567		STOUL	CSTH
0289				34,3570	43156 1	SIN	SET	
0290	REF	7	LAST	662	34,3571			KVSW
0291	REF	7	LAST	662	34,3572		STOVL	SNTH
0292	REF	9	LAST	697	34,3573			VPASS3
0293				34,3574	77657 0	VSR*		
0294				34,3575	57176 0			0.2
0295	REF	10	LAST	695	34,3576		STCALL VVEL	GET TRANSFER TIME BASED ON CENTANG OF
0296	REF	6	LAST	663	34,3577		TIMETHET	PASSIVE VEHICLE
0297				34,3600	77624 1	CALL		
0298	REF	4	LAST	729	34,3601			S34/35.1
0299				34,3602	52145 0	DLOAD	GOTU	GET UNIT NORMAL
0300	REF	4	LAST	726	34,3603			T
0301	REF	9	LAST	729	34,3604			RTRN

R0302 INTRPVP

R0303 SUBROUTINES USED

R0304 CSMPREC

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R0305 LEMPREC

0306				34,3605	43020-1	INTRPVP	STG	BOFF	PRECISION UPDATE-PASSIVE VEHICLE
0307	REF	10	LAST	729	34,3606			RTRN	TDEC1
0308	REF	5	LAST	697	34,3607			AVFLAG	
0309	REF	1			34,3610			OTHERV	
0310					34,3611		CALL		
0311	REF	5	LAST	704	34,3612			USAFREC	
0312					34,3613		GOTO		
0313	REF	11	LAST	730	34,3614			RTRN	
0314					34,3615	OTHERV	CALL		
0315	REF	8	LAST	707	34,3616			LEMPREC	
0316					34,3617		GOTO		
0317	REF	12	LAST	730	34,3620			RTRN	

R0318 VNDSPLY

R0319 SUBROUTINES USED

R0320 BANKCALL

R0321 GUF LASH

R0322 GUTOPDCH

0323				34,3621	0 0006 1	VNDSPLY	EXTEND		FLASH DISPLAY
0324	REF	13	LAST	730	34,3622		QXCH	RTRN	
0325	REF	5	LAST	683	34,3623		TS	VERBNOUN	
0326	REF	6	LAST	730	34,3624		CA	VERBNOUN	
0327	REF	189	LAST	728	34,3625		TCR	BANKCALL	
0328	REF	20	LAST	709	34,3626		CADH	GUF LASH	
0329	REF	22	LAST	725	34,3627		TCF	GUTOPDCH	TERMINATE
0330	REF	14	LAST	730	34,3630		TC	RTRN	PROCEED
0331					34,3631		TCF	-5	RECYCLE
0351					34,3632	01441-1	V06N33SR	VN	0633
0352					34,3633	01467-0	V06N55SR	VN	0655
0353					34,3634	01006-0	V04N06SR	VN	0406
0354					34,3635	01471-1	V06N57SR	VN	0657
0355					34,3636	01442-1	V06N34SR	VN	0634
0356					34,3637	01472-1	V06N58SR	VN	0658
0357					34,3640	01521-0	V06N81SR	VN	0681
0358					34,3641	00002-0	DECTWO	UCT	2

*** END OF KISSING .050 ***

L BURN, BABY, BURN -- MASTER IGNITION ROUTINE

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0001 36,2022 BANK 36
 0002 REF 3 LAST 40 36,2000 SETLOC P405
 0003 36,2022 BANK
 0004 REF 3 LAST 650 E7,1455 EBANK= WHICH
 0005 REF 3 LAST 40 TO 40: 2 18* COUNT= 11/P40
 R0006 THE MASTER IGNITION ROUTINE IS DESIGNED FOR USE BY THE FOLLOWING LEM PROGRAMS: P12, P40, P42, P61, P63.
 R0008 IT PERFORMS ALL FUNCTIONS IMMEDIATELY ASSOCIATED WITH APS OR DPS IGNITION: IN PARTICULAR, EVERYTHING LYING
 R0010 BETWEEN THE PRE-IGNITION TIME CHECK -- ARE WE WITHIN 45 SECONDS OF TIG? -- AND TIG + 26 SECONDS, WHEN DPS
 R0012 PROGRAMS THROTTLE UP.

R0013 VARIATIONS AMONG PROGRAMS ARE ACCOMMODATED BY MEANS OF TABLES CONTAINING CONSTANTS (E.P. AVEDEXIT, FOR
 R0015 WAITLIST, FOR PINBALL) AND TCF INSTRUCTIONS. USERS PLACE THE ADDRES OF THE HEAD OF THE APPROPRIATE TABLE
 R0017 (OF P61TABLE FOR P61LM, FOR EXAMPLE) IN ERASABLE REGISTER 'WHICH' (E4). THE IGNITION ROUTINE THEN INDEXES BY
 R0019 WHICH TO OBTAIN OR EXECUTE THE PROPER TABLE ENTRY. THE IGNITION ROUTINE IS INITIATED BY A TCF SUBROUTINE.
 R0021 THROUGH BANKJUMP IF NECESSARY. THERE IS NO RETURN.

R0022 THE MASTER IGNITION ROUTINE WAS CONCEIVED AND EXECUTED, AND (NOTA BENE) IS MAINTAINED BY ADLER AND FYLES.

R0024 HONI SOIT QUI MAL Y PENSE

R0025 *****
 R0026 TABLES FOR THE IGNITION ROUTINE
 R0027 *****

R0028 NSLT SE TANGERE

0029		36,2022	01512 0	P12TABLE VN	0674	(0)
0030	REF 1	36,2023	1 2325 0	TCF	ULLCNDT	(1)
0031	REF 1	36,2024	1 2612 1	TCF	COMFAIL3	(2)
0032	REF 1	36,2025	1 3062 1	TCF	GOCUTOFF	(3)
0033	REF 35 LAST 716	36,2026	1 5261 0	TCF	TASKOVER	(4)
0034	REF 1	36,2027	1 2146 1	TCF	P12SPOT	(5)
0035		36,2030	00000 1	DEC	0	(6) NO ULLAGE
0036	REF 4 LAST 731	E7,1455		EBANK= WHICH		
0037	REF 1	36,2031	03770 1	2CADR	SERVEXIT	(7)
0037	REF 1	36,2032	64067 1			
0038	REF 1	36,2033	1 2376 0	TCF	DISPCHNG	(11)
0037	REF 1	36,2034	1 2563 1	TCF	VALIABIT	(12)
0040	REF 1	36,2035	1 2521 1	TCF	P12IGN	(13)

R0043

0044		36,2036	01450 1	P40TABLE VN	0640	(0)
0045	REF 2 LAST 731	36,2037	1 2325 0	TCF	ULLCNDT	(1)
0046	REF 1	36,2040	1 2614 1	TCF	COMFAIL4	(2)
0047	REF 1	36,2041	1 3047 0	TCF	GOPUST	(3)
0048	REF 36 LAST 731	36,2042	1 5261 0	TCF	TASKOVER	(4)
0049	REF 1	36,2043	1 2146 1	TCF	P40SPOT	(5)

L BURN. BABY. BURN -- MASTER IGNITION ROUTINE

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0050				36,2044	04300-0	DEC	2240	(6)	
0051	REF	1		E6,1422		EBANK=	OMEGAQ		
0052	REF	1		36,2045	03666-1	2CADK	STEERING	(7)	
0052	REF	1		36,2046	74066-1				
0053	REF	1		36,2047	1-2366-1	TCF	P40SJUNK	(11)	
0054	REF	2	LAST	731	36,2050	1-2563-1	TCF	WAITABIT	(12)
0055	REF	1			36,2051	1-2504-0	TCF	P40IGN	(13)
0056	REF	1			36,2052	1-3123-0	TCF	REP40ALM	(14)

R0058

0060	REF	1			36,2053	1-2151-1	P41TABLE	TCF	P41SPOT	(5)
0061					36,2054	77776-1		DEC	-1	(6)
0062	REF	2	LAST	732	E6,1422			EBANK=	OMEGAQ	
0063	REF	1			36,2055	03376-0		2CADR	CALCN85	(7)
0063	REF	1			36,2056	74066-1				
0064	REF	1			36,2057	1-2400-0		TCF	COMMON	(11)
0065	REF	1			36,2060	1-2567-0		TCF	TIGTASK	(12)

R0066

0067					36,2061	01450-1	P42TABLE	VM	0000	(0)
0068	REF	1			36,2062	1-2322-1		TCF	WANTAPS	(1)
0069	REF	2	LAST	731	36,2063	1-2614-1		TCF	CONFAIL4	(2)
0070	REF	2	LAST	731	36,2064	1-3047-0		TCF	00PST	(3)
0071	REF	37	LAST	731	36,2065	1-5261-0		TCF	TASKOVER	(4)
0072	REF	1			36,2066	1-2146-1		TCF	P42SPOT	(5)
0073					36,2067	05120-1		DEC	2640	(6)
0074	REF	3	LAST	732	E6,1422			EBANK=	OMEGAQ	
0075	REF	2	LAST	732	36,2070	03666-1		2CADK	STEERING	(7)
0075					36,2071	74066-1				
0076	REF	2	LAST	732	36,2072	1-2366-1		TCF	P40SJUNK	(11)
0077	REF	3	LAST	732	36,2073	1-2563-1		TCF	WAITABIT	(12)
0078	REF	1			36,2074	1-2541-1		TCF	P41IGN	(13)
0079	REF	1			36,2075	1-3420-0		TCF	P42STAGE	(14)

R0081

0082					36,2076	01476-0	P63TABLE	VM	0000	(0)
0083	REF	3	LAST	731	36,2077	1-2325-0		TCF	ALLGHT	(1)
0084	REF	2	LAST	731	36,2100	1-2612-1		TCF	CONFAIL3	(2)
0085	REF	1			36,2101	1-2777-0		TCF	V99RECYC	(3)
0086	REF	36	LAST	732	36,2102	1-5261-0		TCF	TASK-VEF	(4)
0087	REF	1			36,2103	1-2151-1		TCF	P63SPOT	(5)
0088					36,2104	04300-0		DEC	2240	(6)
0089	REF	5	LAST	731	E7,1455			EBANK=	WHICH	
0090	REF	2	LAST	731	36,2105	03770-1		2CADR	SERVEXIT	(7)
0090					36,2106	64067-1				
0091	REF	2	LAST	731	36,2107	1-2376-0		TCF	DISPCHNG	(11)
0092	REF	4	LAST	732	36,2110	1-2563-1		TCF	WAITABIT	(12)

L BURN, BABY, BURN -- MASTER IGNITION ROUTINE

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0093 REF 1 36.2111 1 2455 0 TCF P03IGN (13)
R0096

0112 36.2112 01477 1 ABRTABLE VN 0663 (01)
0113 REF 4 LAST 732 36.2113 1 2325 0 TCF ULLCNOT (1)
0114 REF 3 LAST 732 36.2114 1 2612 1 TCF COMFAIL3 (2)
0115 REF 2 LAST 731 36.2115 1 3062 1 TCF GOCUTOFF (3)
0116 REF 39 LAST 732 36.2116 1 5261 0 TCF TASKOVER (4)
0117 36.2117 12 120 1 NOOP (5)
0118 36.2120 12 121 0 NOOP (6)
0119 36.2121 12 122 0 NOOP (7)
0120 36.2122 12 123 1 NOOP
0121 REF 3 LAST 732 36.2123 1 2376 0 TCF DISPCING (11)
0122 REF 5 LAST 732 36.2124 1 2563 1 TCF WAITABIT (12)
0123 REF 1 36.2125 1 2531 0 TCF ABRTION (13)
R0126

R0127
R0128
R0129

GENERAL PURPOSE IGNITION ROUTINES

0130 REF 29 LAST 711 36.2126 0 5353 1 BURNBABY TC PHASCHNG GROUP 4 RESTARTS HERE
0131 36.2127 04024 0 DCI 04024
0132 REF 133 LAST 716 36.2130 3 4755 1 CAF ZER0 EXTIRPATE JUNK LEFT IN PVTOTAL
0133 REF 4 LAST 315 36.2131 55*507 0 TS DVTOTAL
0134 REF 5 LAST 733 36.2132 55*510 0 TS DVTOTAL +1
0135 REF 190 LAST 730 36.2133 0 4616 1 TC BANKCALL P40AUTO MUST BE BANKCALLED EVER FROM ITS
0136 REF 1 36.2134 73747 1 CADR P40AUTL OWN BANK TO SET UP RETURN PROPERLY
0141 36.2135 0 0006 1 B*RN8*B* EXTEND
0142 REF 26 LAST 729 36.2136 3 1442 1 DCA TIC STORE NOMINAL TIC FOR BLATERLSE COMP.
0143 REF 2 LAST 147 36.2137 53*512 1 DXCH DBRTIME AND FOR P70 OR P71.
0173 36.2140 0 0004 0 INHINT
0174 REF 22 LAST 519 36.2141 0 4674 0 TC IBNRCALL
0175 REF 1 36.2142 75564 1 CADR ENGINDF3
0176 36.2143 0 0003 1 RELINT
0179 REF 6 LAST 732 36.2144 51*455 1 INDEX WHICH
0180 36.2145 1 0005 0 TCF 5
0182 REF 2 LAST 731 36.2146 P42SPOT = P40SPOT (5)
0183 REF 3 LAST 733 36.2146 P12SPOT = P40SPOT (5)
0185 REF 2 LAST 732 36.2151 P63SPOT = P41SPOT (5) IN P63 CLERTACK ALREADY GOING
0186 REF 1 36.2146 4 4762 1 P40SPOT CS CNTDNDX (5)

L BURN, BABY, BURN -- MASTER IGNITION ROUTINE

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01861	REF 191	LAST 733	36,2147	0 4616 1	TC	BANKCALL	MUST BE BANKCALLED FOR GENERALIZED
01862	REF 1		36,2150	74664 0	CADP	CTCLOCK2	RETURN
0187	REF 102	LAST 728	36,2151	0 6037 0	TC	INTPRET	(5)
01871			36,2152	45345 1	DLOAD	DSU	
0188	REF 27	LAST 733	36,2153	03442 0		TIG	
0189	REF 1		36,2154	35143 1		029.9SEC	
01891	REF 45	LAST 729	36,2155	34041 0	STCALL	TIEL1	
01892	REF 1		36,2156	61104 0		INTICDOW	
0190			36,2157	45014 0	BUFF	CALL	
0191	REF 3	LAST 706	36,2160	03347 1		ADRF1AG	
0192	REF 1		36,2161	74200 0		GOMIDAV	
0193	REF 6	LAST 730	36,2162	27043 0		CSMPREC	
0194			36,2163	64375 1	VLOAD	MXV	
0195	REF 12	LAST 710	36,2164	00025 0		VATT1	
0196	REF 20	LAST 707	36,2165	01734 0		REFSMAT	
0197			36,2166	77762 1	VSRI		
0198	REF 3	LAST 706	36,2167	25726 0	STOVL	V(CSM)	CSM VELOCITY - M/C(24)
0199	REF 9	LAST 710	36,2170	00017 1		RATT1	
0200			36,2171	64312 0	VSL4	MXV	
0201	REF 21	LAST 734	36,2172	01734 0		REFSMAT	
0202	REF 3	LAST 706	36,2173	35720 1	STCALL	R(CSM)	CSM POSITION - M#2(24)
0203	REF 1		36,2174	67130 1		MUNGRAV	
0204	REF 2	LAST 120	36,2175	16317 0	STOVL	G(CSM)	CSM GRAVITY VEC. - M/C(24)
02042	REF 14	LAST 710	36,2176	00015 0		TAT	
02044	REF 46	LAST 734	36,2177	00041 1	STORE	TDECT	RELOAD TDECT FOR NEXT...
0205			36,2200	77624 1	GOMIDAV	CALRB	
0206	REF 1		36,2201	27557 0		MIDTDAV1	
0207	REF 1		36,2202	1 2211 0	TCF	CALLT-35	MADE IT IN TIME.
0208			36,2203	0 0006 1	EXTEND		
0209	REF 3	LAST 195	36,2204	3 1561 1	DCA	PIPTIME3	TIG WAS SLIPPED, SO RESET TIG TO 29.0
0210	REF 23	LAST 734	36,2205	53'442 0	DXCH	TIG	SECONDS AFTER THE TIME TO WHICH WE DID
0211			36,2206	0 0006 1	EXTEND		INTEGRATE.
0212	REF 2	LAST 734	36,2207	3 3143 1	DCA	029.9SEC	
0213	REF 29	LAST 734	36,2210	21'442 0	DAS	TIG	
0214	REF 285	LAST 721	36,2211	52 155 1	CALLT-35	DXCH	MPAC
0215	REF 5	LAST 241	36,2212	53'500 1		DXCH	SAVET-10
0216			36,2213	0 0006 1	EXTEND		DELTA-T UNTIL TIME...
0217	REF 1		36,2214	4 3756 1	DCS	5SECDP	
0218	REF 6	LAST 734	36,2215	21'500 1	DAS	SAVET-20	DELTA-T UNTIL TIME...
0219			36,2216	0 0006 1	EXTEND		
0220	REF 7	LAST 734	36,2217	3 1500 0	DCA	SAVET-30	
0221	REF 3	LAST 511	36,2220	0 5277 0	TC	BANKCALL	
0222	REF 15	LAST 316	36,2221	07,1453	EBANK	TTOGO	
0223	REF 3	LAST 241	36,2222	02240 0	ECADP	TIG-35	
0223			36,2222	74067 0			
0224	REF 30	LAST 733	36,2223	0 5353 1	TC	PHASCHNG	
0225			36,2224	20254 0	DCT	20254	4.25SPOT FOR TIG-35-RESTART.

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0226	REF	1		36,2225	0 5321 1	TC	CHECKMM	
0227				36,2226	06077 1	DEC	62	
0228	REF	108	LAST	725	36,2227	1 5155 1	TCF	ENDOFJOB
0229	REF	2	LAST	733	36,2230	4 4762 1	CS	CHTINDEX
0230	REF	5	LAST	681	36,2231	55'163 0	TS	DISPDEX
0231	REF	103	LAST	734	36,2232	0 6037 0	TC	INTPRET
0232				36,2233	51575 1	VLOAD	ABVAL	
0233	REF	2	LAST	147	36,2234	03553 1	VN1	
0234	REF	4	LAST	315	36,2235	03472 0	STORE	ABVEL
0235				36,2236	77776 1	EXIT		
0236	REF	109	LAST	735	36,2237	1 5155 1	TCF	ENDOFJOB

NOT-P63
P63 CAN START DISPLAYING NOW.
INITIALIZE ABVEL FOR P63 DISPLAY

R0237

0238	REF	1		36,2240	3 5756 0	TIG-35	CAF	5SEC	
0239	REF	9	LAST	519	36,2241	0 5173 1	TC	THIDDLE	
0240	REF	2	LAST	241	36,2242	02276 0	ADRES	TIG-30	
0241	REF	31	LAST	734	36,2243	0 5353 1	TC	PHASCHNG	
0242				36,2244	40154 0	DET	40154		4.15SPOT FOR TIG-30 RESTART
0243	REF	1		36,2245	4 4752 1	CS	BLANKDEX		BLANK DSKY FOR 5 SECONDS
0244	REF	6	LAST	735	36,2246	55'163 0	TS	DISPDEX	
0245	REF	7	LAST	733	36,2247	51'455 1	INDEX	WHICH	
0246				36,2250	4 0006 0	CS	6		CHECK ULLAGE TIME.
0247				36,2251	0 0006 1	EXTEND			
0248	REF	40	LAST	733	36,2252	6 5261 1	BZMF	TASKOVER	
0249	REF	1		36,2253	0 5145 1	CAF	4.95EC		SET UP TASK TO RESTORE DISPLAY AT TIG-30
0250	REF	10	LAST	735	36,2254	0 5173 1	TC	THIDDLE	
0251	REF	1		36,2255	02266 1	ADRES	TIG-30.1		
0252	REF	1		36,2256	3 5027 1	CAF	PR1017		A NEGATIVE ULLAGE TIME INDICATES P41. IS
0253	REF	16	LAST	716	36,2257	0 5072 1	TC	NOVAC	WHICH CASE WE HAVE TO SET UP A JOB
0254	REF	16	LAST	734	E7,1453		EBANK=	TTUGO	BLANK THE DSKY FOR FIVE SECONDS, SINCE
0255	REF	1		36,2260	02263 1	2CADR	P41BLANK		CLOCKJOB IS NOT RUNNING DURING P41.
0255	REF	1		36,2261	74067 0				
0256	REF	41	LAST	735	36,2262	1 5261 0	TCF	TASKOVER	
0257	REF	192	LAST	734	36,2263	0 4616 1	P41BLANK	TC	PANCKALL
0258	REF	1		36,2264	20456 1	CAOP	CLEAROSP		BLANK DSKY.
0259	REF	110	LAST	735	36,2265	1 5155 1	TCF	ENDOFJOB	
0260	REF	2	LAST	735	36,2266	3 5027 1	TIG-30.1	CAF	PR1017
0261	REF	17	LAST	735	36,2267	0 5072 1	TC	NOVAC	SET UP JOB TO RESTORE DISPLAY AT TIG-30
0262	REF	17	LAST	735	E7,1453		EBANK=	TTUGO	
0263	REF	1		36,2270	02273 0	2CADR	TIG-30A		
0263	REF	1		36,2271	74067 0				
0264	REF	42	LAST	735	36,2272	1 5261 0	TCF	TASKOVER	

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0265	REF	1		36,2273	3	3761	1	TIG-30A	CAF	VIGNR5B	
0266	REF	193	LAST	735	36,2274	0	4616	1	TC	BANKCALL	RESTORE DISPLAY.
0267	REF	1		36,2275		20465	1		CAD5	REGDOSP	REGDOSP DOES A TCF ENDFUNC

R0268

0269	REF	1		36,2276	3	3144	0	TIG-30	CAF	S24.9SEL	
0270	REF	11	LAST	735	36,2277	0	5173	1	TC	THIDDLE	
0271	REF	3	LAST	241	36,2300		02352	1	ADRES	TIG-3	
0272	REF	3	LAST	735	36,2301	4	4762	1	CS	CNTDINDEX	START UP CLKDTASK AGAIN
0273	REF	7	LAST	735	36,2302	55	163	0	TS	DISPDEX	
0274	REF	8	LAST	735	36,2303	51	455	1	INDEX	WHICH	PICK UP APPROPRIATE ULLAGE ON TIME
0275					36,2304	3	0006	1	CAF	6	
0276					36,2305	0	0006	1	EXTEND		
0277	REF	5	LAST	733	36,2306	6	2325	1	BZMF	ULLGNOT	DON'T SET UP ULLAGE IF DT IS NEG OR ZERO
0278	REF	8	LAST	734	36,2307	55	477	0	TS	SAVET-30	SAVE DELTA-T FOR RESTART
0279	REF	12	LAST	736	36,2310	0	5173	1	TC	THIDDLE	
0280	REF	2	LAST	239	36,2311		02346	1	ADRES	ULLGTASK	
0281	REF	23	LAST	724	36,2312	3	6245	1	CA	THREE	RESTART PROTECT ULLGTASK (1.35SPOT)
0282	REF	97	LAST	716	36,2313	54	001	1	TS	1	
0283	REF	24	LAST	736	36,2314	4	6245	0	CS	THREE	
0284	REF	3	LAST	216	36,2315	52	753	1	DXCH	-PHASE1	
0285	REF	5	LAST	367	36,2316	4	0025	1	CS	TIME1	
0286	REF	1			36,2317	55	053	1	TS	TBASE1	
02861	REF	9	LAST	736	36,2320	51	455	1	INDEX	WHICH	
02862					36,2321	1	0001	1	TCF	1	
02863	REF	11	LAST	295	36,2322	4	0106	1	WANTAPS	CS	FLGWRD10
02864	REF	7	LAST	295	36,2323	7	4737	1	MASK	APSFLBIT	(1) FOR P42 ENSURE APSFLAG IS SET. IF IT WASN'T SET, GAP WILL BE INITIALIZED TO
02865	REF	12	LAST	736	36,2324	26	106	1	ADS	FLGWRD10	ASCENT VALUES BY 1/ACCS IN 2 SECONDS.
0287					36,2325	0	0006	1	ULLGNOT	EXTEND	(1)
0288	REF	10	LAST	736	36,2326	5	1455	1	INDEX	WHICH	
0289					36,2327	3	0010	0	DEA	7	LOAD AVEGEXIT WITH APPROPRIATE LOAD
0290	REF	3	LAST	105	36,2330	53	253	0	DXCH	AVEGEXIT	
0291	REF	38	LAST	713	36,2331	3	4752	0	CAF	TWO	4.2 SPOT RESTARTS IMMEDIATELY AT RED 4.2
0292	REF	98	LAST	736	36,2332	54	001	1	TS	1	
0293	REF	39	LAST	736	36,2333	4	4752	1	CS	TWO	AND ALSO AT TIG-5 AT THE CORRECT TIME.
0294	REF	3	LAST	224	36,2334	52	761	0	DXCH	-PHASE4	
0295	REF	6	LAST	736	36,2335	4	0025	1	CS	TIME1	
0296	REF	2	LAST	232	36,2336	55	061	0	TS	TBASE4	SET TBASE4 FOR TIG-5 RESTART
02961					36,2337	0	0006	1	RED02.17	EXTEND	

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02962	REF	10	LAST	536	36,2340	3 4755 1	DCA	REGO	CLEAR OUT GROUP 2 SO LAMBERT CAN START
02963	REF	4	LAST	231	36,2341	52 755 1	DXCH	-PHASE2	IF NEEDED.
0297	REF	1			36,2342	10 763 1	CCS	PHASE5	IS SERVICER GOING?
0298	REF	43	LAST	735	36,2343	1 5261 0	TCF	TASKOVER	YES. DON'T START IT UP AGAIN.
0299	REF	40	LAST	611	36,2344	0 4635 0	TC	POSTJUMP	
0300	REF	1			36,2345	77410 1	CADN	PREHEAD	PREHEAD ENDS THIS TASK

R0301

0302	REF	1			36,2346	0 2657 1	ULLGTASK	TC	DEMLLAGE	THIS COMES AT TIG-7.5 OR TIG-1.5
0303	REF	32	LAST	735	36,2347	0 5353 1	TC	PHASCHNG		
0304					36,2350	00001 0	DCT	1		
0305	REF	44	LAST	737	36,2351	1 5261 0	TCF	TASKOVER		

R0306

0307					36,2352	0 0006 1	TIG-5	EXTEND		
03072	REF	11	LAST	737	36,2353	3 4755 1	DCA	REGO	INSURE THAT GROUP 3 IS INACTIVE.	
03074	REF	2	LAST	214	36,2354	52 757 0	DXCH	-PHASE3		
03076	REF	2	LAST	735	36,2355	3 3756 0	CAF	SSEC		
0308	REF	13	LAST	736	36,2356	0 9173 1	TC	TWIDDLE		
0309	REF	2	LAST	241	36,2357	02403 1	ADRES	TIG-0		
0310	REF	56	LAST	629	36,2360	0 5516 0	TC	DOWNFLAG	RESET IGNFLAG AND ASTNFLAG	
0311	REF	1			36,2361	00153 0	ADRES	IGNFLAG	FOR LIGHT-UP LOGIC	
0312	REF	57	LAST	737	36,2362	0 5516 0	TC	DOWNFLAG		
0313	REF	1			36,2363	00154 1	ADRES	ASTNFLAG		
0318	REF	11	LAST	736	36,2364	51 455 1	INDEX	WHICH		
0319					36,2365	1 0011 0	TCF	11		
0320	REF	1			36,2366	10 757 0	P40SJUNK	CCS	PHASE5	(11) P40 AND P42. S40.13 IN PROGRESS?
03202	REF	4	LAST	733	36,2367	1 2376 0	TCF	DISPCHNG	YES	
03204	REF	4	LAST	384	36,2370	3 4736 1	CAF	PRIG20		
0321	REF	27	LAST	717	36,2371	0 5105 0	TC	FINDVAC		
0322	REF	18	LAST	735	E7,1453		EBANK	TIGGO		
0323	REF	2	LAST	240	36,2372	02540 1	2CADR	S40.13		
0323					36,2373	56067 0				
03232	REF	33	LAST	737	36,2374	0 5353 1	TC	PHASCHNG	3.55POT FOR S40.13	
03234					36,2375	00053 1	UUT	00053		
0324	REF	1			36,2376	4 4760 0	DISPCHNG	LS	V899DEX	(11)
0325	REF	8	LAST	736	36,2377	55 163 0	TS	DISPDEX		

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03252 REF 34 LAST 737 36,2400 0 5353 1 COMMON TC PHASCHNG RESTART TIG-0 (4.7SPOT)
 03254 36,2401 40074 0 OCT 40074
 0326 REF 45 LAST 737 36,2402 1 5261 0 TCF TASKOVER

R0327

0328 REF 6 LAST 704 36,2403 4 0103 1 TIG-0 CS FLAGWRD7 SET IGNFLAG SINCE TIG HAS ARRIVED
 0329 REF 1 36,2404 7 4737 1 MASK IGNFLBIT
 0330 REF 7 LAST 738 36,2405 26 103 1 ADS FLAGWRD7
 0331 REF 2 LAST 735 36,2406 0 5321 1 TC CHECKMM IN P63 CASE, THROTTLE-UP IS ZONETIME
 0332 36,2407 00077 1 DEC 63 AFTER-NOMINAL IGNITION, NOT ACTUAL
 0333 REF 1 36,2410 1 2421 0 TCF IGNDET?
 0334 REF 2 LAST 240 36,2411 3 1422 1 CA ZONETIME
 0335 REF 32 LAST 716 36,2412 0 5203 0 TC WAITLIST
 0336 REF 21 LAST 242 E7.1515 EBANK= DVLCNR
 03365 REF 1 36,2413 02007 1 ZCADR P63ZOOM
 03365 REF 1 36,2414 36067 0
 0337 REF 4 LAST 650 36,2415 0 5327 1 TC PHASCHNG
 0338 36,2416 40033 0 OCT 40033

0339 36,2417 05014 1 OCT 05014
 0340 36,2420 77777 0 OCT 77777

0341 REF 1 36,2421 3 4740 0 IGNDET? LAF ASTDET CHECK ASTNFLAG: HAS ASTRONAUT RE P. 000
 0342 REF 8 LAST 738 36,2422 7 0103 1 MASK FLAGWRD7 TO OUR ENGINE ENABLE REQUEST?
 0343 36,2423 0 0006 1 EXTEND
 0344 REF 12 LAST 737 36,2424 5 1455 1 INDEX WHICH
 0345 36,2425 1 0012 0 BZF 12 BRANCH IF HE HAS NOT RESPONDED YET

0346 REF 19 LAST 606 36,2426 4 0101 0 IGNITION CS FLAGWRD5 INSURE ENGONFLG IS SET.

03461 REF 3 LAST 216 36,2427 7 4745 1 MASK ENGONBIT
 03462 REF 20 LAST 738 36,2430 26 101 0 ADS FLAGWRD5
 03463 REF 6 LAST 257 36,2431 4 4355 1 CS PRIMO TURN ON THE ENGINE.

0347 36,2432 0 0006 1 EXTEND
 0348 REF 22 LAST 470 36,2433 02 011 0 FAND DSALHOUT
 0349 REF 26 LAST 562 36,2434 6 4737 0 AD BIT13

0350 36,2435 0 0006 1 EXTEND
 0351 REF 23 LAST 738 36,2436 01 011 0 WHITE DSALHOUT
 0352 36,2437 0 0006 1 EXTEND SET TEVENT FOR DOWNLINK

0353 REF 17 LAST 597 36,2440 3 0025 0 DCA TIME2
 0354 REF 4 LAST 200 36,2441 53 345 0 DXCH TEVENT

0355 36,2442 0 0006 1 EXTEND UPDATE TIG USING TIG FROM 340.13

0356 REF 4 LAST 241 36,2443 3 1517 0 DCA TIG
 0357 REF 30 LAST 734 36,2444 53 442 0 DXCH TIG

0358 36,2445 0 0006 1 EXTEND
 0359 REF 18 LAST 738 36,2446 3 0025 0 DCA TIME2
 0360 REF 31 LAST 738 36,2447 21 442 0 DAS TIG

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Address	Ref	Count	Last	Address	Count	Address	Count	Operation	Comments
03601	REF	1		36,2450	4 4742 0	CS	FLDNDRIT		PERMIT GUIDANCE LOOP DISPLAYS
03602	REF	9	LAST	704	36,2451 7 0104 0	MASK	FLAGWRD8		
03603	REF	10	LAST	739	36,2452 54 104 0	TS	FLAGWRD8		
0361	REF	13	LAST	738	36,2453 51'455 1	INDEX	WHICH		
0362					36,2454 1 0013 1	TCF	13		
0363					36,2455 0 0006 1	P63IGN	EXTEND	(13)	INITIATE BUREAU DISPLAYS
0364	REF	1			36,2456 3 3137 1	DCA	DSP2CADR		
0366	REF	1			36,2457 53'253 0	DXCH	AVGEXIT		
03661	REF	15	LAST	681	36,2460 3 0005 1	CA	7		ASSASSINATE CLOUTASK
03662	REF	9	LAST	737	36,2461 55'163 0	TS	DISPDEX		
0370	REF	1			36,2462 4 0105 1	CS	FLAGWRD9		SET FLAG FOR P70-P71
0371	REF	1			36,2463 7 4743 1	MASK	LETABBIT		
0372	REF	2	LAST	739	36,2464 26 105 1	ADS	FLAGWRD9		
0373	REF	9	LAST	738	36,2465 4 0103 1	CS	FLAGWRD7		SET SWANDISP TO ENABLE FID.
0374	REF	1			36,2466 7 4741 0	MASK	SWANDBIT		
0375	REF	10	LAST	739	36,2467 26 103 1	ADS	FLAGWRD7		
03751	REF	3	LAST	285	36,2470 4 4735 0	CS	PULSP5		MAKE SURE DAP IS NOT IN MINIMUM-IMPULSE
03752	REF	16	LAST	294	36,2471 7 0111 1	MASK	DAPBUUL5		MODE, IN-CASE OF SWITCH-TO P66
03753	REF	17	LAST	739	36,2472 54 111 1	TS	DAPBUUL5		
03754					36,2473 0 0006 1	EXTEND			INITIALIZE TIG FOR P70 AND P71.
03755	REF	19	LAST	738	36,2474 3 0025 0	DCA	TIME2		
03756	REF	32	LAST	738	36,2475 53'442 0	DXCH	T15		
0376	REF	134	LAST	733	36,2476 3 4755 1	CAF	ZERIP		INITIALIZE WCHPHASE AND FLPHASE
0377	REF	1			36,2477 55'351 0	TS	WCHPHASE		
03771	REF	2	LAST	149	36,2500 55'621 1	TS	WCHPHOLD		ALSO WCHPHOLD
0378	REF	40	LAST	736	36,2501 3 4752 0	CA	TWO		
0379	REF	2	LAST	149	36,2502 55'623 0	TS	FLPASSO		
0380	REF	2	LAST	732	36,2503 1 2541 1	TCF	P42IGN		
0381	REF	21	LAST	738	36,2504 4 0101 0	P40IGN	CS	FLAGWRD5	(13)
0382	REF	1			36,2505 7 4740 1	MASK	NOTHRBIT		
0383					36,2506 0 0006 1	EXTEND			
0384	REF	3	LAST	739	36,2507 1 2541 1	BZF	P42IGN		
0385	REF	3	LAST	738	36,2510 3 1422 1	CA	ZOOMTIME		
0386	REF	33	LAST	738	36,2511 0 5203 0	TC	WAITLIST		
0387	REF	22	LAST	738	E7,1515	EBANK=	DVLCNTR		
03875	REF	1			36,2512 02015 1	2CADR	P40ZOOM		
03875	REF	1			36,2513 36067 0				
0388	REF	5	LAST	738	36,2514 0 5327 1	P63IGN1	TC	2PHSCHNG	
0389					36,2515 40033 0	OCT	40033		3.35POT FOR ZOOM-RESTART.
0390					36,2516 05014 1	OCT	05014		TYPE C RESTARTS HERE IMMEDIATELY
0391					36,2517 77777 0	OCT	77777		

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0392	REF	4	LAST	739	36,2520	1 2541 1	TCF	P42IGN	
0398	REF	6	LAST	520	36,2521	3 5015 0	CAF	EBANK6	
039805	REF	21	LAST	713	36,2522	54 003 0	TS	EBANK	
03981	REF	7	LAST	222	E6,1537		EBANK	AOSQ	
039814	REF	1			36,2523	3 1412 1	CA	IGNAOSQ	INITIALIZE OAP BIAS ACCELERATION.
039815	REF	8	LAST	740	36,2524	55 537 0	TS	AOSQ	ESTIMATES AT P12 IGNITION.
03982	REF	1			36,2525	3 1413 0	CA	IGNAOSR	
039825	REF	1			36,2526	55 541 1	TS	AOSR	
03983	REF	4	LAST	678	36,2527	3 5016 0	CAF	EBANK7	
039835	REF	22	LAST	740	36,2530	54 003 0	TS	EBANK	
03984	REF	23	LAST	739	E7,1515		EBANK	DVCNTR	
0399	REF	16	LAST	739	36,2531	3 0005 1	CA	Z	(13) KILL CLOKTASK
0400	REF	10	LAST	739	36,2532	55 163 0	TS	DISHAEX	
04001					36,2533	0 0006 1	EXTEND		CONNECT ASCENT GUIDANCE TO SERVICE.
04002	REF	1			36,2534	3 3141 0	DCA	ATHAGADR	
04003	REF	2	LAST	739	36,2535	53 253 0	DXCH	AVGEXIT	
0401	REF	11	LAST	739	36,2536	4 0103 1	CS	FLAGWRD7	ENABLE R10.
0402	REF	2	LAST	739	36,2537	7 4741 0	MASK	SHANDBIT	
0403	REF	12	LAST	740	36,2540	26 103 1	ADS	FLAGWRD7	
0405	REF	1			36,2541	4 4744 0	CS	DRIFTBIT	ENSURE THAT POWERED-FLIGHT SELECTION
0409	REF	18	LAST	739	36,2542	7 0111 1	MASK	DAPBOULS	CURVES ARE USED.
0410	REF	19	LAST	740	36,2543	54 111 1	TS	DAPBOULS	
0411	REF	1			36,2544	3 4743 0	CAF	IMPULBIT	EXAMINE IMPULSE SWITCH
0412	REF	18	LAST	681	36,2545	7 0076 1	MASK	FLAGWRD2	
0413	REF	219	LAST	716	36,2546	10 000 0	CCS	"	
0414	REF	1			36,2547	1 3522 0	TCF	IMPLBURN	
0415	REF	58	LAST	737	36,2550	0 5516 0	TC	DOWNFLAG	
0416	REF	2	LAST	737	36,2551	00153 0	ADRES	IGNFLAG	CONNECT DVMON
0417	REF	59	LAST	740	36,2552	0 5516 0	TC	DOWNFLAG	
0418	REF	2	LAST	737	36,2553	00154 1	ADRES	ASTNFLAG	
0419	REF	60	LAST	740	36,2554	0 5516 0	TC	DOWNFLAG	
0420	REF	1			36,2555	00161 1	ADRES	IDLEFLAG	
0421	REF	35	LAST	738	36,2556	0 5353 1	TC	PHASCHNG	
0422					36,2557	40054 1	DCT	40054	
0423	REF	11	LAST	703	36,2560	0 5221 0	TC	FIXDELAY	TURN ULLAGE OFF HALF A SECOND AFTER
0424					36,2561	00062 0	DEC	50	LIGHT UP.
0425	REF	1			36,2562	0 2653 0	ULLAGOFF	TC	NOULLAGE
0426					36,2563	0 0006 1	WAITABIT	EXTEND	KILL GROUP 4
0427	REF	12	LAST	737	36,2564	3 4755 1	DCA	NEGO	

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0428	REF	4	LAST	736	36,2565	52 761 0	DXCH	-PHASE4	
0429	REF	46	LAST	738	36,2566	1 5261 0	TCF	TASKOVER	
04292	REF	41	LAST	737	36,2567	0 4635 0	TIGTASK	TC	POSTJUMP (12)
04293	REF	1			36,2570	36000 1	CADR	TIGTASK1	

R0430

04302					31,2144		BANK	31	
04303	REF	1			17,2000		SETLOC	P4053	
04304					17,2000		BANK		
04305	REF	1					COUNT*	33/P40	
0431	REF	6	LAST	470	17,2000	3 5026 0	TIGTASK1	CAF	PRI016
0432	REF	18	LAST	735	17,2001	0 5072 1	TC	MOVAC	
0433	REF	6	LAST	606	E7,1462		EBANK=	TRKMKT	
0434	REF	1			17,2002	03241 0	2CADR	TIGNOW	
0434	REF	1			17,2003	74067 0			
0435	REF	36	LAST	740	17,2004	0 5353 1	TC	PHASCHNG	
0436					17,2005	60006 1	OCT		KILL GROUP 6.
0437	REF	47	LAST	741	17,2006	1 5261 0	TCF	TASKOVER	

R0438

0441					17,2007	0 0006 1	P63200M	EXTEND	
0442	REF	1			17,2010	3 2026 1	DCA	LUNLANAD	
0443	REF	4	LAST	736	17,2011	53 253 0	DXCH	AVEGEXIT	
0445	REF	23	LAST	733	17,2012	0 4674 0	TC	IBNKCALL	
0446	REF	1			17,2013	62370 1	CADR	FLATOUT	
04462	REF	1			17,2014	1 2022 1	TCF	P40ZOOMA	
04463	REF	27	LAST	738	17,2015	3 4737 0	CAF	BIT13	
04464	REF	2	LAST	211	17,2016	54 055 0	TS	THRUST	
04465	REF	29	LAST	713	17,2017	3 4750 1	CAF	BIT4	
04466					17,2020	0 0006 1	EXTEND		
04467	REF	8	LAST	536	17,2021	05 014 1	WOR	CHAN14	
0447	REF	37	LAST	741	17,2022	0 5353 1	P40ZOOMA	TC	PHASCHNG
0448					17,2023	00003 1	OCT	3	
0449	REF	48	LAST	741	17,2024	1 5261 0	TCF	TASKOVER	
044905	REF	24	LAST	740	E7,1515		EBANK=	DVCMTK	
04491	REF	1			17,2025	02462 0	LUNLANAD	2CADR	LUNLAND
04491	REF	1			17,2026	62067 1			

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04492 REF 2 LAST 741 17,2022 ZOOM * P40ZOOMA
 04493 36,2571 BANK 36
 04494 REF 4 LAST 731 36,2000 SETLOC P40S
 04495 36,2571 BANK
 04496 REF 4 LAST 731 TO 741: 359 377# COUNT# 41/P40

R0450

0451 REF 41 LAST 711 36,2571 0 5504 0 COMFAIL TC OFFLAG (15)
 0452 REF 2 LAST 740 36,2572 00161 1 ADRES IDLEFLAG
 0453 REF 42 LAST 742 36,2573 0 5504 0 TC OFFLAG SET FLAG TO SUPPRESS CONFLICTING DISPLAY
 0454 REF 1 36,2574 00175 1 ADRES FLUNDISP
 0455 REF 10 LAST 443 36,2575 3 4751 0 CAF FOUR RESET DVMON
 0456 REF 25 LAST 741 36,2576 55 515 0 TS DVNTR
 0457 REF 1 36,2577 10 765 1 CCS PHASCHN CLOCKTASK ACTIVE?
 0458 36,2600 1 2603 1 TCF +3 YES
 0459 REF 194 LAST 736 36,2601 0 4616 1 TC BANKCALL OTHERWISE, START IT
 0461 REF 1 36,2602 74663 1 CADR STCLOCK
 0462 REF 1 36,2603 4 4765 0 +3 CS YES7DEX
 0463 REF 11 LAST 740 36,2604 55 163 0 TS DISPDIX
 0464 REF 38 LAST 741 36,2605 0 5353 1 TC PHASCHNG TURN OFF GROUP 4.
 0465 36,2606 00004 0 GCT 0000
 04655 REF 111 LAST 735 36,2607 1 5155 1 TCF ENDPJOB

0466 REF 14 LAST 739 36,2610 51 455 1 COMFAIL1 INDEX WHICH
 0467 36,2611 1 0002 1 TCF 2

0468 REF 17 LAST 740 36,2612 3 0005 1 COMFAIL3 CA 7 (15) KILL TASK D 144 2
 0469 36,2613 1 2615 0 TCF +2

0470 REF 4 LAST 736 36,2614 4 4762 1 COMFAIL4 CS CHDDEX
 0471 REF 12 LAST 742 36,2615 55 163 0 TS DISPDIX

0472 REF 61 LAST 740 36,2616 0 5516 0 TC OFFFLAG RECONNECT DV MONITOR
 0473 REF 3 LAST 742 36,2617 00161 1 ADRES IDLEFLAG
 0474 REF 62 LAST 742 36,2620 0 5516 0 TC OFFFLAG PERMIT GUIDANCE LOOP
 0475 REF 2 LAST 742 36,2621 00175 1 ADRES FLUNDISP
 0476 REF 112 LAST 742 36,2622 1 5155 1 TCF ENDPJOB

0477 REF 39 LAST 742 36,2623 0 5353 1 COMFAIL2 TC PHASCHNG KILL ZOOM RESTART
 0478 36,2624 00003 1 GCT 0000

0479 36,2625 0 0004 0 INHINT
 0480 REF 10 LAST 593 36,2626 0 6027 1 TC KILL TASK KILL ZOOM, IN CASE IT'S STILL DOING
 0481 REF 2 LAST 240 36,2627 36022 1 CADR ZOOM
 0482 REF 24 LAST 741 36,2630 0 4674 0 TC INTRCALL COMMAND ENGINE OFF
 0483 REF 1 36,2631 75561 1 CADR ENGINEOFF
 04832 REF 43 LAST 742 36,2632 0 5504 0 TC OFFLAG SET THE DRIFT BIT FOR THE DOP.
 04834 REF 1 36,2633 00312 1 ADRES DRIFTDFL

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0484	REF	1		36,2634	0 2645 1	TC	INVFLAG	USE OTHER PCS SYSTEM
0485	REF	1		36,2635	00310 0	ADRES	AGRTFLO	
0486	REF	44	LAST 742	36,2636	0 5504 0	TC	UPFLAG	TURN ON ULLAGE
0487	REF	2	LAST 224	36,2637	00314 1	ADRES	ULLAGFLO	
0488	REF	35	LAST 715	36,2640	3 4753 1	CAF	BIT1	
0489				36,2641	0 0004 0	INHINT		
0490	REF	14	LAST 737	36,2642	0 5173 1	TC	TWIDDLE	
0491	REF	4	LAST 736	36,2643	02352 1	ADRES	TIG-5	
0492	REF	113	LAST 742	36,2644	1 5155 1	TCF	ENDOFJOB	

R0493
R0494
R0495

SUBROUTINES OF THE IGNITION ROUTINE

0496	REF	186	LAST 683	36,2645	3 0002 0	INVFLAG	CA	
0497	REF	1		36,2646	0 5522 1	TC	DEBIT	
0498				36,2647	4 0000 0	COM		
0499				36,2650	0 0006 1	EXTEND		
0500	REF	14	LAST 558	36,2651	06 001 0	RXOR	LCHAN	
0501	REF	1		36,2652	1 5511 0	TCF	COMFLAG	

R0502

0503	REF	1		36,2653	4 4746 1	NULLAGE	CS	ULLAGER	MUST BE CALLED IN A TASK OR WHEN INHINT
0504	REF	20	LAST 740	36,2654	7 0111 1		MASK	DAPBUDLS	
0505	REF	21	LAST 743	36,2655	54 111 1		TS	DAPBUDLS	
0506	REF	187	LAST 743	36,2656	0 0002 0		TC	0	

R0507

0508	REF	22	LAST 743	36,2657	4 0111 1	NULLAGE	CS	DAPBUDLS	TURN ON ULLAGE. MUST BE CALLED IN
0509	REF	2	LAST 743	36,2660	7 4746 1		MASK	ULLAGER	A TASK OR WHILE INHINTED.
0510	REF	23	LAST 743	36,2661	26 111 1		ADS	DAPBUDLS	
0511	REF	188	LAST 743	36,2662	0 0002 0		TC	0	

R0512

0513	REF	135	LAST 739	36,2663	3 4755 1	STCLUK1	CA	ZERO	THIS ROUTINE STARTS THE COUNT-DOWN
0514	REF	13	LAST 742	36,2664	55 163 0	STCLUK2	TS	DISPEX	(CLKTASK AND CLKJOB). SETTING
0515	REF	9	LAST 572	36,2665	0 4645 1	STCLUK3	TC	FAKCADE	SETTING DISPEX POSITIVE KILLS IT.
0516	REF	3	LAST 736	36,2666	55 061 0		TS	TBASE4	RETURN-SAVE (NOT-FOR-RESTARTS)
0517				36,2667	0 0006 1		EXTEND		
0518	REF	33	LAST 739	36,2670	3 1442 1		DCA	TIG	
0519	REF	286	LAST 734	36,2671	52 155 1		DXCH	MPAC	
0520				36,2672	0 0006 1		EXTEND		
0521	REF	20	LAST 739	36,2673	4 0025 1		DCS	TIME2	

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0522	REF 287	LAST 743	36,2674	20 155 1	OAS	HPAC	HAVE TIG - TIMEZ. UNOCCUPY + NUMBER
0523	REF 7	LAST 435	36,2675	0 7257 0	TC	TPAGREF	POSITIVE, SINCE WE PASSED THE
0524	REF 12	LAST 718	36,2676	3 4777 1	CAF	1SEC	45 SECOND CHECK
0525	REF 189	LAST 743	36,2677	54 002 1	TS	G	
0526	REF 288	LAST 744	36,2700	52 155 1	DXCH	HPAC	
0527	REF 8	LAST 444	36,2701	7 4346 0	MASK	LOW	RESTRICT MAGNITUDE OF NUMBER 1-7
0528			36,2702	0 0006 1	EXTEND		
0529	REF 190	LAST 744	36,2703	10 002 1	DV	G	
0530	REF 99	LAST 736	36,2704	3 0001 0	CA	L	GET REMAINDER
0531	REF 41	LAST 739	36,2705	6 4752 0	AD	TWU	
0532			36,2706	0 0004 0	INHINT		
0533	REF 15	LAST 743	36,2707	0 5173 1	TC	TWIDDLE	
0534	REF 3	LAST 650	36,2710	02717 1	ADRES	CLOCKTASK	
0535	REF 6	LAST 739	36,2711	0 5327 1	TC	2PHSCHNG	
0536			36,2712	40036 0	DCT	40036	6.3SPDT FOR CLOCKTASK
0537			36,2713	05024 1	DCT	05024	
0538			36,2714	13000 0	DCT	13000	
0539	REF 4	LAST 743	36,2715	3 1061 1	CA	TRASE4	
0540	REF 12	LAST 573	36,2716	0 4640 1	TC	BANKJUMP	
0541	REF 7	LAST 736	36,2717	4 0025 1	CLOCKTASK CS	TIME:	SET TRASE6 FOR GROUP 6 RESTART
0542	REF 1		36,2720	55 065 1	TS	TRASE6	
0543	REF 14	LAST 743	36,2721	11 163 0	CCS	DISPDEX	
0544	REF 1		36,2722	1 2733 0	TCF	KILLCLOCK	
0545			36,2723	12 724 0	ROSP		
0546	REF 3	LAST 506	36,2724	3 7715 0	CAF	PRI027	
0547	REF 19	LAST 741	36,2725	0 5072 1	TC	NOVAC	
0548	REF 19	LAST 737	E7,1453		EBANK	TTOGO	
0549	REF 1		36,2726	02737 0	2CADR	CLOCKJOB	
0549	REF 1		36,2727	74067 0			
0550	REF 12	LAST 740	36,2730	0 5221 0	TC	FIXDELAY	WAIT A SECOND BEFORE STARTING
0551			36,2731	00144 0	DEC	100	
0552	REF 4	LAST 744	36,2732	1 2717 0	TCF	CLOCKTASK	
0553			36,2733	0 0006 1	KILLCLOCK EXTEND		KILL RESTART
0554	REF 13	LAST 740	36,2734	3 4755 1	DCA	REGG	
0555	REF 2	LAST 214	36,2735	52 765 1	DXCH	-PHASEC	
0556	REF 49	LAST 741	36,2736	1 5261 0	TCF	TASKOVER	
0557			36,2737	0 0006 1	CLOCKJOB EXTEND		
0558	REF 34	LAST 743	36,2740	4 1442 0	DCS	TIG	
0559	REF 20	LAST 744	36,2741	53 454 1	DXCH	TTOGO	
0560			36,2742	0 0006 1	EXTEND		

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0561	REF	21	LAST	743	36.2743	3 0029 0		OCA	TIMEP	
0562	REF	21	LAST	744	36.2744	21'454 1		OAS	TIMEC	
0563					36.2745	0 0004 0		INHINT		
0564	REF	15	LAST	744	36.2746	11'163 0		CLS	DISPDEX	IF DISPDEX HAS BEEN SET POSITIVE BY A
0565	REF	114	LAST	743	36.2747	1 5155 1		TCF	ENDOFJOB	TASK OR A HIGHER PRIORITY JOB SINCE THE
0566	REF	115	LAST	745	36.2750	1 5155 1		TCF	ENDOFJOB	LAST CLOKTASK. AVOID USING IT AS AN
0567					36.2751	4 0000 0		COM		INDEX.
0568					36.2752	0 0003 1		RELINT		***** DISPDEX MUST NEVER BE -6 *****
0569	REF	220	LAST	740	36.2753	50 000 1		INDEX		
0570	REF	1			36.2754	1 3011 0		TCF	DISPDEX-1	(-1 DUE TO EFFECT OF CLS)
0571	REF	1			4765		VB97DEX	=	CLTAS	NEGATIVE OF THIS IS PROPER FOR DISPDEX
05711	REF	136	LAST	743	36.2755	4 4755 0	-35	CS	ZERO	INDICATE VERB 97 PASTE
05712	REF	1			36.2756	55'067 0		TS	NVWORD1	
0572	REF	1			36.2757	3 0371 1		CA	NVWORD+2	NVWORD+2 CONTAINS VERB & APPROPRIATE NOUN
0572	REF	195	LAST	742	36.2760	0 4616 1		TC	BANKCALL	
0574	REF	1			36.2761	20473 0		CADR	CLOCPLAY	
0575	REF	1			36.2762	1 3013 1		TCF	STOPCLOK	TERMINATE CLOKTASK ON THE WAY TO POOH
0576	REF	1			36.2763	1 2610 0		TCF	COMFAIL1	
0577	REF	1			36.2764	1 2623 0		TCF	COMFAIL2	
A0583										THIS DISPLAY IS CALLED VIA A5INCLOK
0584	REF	1			36.2765	3 3146 1	-25	CAF	VORF1	IT IS PRIMARILY USED BY THE CREW IN P63
0585	REF	196	LAST	745	36.2766	0 4616 1		TC	BANKCALL	TO RESET HIS EVENT TIMER TO AGREE WITH
0586	REF	1			36.2767	20457 0		CAD	REFLASH	TIG.
0587	REF	2	LAST	745	36.2770	1 3013 1		TCF	STOPCLOK	
0588	REF	1			36.2771	1 3030 0		TCF	STOPCLOK	
0589					36.2772	1 2764 1		TCF	-6	
0590	REF	1			4762		ONTDEX	=	CLTAS	OUT17; NEGATIVE PROPER FOR DISPDEX
0591	REF	15	LAST	742	36.2773	51'455 1	-17	INDEX	WHICH	THIS DISPLAY COMES UP AT ONE SECOND
0592					36.2774	3 0000 1		CAF	0	INTERVALS. IT IS NORMALLY OPERATED
0593	REF	197	LAST	745	36.2775	0 4616 1		TC	BANKCALL	BETWEEN TIG-30 SECONDS AND TIG-5 SECONDS
0594	REF	2	LAST	736	36.2776	20465 1		CADR	RECORDSF	RECORDSF DOES ITS OWN TCF ENDOFJOB
0595	REF	2	LAST	467	4760		VB99DEX	=	ELLYN	OUT13; NEGATIVE PROPER FOR DISPDEX
05955					36.2777		V99RECYC	EQUALS		
05956	REF	20	LAST	557	36.2777	4 4743 1	-13	CS	RITY	INDICATE VERB 99 PASTE
05957	REF	2	LAST	745	36.3000	55'067 0		TS	NVWORD1	
0596	REF	16	LAST	745	36.3001	51'455 1		INDEX	WHICH	THIS IS THE "PLEASE ENABLE ENGINE"
0597					36.3002	3 0000 1		CAF	0	DISPLAY; IT IS INITIATED AT TIG-5-SEC.
0598	REF	198	LAST	745	36.3003	0 4616 1		TC	BANKCALL	THE DISPLAY IS A V99NXX, WHERE XX IS THE
0599	REF	2	LAST	745	36.3004	20473 0		CADR	CLOCPLAY	NOUN THAT HAD PREVIOUSLY BEEN DISPLAYED
0600	REF	3	LAST	745	36.3005	1 3013 1		TCF	STOPCLOK	TERMINATE GOTOPOOH TURNS OFF ULLAGE.
0601	REF	1			36.3006	1 3041 0		TCF	REFCEED	
0602	REF	1			36.3007	1 3044 0		TCF	REENTER	

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0606	REF	42	LAST	744	4752	BLANKDEX =	TWO	NEGATIVE OF THIS IS PROPER FOR DISK		
0607	REF	199	LAST	745	36,3010	0 4616 1	-2	TC	BANKCALL	BLANK DSKY. THE DSKY IS BLANKED FOR
0608	REF	2	LAST	735	36,3011	20456 1		CADR	CLEANDSP	5 SECONDS AT TIG-35 TO INDICATE THAT
0609	REF	116	LAST	745	36,3012	1 5155 1	DISPNOT	TCF	ENDOFJOB	AVERAGE 5 IS STARTING.
0610	REF	1			36,3013	0 3015 0	STOPCLOK	TC	NULLCLOK	STOP CLOK TASK & TURN OFF ULLAGE IN THE
0611	REF	23	LAST	730	36,3014	1 6001 1		TCF	GOTOPROG	WAY TO EGO (GOTOPROG RELINTS)
0612					36,3015	0 0004 0	NULLCLOK	INHINT		
0613					36,3016	0 0006 1		EXTEND		
0614	REF	1			36,3017	23 142 1		QXCH	P40/RET	
0615	REF	2	LAST	740	36,3020	0 2653 0		TC	NULLAGE	TURN OFF ULLAGE...
0616	REF	11	LAST	742	36,3021	0 6027 1		TC	KILLTASK	DON'T LET IT COME ON, EITHER...
0617	REF	3	LAST	736	36,3022	74346 0		CADR	ULLGTASK	
0618	REF	40	LAST	742	36,3023	0 5353 1		TC	PHASCHNG	NOT EVEN IF THERE'S A SPECTOR.
0619					36,3024	00001 0		OCT	1	
0620	REF	18	LAST	742	36,3025	3 0005 1		CA	2	KILL CLOK TASK
0621	REF	16	LAST	745	36,3026	55 163 0		TS	DISPDEX	
0622	REF	2	LAST	746	36,3027	0 1142 1		TC	P40/RET	
06222	REF	41	LAST	746	36,3030	0 5353 1	ASTNRETN	TC	PHASCHNG	
06224					36,3031	04024 0		OCT	04024	
0623	REF	137	LAST	745	36,3032	3 4755 1		CAF	ZERR	STOP DISPLAYING BUT KEEP PUMP...
06231	REF	17	LAST	746	36,3033	55 163 0		TS	DISPDEX	
06232	REF	1			36,3034	3 5023 0		CAF	P40/RET	
0625	REF	28	LAST	737	36,3035	0 5105 0		TC	FINDVAC	
0626	REF	2	LAST	124	36,3036	03210 1		EBANK	STARIND	
0627	REF	1			36,3037	64065 0		2CADR	ASTNRET	
0628	REF	117	LAST	746	36,3040	1 5155 1		TCF	ENDOFJOB	
0629	REF	45	LAST	743	36,3041	0 5504 0	*PROCEED	TC	UPFLAG	
0630	REF	3	LAST	740	36,3042	00154 1		ADRES	ASTNFLAG	
0631	REF	1			36,3043	1 3102 0		TCF	IGNITE	
0632					36,3044	0 0604 0	*ENTER	INHINT		
0633	REF	17	LAST	745	36,3045	51 455 1		INDEX	PHIF	
0634					36,3046	1 0003 0		TCF	3	
0635	REF	2	LAST	211	36,3047	3 4644 0	DEPUS	CAF	P40/RET	(1) MUST BE LOWER PRIORITY THAN CLOK JOB
0636	REF	29	LAST	746	36,3050	0 5105 0		TC	FINDVAC	
0637	REF	22	LAST	745	E7,1453			EBANK	TIOGO	
0638	REF	2	LAST	241	36,3051	03223 1		2CADR	POSTBURN	
0638					36,3052	74067 0				

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06382          36,3053 0 0004 0      INHINT      SET UP THE GAP FOR COASTING FLIGHT.
06383 REF 25 LAST 742 36,3054 0 4674 0      TC      IBNRCALL
06384 REF 2 LAST 230 36,3055 40204 0      CADR      ALLCOAST
0639 REF 2 LAST 746 36,3056 0 3015 0      TC      NULLCLOCK
0640 REF 42 LAST 746 36,3057 0 5353 1      TC      PHASCHNG
0641          36,3060 -00134 1      DCT      07024
                                DCT      17000
0642 REF 118 LAST 746 36,3061 1 5155 1      TCF      ENDOFJOB

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0643 REF 3 LAST 735 36,3062 3 5027 1 GOCUTOFF CAP PRI017 (3)
0644 REF 30 LAST 746 36,3063 0 5105 0      TC      FIMOVAC
0645 REF 5 LAST 738 E7.1516      EBANK= TGO
0646 REF 1          36,3064 02424 1      ZCADR      CUTOFF
0646 REF 1          36,3065 30067 0
0649 REF 83 LAST 742 36,3066 0 5516 0      TC      PHASCHNG
0650 REF 3 LAST 742 36,3067 00175 1      ADRES      FLUW-1SP

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06502          36,3070 0 0004 0      INHINT      SET UP THE GAP FOR COASTING FLIGHT.
06504 REF 26 LAST 747 36,3071 0 4674 0      TC      IBNRCALL
06506 REF 3 LAST 747 36,3072 40204 0      CADR      ALLCOAST
0651 REF 3 LAST 747 36,3073 0 3015 0      TC      NULLCLOCK
0652 REF 43 LAST 747 36,3074 0 5353 1      TC      PHASCHNG
0653          36,3075 07024 0      DCT      07024
0654          36,3076 17000 1      DCT      17000
0655 REF 6 LAST 747 E7.1516      EBANK= TGO
0656 REF 2 LAST 747 36,3077 02424 1      ZCADR      CUTOFF
0656          36,3100 30067 0
0657 REF 119 LAST 747 36,3101 1 5155 1      TCF      ENDOFJOB

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0658 REF 13 LAST 740 36,3102 4 0103 1 IGNITE CS FLAGWRD7 (2)
0659 REF 2 LAST 738 36,3103 7 4757 1      MASK      IGNFLBIT
0660 REF 271 LAST 745 36,3104 10 000 0      CCS      A
0661 REF 1          36,3105 1 3116 0      TCF      IGNITE1
0662 REF 36 LAST 743 36,3106 3 4753 1      CAP      BIT1
0663          36,3107 0 0004 0      INHINT
0664 REF 16 LAST 744 36,3110 0 5173 1      TC      IBNRCALL
0665 REF 2 LAST 241 36,3111 02424 0      ADRES      IGNITION
0666 REF 1          36,3112 3 4350 0      CAP      00123
0667 REF 100 LAST 744 36,3113 54 002 1      TS      2
0668          36,3114 4 0000 0      CCH
0669 REF 5 LAST 741 36,3115 52 761 0      DXCH      PHASE4

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0670 REF 5 LAST 742 36,3116 4 4762 1 IGNITE1 CS CNTINDEX RESTORE OLD DISPLAY.
0671 REF 18 LAST 746 36,3117 55 163 0      TS      DIS-EX
0672 REF 120 LAST 747 36,3120 1 5155 1      TCF      ENDOFJOB

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R0673

0674	REF	29	LAST	662	36,3121	0 5567 0	P40ALM	TC	ALARM	PROGRAM SELECTION NOT CONSISTENT WITH
0675					36,3122	01700 1		DET	1706	VEHICLE CONFIGURATION
0676	REF	4	LAST	662	36,3123	3 5006 1	REP40ALM	CAF	V05N09	(14)
0677	REF	200	LAST	746	36,3124	0 4616 1		TC	BANKCALL	
0678	REF	21	LAST	730	36,3125	20476 0		CAOR	GOFLASH	
0679	REF	24	LAST	746	36,3126	1 6001 1		TCF	GOBPOOH	V34E TERMINATE
0680					36,3127	1 3131 0		TCF	+	PROCEED CHECK FOR P42
0681	REF	2	LAST	732	36,3130	1 3123 0		TCF	REP40ALM	V32E REDISPLAY ALARM
0682	REF	18	LAST	746	36,3131	51'455 1		INDEX	HIGH	FOR P42, ALLOW CREW TO PROCEED EVEN
0683					36,3132	1 0014 0		TCF	14	THOUGH VEHICLE IS UNSTAGED

R0684

0685					31,2144			BANK	31	
0686	REF	1			35,2000			SETLOC	P40S2	
0687					35,3747			BANK		
0688	REF	1						COUNT	147/44	
0689	REF	10	LAST	743	35,3747	0 4645 1	P40AUTO	TC	WALKER	HELLO THERE.
0690	REF	4	LAST	474	35,3750	55'164 1		TS	TEMPRO	FOR GENERALIZED RETURN TO OTHER BANKS.
0691	REF	201	LAST	748	35,3751	0 4616 1	P40A/P	TC	BANKCALL	SUBROUTINE TO CHECK PGNC'S CONT-
0692	REF	5	LAST	518	35,3752	54255 1		CAOR	GOBPOOH	AND AUTO STABILIZATION MODES
0693	REF	222	LAST	747	35,3753	10 000 0		CLS		+0 INDICATES IN PGNC'S. IN AUTO
0694	REF	1			35,3754	1 3766 1		TCF	TURNITON	+ INDICATES NOT IN PGNC'S AND/OR AUTO
0695	REF	8	LAST	736	35,3755	3 4737 0		CAF	ANGLEBII	ARE WE ON THE DESCENT STAGE?
0696	REF	13	LAST	736	35,3756	7 0106 1		MASK	FLGWRDIO	
0697	REF	223	LAST	748	35,3757	10 000 0		CLS		
0698	REF	1			35,3760	1 3773 0		TCF	GOBACK	RETURN
0699	REF	31	LAST	718	35,3761	3 4747 1		CAF	FILE	YES, CHECK FOR AUTO THROTTLE MODE
0700					35,3762	0 0006 1		EXTEND		
0701	REF	4	LAST	475	35,3763	02 030 0		RAND	CHANG30	
0702					35,3764	0 0006 1		EXTEND		
0703	REF	2	LAST	748	35,3765	1 3773 0		BZF	GOBACK	IN AUTO THROTTLE MODE -- RETURN
0704	REF	1			35,3766	3 3775 1	TURNITON	CAF	P40A/P40	DISPLAY V50N25 R1=203 PLEASE PERFORM
0705	REF	202	LAST	748	35,3767	0 4616 1		TC	BANKCALL	CHECKLIST 203 TURN ON PGNC'S ETC.
0706	REF	3	LAST	513	35,3770	20623 1		CAOR	GOPEPEI	
0707	REF	25	LAST	748	35,3771	1 6001 1		TCF	GOBPOOH	V34E TERMINATE
0708	REF	1			35,3772	1 3751 0		TCF	P40A/P	RECYCLE
0709	REF	5	LAST	748	35,3773	3 1164 0	GOBACK	CA	TEMPRO	
0710	REF	13	LAST	744	35,3774	0 4640 1		TC	BANKCALL	GOODBYE. COME AGAIN SOON.

0711 35,3775 00203 0 P40A/PMO OCT 00203

L BURN. BABY. BURN -- MASTER IGNITION ROUTINE

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0712				36,3133		BANK 30
0713	REF	5	LAST	742	36,2000	SETLOC P405
0714				36,3133		BANK
0715	REF	5	LAST	742 TO 748:	226 603*	COUNT* 43/P40

R0716	*****					
R0717	CONSTANTS FOR THE IGNITION ROUTINE					
R0718	*****					

0719	REF	1		36,2105		SERVADR =	P63TABLE +7
0720	REF	1		36,3133	02036 0	P40ADRES ADRES	P40TABLE
0721	REF	1		36,3134	02046 1	P41ADRES ADRES	P41TABLE -5
0722	REF	1		36,3135	02061 1	P42ADRES ADRES	P42TABLE
0723	REF	26	LAST	742	E7,1515	EBANK=	DVCNTR
0724	REF	1		36,3136	03471 0	DSP2CADR 2CADR	P63RISFS -2
0724	REF	1		36,3137	62067 1		

0727	REF	27	LAST	749	E7,1515	EBANK=	DVCNTR
0728	REF	1		36,3140	03642 1	ATMAGADR 2CADR	ATMAG
0728	REF	1		36,3141	70067 1		
0729	REF	26	LAST	748	6001	?	=

0730				36,3142	00000 1	P29.9SEC 2DLC	.990
0730				36,3143	05656 1		

0731				36,3144	04672 0	S24.9SEC DEL	.490
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0732				36,3145	00752 1	4.9SEC DEC	.490
------	--	--	--	---------	---------	------------	------

0733	REF	32	LAST	748	4747	DCT20	=
------	-----	----	------	-----	------	-------	---

07331				36,3146	01475 0	VC6N61 VN	0661
-------	--	--	--	---------	---------	-----------	------

L BURN, BABY, BURN -- MASTER IGNITION ROUTINE

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P0735 KILLTASK
 R0736 MOD NO: NEW PROGRAM
 R0737 MOD BY: COVELL

R0738 FUNCTIONAL DESCRIPTION:

R0739 KILLTASK IS USED TO REMOVE A TASK FROM THE WAITLIST BY SUBSTITUTING A NULL TASK CALLED 'NULLTASK' (OF C-1200).
 R0741 WHICH MERELY DOES A TC TASKOVER. IF THE SAME TASK IS SCHEDULED MORE THAN ONCE, ONLY THE ONE WHICH WILL OCCUR
 R0743 FIRST IS REMOVED. IF THE TASK IS NOT SCHEDULED, KILLTASK TAKES NO ACTION AND RETURNS WITH NO ALARM. KILLTASK
 R0745 LEAVES INTERRUPTS INHIBITED SO CALLER MUST RELINT

R0746 CALLING SEQUENCE:

A0748	L	TC	KILLTASK	IN-FIXED-FIXED
A0749	L+1	CADR	????????	CADR (NOT 2CADR) OF TASK TO BE REMOVED.
A0750	L+2	(RELINT)		RETURN

R0751 EXIT MODE: AT L+2 OF CALLING SEQUENCE.

R0752 ERASABLE INITIALIZATION= NONE.

R0753 OUTPUT: 2CADR OF NULLTASK IN LST2

R0754 DEBRIS: ITEMP1 -- ITEMP4. A.L.Q.

0755	REF	19	LAST	221	E3.1410	EBANK= LST2	
0756					6027	BLOCK 3	KILLTASK MUST BE IN FIXED-FIXED.
0757	REF	2	LAST	516	6000	SETLOC FFTAG6	
0758					6027	BANK	
0759	REF	1				COUNT* \$5/KILL	
0760	REF	1			6027	CA KILLBB	
07605					6030	INHINT	
0761	REF	224	LAST	748	6031	LXCH *	
0762	REF	191	LAST	744	6032	INDEX Q	
0763					6033	CA 0	GET-CADR.
0764	REF	16	LAST	584	6034	LXCH BBANK	
0765	REF	1			6035	TCF KILLTSK2	CONTINUE IN SWITCHED FIXED
0766	REF	20	LAST	750	E3.1410	EBANK= LST2	
0767	REF	2	LAST	750	6036	BBCON KILLTSK2	
0768					27.2200	BANK 27	
0769	REF	3	LAST	44	27.2000	SETLOC P-051	
0770					27.2200	BANK	
0771	REF	1				COUNT* \$5/KILL	
0772	REF	10	LAST	544	27.2200	LXCH ITEMP2	SAVE CALLER'S BBANK

L BURN. BABY. BURN -- MASTER IGNITION ROUTINE

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0773	REF 192	LAST 750	27,2201	24 002 0	INCR	Q	
0774			27,2202	0 0006 1	EXTEND		
0775	REF 29	LAST 612	27,2203	22 061 0	QXCH	ITEMP1	RETURN 2CADR IN ITEMP1, ITEMP2
0776	REF 16	LAST 560	27,2204	54 063 0	TS	ITEMP3	CADR IS IN A
0777	REF 5	LAST 455	27,2205	7 5012 0	MASK	LOW10	
0778	REF 21	LAST 431	27,2206	6 4741 1	AD	BIT11	
0779	REF 7	LAST 559	27,2207	54 064 1	TS	ITEMP4	GENADR OF TASK
0780	REF 6	LAST 751	27,2210	4 5012 0	CS	LOW10	
0781	REF 17	LAST 751	27,2211	7 0063 0	MASK	ITEMP3	
0782	REF 18	LAST 751	27,2212	54 063 0	TS	ITEMP3	FBANK OF TASK
0783			27,2213	22 007 0	ZL		
0784	REF 101	LAST 747	27,2214	50 001 0	ADKSCAN	INDEX	L
0785	REF 21	LAST 750	27,2215	4 1410 1	CS	LST2	
0786	REF 8	LAST 751	27,2216	6 0064 0	AD	ITEMP4	COMPARE GENADRS
0787			27,2217	0 0006 1	EXTEND		
0788	REF 1		27,2220	1 2232 1	BZF	TSTFBANK	IF THEY MATCH, COMPARE FBANKS
0789	REF 1		27,2221	4 4747 0	CS	LSTLIM	
0790	REF 102	LAST 751	27,2222	6 0001 0	AD	L	
0791			27,2223	0 0006 1	EXTEND		ARE WE DONE?
0792	REF 1		27,2224	1 2230 0	BZF	DEAD	YES - DONE - SO RETURN
0793	REF 103	LAST 751	27,2225	24 001 0	INCR	L	
0794	REF 104	LAST 751	27,2226	24 001 0	INCR	L	
0795	REF 1		27,2227	1 2214 0	TCF	ADKSCAN	CONTINUE LOOP.
0796	REF 30	LAST 751	27,2230	52 062 1	DEAD	DXCH	ITEMP1
0797			27,2231	52 006 0		DTCB	
0798	REF 7	LAST 751	27,2232	4 5012 0	TSTFBANK	CS	LOW10
0799	REF 105	LAST 751	27,2233	50 001 0	INDEX	L	
0800	REF 22	LAST 751	27,2234	7 1411 0	MASK	LST2 +1	COMPARE FBANKS ONLY.
0801			27,2235	0 0006 1	EXTEND		
0802	REF 19	LAST 751	27,2236	60 063 1	SU	ITEMP3	
0803			27,2237	0 0006 1	EXTEND		
0804	REF 1		27,2240	1 2242 0	BZF	KILLDEAD	MATCH - KILL IT.
0805	REF 1		27,2241	1 2221 0	TCF	LETITLIV	NO MATCH - CONTINUE.
0806	REF 1		27,2242	3 4353 0	KILLDEAD	CA	TCTSKOVF
0807	REF 106	LAST 751	27,2243	50 001 0	INDEX	L	
0808	REF 23	LAST 751	27,2244	55 410 1	TS	LST2	REMOVE TASK BY INSERTING TASKOVF
0809	REF 2	LAST 751	27,2245	1 2230 0	TCF	DEAD	
0810	REF 33	LAST 749	4747		LSTLIM	EQUALS BITS	DEC 16

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R0001 PROGRAM DESCRIPTION P40BOTH DECEMBER 22, 1966
 R0002 MOD 03 BY PETER ADLER MARCH 3, 1967
 R0003 CALLED VIA JOB FROM V37E

R0004 FUNCTIONAL DESCRIPTION

R0005 1) TO COMPUTE A PREFERRED IMU ORIENTATION AND A PREFERRED VEHICLE ATTITUDE FOR A LM DPS
 R0007 THRUSTING MANEUVER.
 R0008 3) TO DO THE VEHICLE MANEUVER TO THE THRUSTING ATTITUDE.
 R0009 4) TO CONTROL THE PGNCs DURING COUNTDOWN, IGNITION, THRUSTING, AND THRUST TERMINATION OF A
 R0011 PGNCs CONTROLLED-DPS-MANEUVER.
 R0012 5) IN POSTBURN--ZERO RENDEZVOUS COUNTER. MAINTAIN VG CALCULATIONS FOR POSSIBLE RCS MANEUVER.
 R0014 SET MAXIMUM DEADBAND IN GAP, RESET STEERLAW CSTEER TO ZERO.

R0016 NOTE: P42, WHICH IS IN THIS LOG SECTION, DOES THE SAME FOR AN APS BURN, AND P41 DOES 1-3 FOR
 R0018 RCS PLUS DISPLAYS PARAMETERS FOR MANUAL CONTROL.

R0019 SUBROUTINES USED

R0020 R02 IMU STATUS CHECK
 R0021 S40.1 COMPUTATION OF THRUST DIRECTION
 R0022 S40.13 LENGTH OF BURN
 R0023 S40.2,3 PREFERRED IMU ORIENTATION
 R0024 S40.8 X-PRODUCT STEERING
 R0025 S40.9 LAMBERT VTGAIN
 R0026 R60LEM ATTITUDE MANEUVER
 R0027 LEMPREC EXTRAPOLATE STATE VECTOR
 R0028 PREREAD AVERAGE G. SERVICER
 R0029 ALLCOAST GAP COASTING INITIALIZATION
 R0030 CLOKTASK-ERGO-CLOCKJOB--COUNT-DOWN
 R0031 PHASCHNG, INTERPT, FLAGUP, FLAGDOWN, WAITLIST, LINCALL, GOFFLASH, GOFFLASH, GUPERFI, ALARM,
 R0033 PRIOLARM, GOTOPOOH, ENDOFJOB, BANKCALL, SETMAXDP, SETMINDB, CHECKRM, FLATOUT, OUTFLAT,
 R0035 KILLTASK, SONAGREE, TPAGREE, ETC.

R0036 RESTARTS VIA GROUP 4

R0037 DISPLAYS

R0038 V50N25 203 A/P TO PGNCs, AUTO THROTTLE HOLD, AUTO ATTITUDE CONTROL
 R0040 V06N40 TTI, VG, DELTAVM (DISPLAYED ONCE/SECOND BY CLOKTASK)
 R0041 V50N99 PLEASE PERFORM ENGINE ON ENABLE
 R0042 V06N40 TO (TIME TO GO TO CUTOFF), VG, DELTAVM--ONCE/SECOND
 R0043 V16N40 FINAL VALUES OF TG, VG, DELTAVM
 R0044 V16N85 COMP OF VG (BODY AXES) FOR POSS. RCS MANUAL MANEUVER
 R0045 V05N09 POSSIBLE ALARMS
 R0046 V50N07 PLEASE SELECT-POO

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R0047 VIA R30

R0048 V06N44 HAPD. PERI. TFF
R0049 V06N35 TIME TO PERIGEE. HMS

R0050 ALARM OR ABORT EXIT MODES

R0051 PROGRAM ALARM, FLASHING DISPLAY OF ALARM CODE 1706 IF P40 SELECTED WITH DESCENT UNIT STAGED.
R0053 V34E (TERMINATE) IS THE ONLY RESPONSE ACCEPTED. TO GOTOPUOH.R0054 PROGRAM ALARM, FLASH CODE 1703: TIG LESS THAN 45 SECS AWAY. V34E= GOTOPUOH OR V33E= SLIP
R0056 TIG BY 45 SECS.R0057 ERASABLE INITIALIZATION
R0058 DEBRIS
R0059 OUTPUTR0060 SEE SUBROUTINES E.G.: S40.1, S40.2,3, S40.13, S40.8, S40.9, TRIMGIMB
R0062 XDELVFLG = 1 FOR EXT DELV COMPUTATION
R0063 = 0 FOR AIMPT (LAMBERT) COMP

0064	REF	2	LAST	38	TO	38:	10	10*	COUNT* 34/P40
0065	REF	19	LAST	748		E7,1455			EBANK= WHICH
0066						36,3147			BANK 36
0067	REF	6	LAST	749		36,2000			SETTLC P40S
0068						36,3147			BANK
0069	REF	44	LAST	747		36,3147	0 5353 1	P40LM	TC PHASCHNG
00692						36,3150	04024 0		OCT 04024
00694	REF	1				36,3151	3 3133 0		CAF P40ADIES
0070	REF	20	LAST	753		36,3152	55'455 0		TS WHICH
0071	REF	14	LAST	748		36,3153	3 0106 0		CA FLBW010
0072	REF	9	LAST	748		36,3154	7 4737 1		MASK APSFLBIT
0073	REF	225	LAST	750		36,3155	10 000 0		CCS A
0074	REF	1				36,3156	1 3121 1		TCF P40ALM
0079	REF	203	LAST	748		36,3157	0 4616 1		TC BANKROLL
0080	REF	5	LAST	502		36,3160	11254 1		CADR RO2BOTH
00801	REF	24	LAST	743		36,3161	4 0111 1		CS DAPROOLS
00802	REF	5	LAST	294		36,3162	7 4737 1		MASK CSMOUCKD
00803	REF	226	LAST	753		36,3163	10 000 0		CCS A
00804	REF	1				36,3164	3 2020 1		CAF THRESH1
00805	REF	1				36,3165	6 2021 0		AD THRESH3
00806	REF	2	LAST	105		36,3166	55'251 1		TS DVTHRUSH
00807	REF	11	LAST	742		36,3167	3 4751 0		CAF FOUR
00808	REF	28	LAST	749		36,3170	55'515 0		TS DVCNTR

INITIALIZATION FOR BURNBABY.

GO TO 190 STATUS CHECK ROUTINE.

INITIALIZE DVMDR

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0081 REF 104 LAST 735 36,3171 0 6037 0
 0082 36,3172 43175 0
 0083 REF 1 36,3173 34001 1
 0084 REF 1 36,3174 02663 0
 0085 REF 2 LAST 143 36,3175 03735 0
 00852 36,3176 77735 0
 00854 REF 1 36,3177 26002 1
 00856 36,3200 70476 0 P40IN
 0086 REF 1 36,3201 37743 0
 0087 REF 1 36,3202 56246 1
 0088 36,3203 77624 1
 0089 REF 1 36,3204 56413 1
 0090 36,3205 77776 1

TC INTERPRET LOAD CONSTANTS FOR DPS BURN
 VLOAD CLEAR LOAD F. ADJUST. TDECAY
 FOPS
 ROTHRCTL
 STORE F
 SLOAD
 LPSVEX
 DCOMP SEL
 STCALL VEX LOAD EXHAUST VELOCITY FOR TOL COMP.
 540.1 COMPUTES UT AND VGTIG
 CALL 540.2.3 COMPUTES PREFERRED IMU ORIENTATION
 EXIT

00901 36,3206 0 0004 0
 00902 REF 27 LAST 747 36,3207 0 4674 0
 00903 REF 1 36,3210 40142 1
 0091 REF 1 36,3211 0 3213 1

INITIAL
 TC BANKCALL
 CADR PFLICER ZERO ATTITUDE ERRORS. SET DR TO ONE DEG.
 TC P40SXT4

R0092
 0093 REF 1 36,3212 1 2126 1
 R0094

 TCF DLRGABY

0095 36,3213 0 0006 1 P40SXT4
 0096 REF 3 LAST 746 36,3214 23 142 1 QXCH P40/RET
 0100 36,3215 0 0003 1 P41MANU RELINT

EXTEND
 QXCH P40/RET
 RELINT

0101 REF 64 LAST 747 36,3216 0 5516 0
 0102 REF 6 LAST 519 36,3217 00124 0

TC DOWNFLAG CLEAR 3AXISFLG -- R60 WILL USE VECPOINT.
 ADRES 3AXISFLG

0103 REF 204 LAST 753 36,3220 0 4616 1
 0104 REF 4 LAST 519 36,3221 54123 0
 0105 REF 4 LAST 754 36,3222 0 1142 1

TC BANKCALL
 CADR R60LEN DO ATTITUDE MANEUVER ROUTINE
 TC P40/RET

0106 REF 7 LAST 741 27.1462
 0107 REF 19 LAST 746 36,3223 3 0005 1 POSTBURN
 0108 REF 19 LAST 747 36,3224 55 163 0
 0109 36,3225 0 0006 1
 0110 REF 1 36,3226 3 2056 0
 0111 REF 5 LAST 741 36,3227 53 253 0
 0112 REF 1 36,3230 3 3760 0
 0113 REF 205 LAST 754 36,3231 0 4616 1
 0114 REF 4 LAST 725 36,3232 20635 0
 0115 REF 1 36,3233 0 3256 0
 0116 REF 2 LAST 741 36,3234 1 3241 1
 0117 REF 3 LAST 746 36,3235 0 3223 1

EBANK= TRMKCNT
 CA Z
 TS DISPDEX
 EXTEND
 DCA ACADN85
 DXCH AVEGEXIT
 CAF V16N40
 TC BANKCALL
 CADR GEFLEASH
 TC TEF40
 TCF TIGROW
 TC POSTBURN

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0157	REF	1		36.3306	34017-0		FRC52	
0158	REF	4	LAST	755	36.3307	03735-0	STORE	F
0159					36.3310	77624-1	P41IN	CALL
0160	REF	2	LAST	754	36.3311	56246-1		540.1
0164					36.3312	77624-1	P41NORM	CALL
0165	REF	2	LAST	754	36.3313	56413-1		540.2.5
0166					36.3314	77776-1	EXIT	CALCULATE PREPARED THU ORIENTATION AND SET PERATELG.
0169					36.3315	0 0004 0	INPINT	
0170	REF	31	LAST	755	36.3316	0 4674 0	TC	IBNKCALL
0171	REF	5	LAST	755	36.3317	40153-1	CADR	ZATTEROP
0172	REF	32	LAST	756	36.3320	0 4674 0	TC	IBNKCALL
0173	REF	4	LAST	755	36.3321	40140 0	CADR	SETMINDB
0174	REF	2	LAST	754	36.3322	0 3213-1	TC	P40SXT4
0175	REF	106	LAST	755	36.3323	0 6037 0	TC	INTPRET
0176					36.3324	46175-0	VLOAD	CALL
0177	REF	3	LAST	194	36.3325	03701-1		VCTI
0178	REF	1			36.3326	57267 0		541.1
0179	REF	6	LAST	316	36.3327	03902 0	STORE	VGBODY
0180					36.3330	77776-1	EXIT	TRANSFORM VELOCITY-TO-BE-GAINED AT TIG FROM REFERENCE COORDINATES TO LM BODY-AXIS COORDINATES FOR V16485 DISPLAY. (SCALED AT 2 (+7) METERS/CENTISECOND)
0181	REF	3	LAST	755	36.3331	3 3761-1	CAF	V16485B
0182	REF	208	LAST	755	36.3332	0 4616-1	TC	BANKCALL
0183	REF	1			36.3333	20446 0	CADR	GOODSPRET
01831	REF	6	LAST	703	36.3334	3 5017-1	CAF	PRIOB
01832	REF	21	LAST	755	36.3335	55163 0	TS	DISPDEX
01833	REF	31	LAST	747	36.3336	0 5105 0	TC	FINDVAL
01834	REF	3	LAST	243	36.3337	071700	EBANK	VGFREV
01835	REF	1			36.3337	03361-0	2CADR	DYNHDISP
01835	REF	1			36.3340	74067 0		
01836	REF	7	LAST	744	36.3341	0 5327-1	TC	2PHSCHNG
0184					36.3342	00076-0	OCT	00076
0185					36.3343	04024-0	OCT	04024
								GROUP 6-RESTARTS AT-REDO6.7
								GROUP 4-RESTARTS HERE
RO186								
0187	REF	1			36.3344	1 2135-0	TCF	B*KNB*B*
A01871								
01872	REF	13	LAST	744	36.3345	3 4777-1	BLNKWAIT	CAF
01873	REF	209	LAST	756	36.3346	0 4616-1	TC	BANKCALL
01874	REF	14	LAST	718	36.3347	01735-1	CADR	DELAYJOB
01875	REF	22	LAST	756	36.3350	3 1163-1	RED06.7	CA
01876	REF	43	LAST	746	36.3351	6 4752 0	AD	TW
RO188								

ON A RESTART, DO NOT PUT UP BLANKING (BETWEEN TIG-5 AND TIG-1)

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018801				36,3352	0 0006 1	EXTEND		
018802	REF	1		36,3353	1 3345 1	BZF	BLKWAIT	
018803	REF	4	LAST	756	36,3354	3 3761 1	CAF	V16N858
018804	REF	210	LAST	756	36,3355	0 4616 1	TC	BANKCALL
018805	REF	2	LAST	756	36,3356	20446 0	CADR	GODSPRET
018806	REF	7	LAST	756	36,3357	3 5017 1	CAF	PRIOS
018807	REF	12	LAST	706	36,3360	0 5146 1	TC	PRIORCHNG
018808	REF	23	LAST	756	36,3361	3 1163 1	DYNMDISP	CA DISPOEX
018809				36,3362	0 0006 1	EXTEND		
01881	REF	122	LAST	755	36,3363	6 5155 0	BZNF	ENDLEJOP
018811	REF	107	LAST	756	36,3364	0 6037 0	TC	INTERPRT
018812				36,3365	45175 0	VLOAD	CALL	
018813	REF	4	LAST	756	36,3366	03701 1		VGPREV
018814	REF	2	LAST	756	36,3367	57267 0		S41.1
018815	REF	7	LAST	756	36,3370	03502 0	STORE	VGBODY
018816				36,3371	77776 1	EXIT		
018817	REF	14	LAST	756	36,3372	3 4777 1	CAF	ISEL
018818	REF	211	LAST	757	36,3373	0 4616 1	TC	BANKCALL
018819	REF	15	LAST	756	36,3374	01735 1	CADR	DELAYJOB
01882	REF	2	LAST	756	36,3375	1 3361 1	TCF	DYNMDISP

A NON-POSITIVE DISPOEX INDICATES THAT
TIG-35, SO SERVICES WILL BE DOING THE
UPDATING OF NOON BY STEP DYNALIF.

0189	REF	108	LAST	757	36,3376	0 6037 0	CALCNBS	TC	INTERPRT
0190					36,3377	77624 1		CALL	
0191	REF	1			36,3400	75611 0			UPDATEVG
0192					36,3401	45175 0	VLOAD	CALL	
0193	REF	5	LAST	757	36,3402	03701 1			VGPREV
0194	REF	3	LAST	757	36,3403	57267 0			S41.1
0195	REF	8	LAST	757	36,3404	03502 0	STORE	VGBODY	
0196					36,3405	77776 1	EXIT		
0197	REF	42	LAST	741	36,3406	0 4635 0	TC	POSTJUMP	
0198	REF	3	LAST	732	36,3407	65770 1	CADR	SERVEXIT	

0199	REF	1					COUNT*	33/P42
0200	REF	23	LAST	755	E7.1455		EBANK*	WHICH

0201	REF	46	LAST	755	36,3410	0 5353 1	P42LM	TC	PHASECHNG
02012					36,3411	04024 0		OCT	04024

02014	REF	1			36,3412	3 3135 0	CAF	P42ADRES	INITIALIZATION FOR BURRBABY.
0202	REF	24	LAST	757	36,3413	55455 0	TS	WHICH	

0203	REF	15	LAST	753	36,3414	4 0106 1	CS	FLGWRD10	
0204	REF	10	LAST	753	36,3415	7 4737 1	MASK	APSFLBIT	
0205	REF	227	LAST	753	36,3416	10 000 0	CCS	A	
0208	REF	2	LAST	753	36,3417	0 3121 0	TC	P40PLM	
0209	REF	212	LAST	757	36,3420	0 4616 1	P42STAGE	TC	BANKCALL

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0210	REF	7	LAST	755	36,3421	11254 1	CADR	R02BOTH	
02101	REF	1			36,3422	3 6000 1	CAF	THRESH2	INITIALIZE DIVISION
02102	REF	3	LAST	753	36,3423	55'251-1	TS	DVTHRUSH	
02103	REF	12	LAST	753	36,3424	3 4751 0	CAF	FOUR	
02104	REF	29	LAST	753	36,3425	55'515 0	TS	DVCNTR	
0211	REF	109	LAST	757	36,3426	0 6037 0	TC	INTPRET	
0212					36,3427	77214 0	SET	VLAD	LOAD FAPS, MORTAPS, AND AVERAGE INFO
0213	REF	6	LAST	730	36,3430	01072 0		AVFLAG	F, RDOT, AND TDECAV BY VFLG OF LOAD.
0214	REF	1			36,3431	34007 1		FAPS	
0215	REF	5	LAST	756	36,3432	03735 0	STORE	F	
0216					36,3433	52135 1	SLOAD	GOTO	
02162	REF	1			36,3434	26001 1		APSVEX	
02164	REF	1			36,3435	75200 1		P40IN	
0217	REF	25	LAST	757	E7,1455		EBANK	WHICH	
0218	REF	1					COUNT*	33/P47	
0219	REF	213	LAST	757	36,3436	0 4616 1	TC	BANKCALL	P47LR
0220	REF	8	LAST	758	36,3437	11254 1	CADR	R02BOTH	
0221	REF	110	LAST	758	36,3440	0 6037 0	TC	INTPRET	
0222					36,3441	77624 1	CALPS		
0223	REF	1			36,3442	27553 1		HIST-AV2	
0224	REF	289	LAST	744	36,3443	3 0155 0	CA	HPAC +1	
0225	REF	17	LAST	747	36,3444	0 5173 1	TC	TWIDDLE	
0226	REF	1			36,3445	03447 0	ADRES	STARTP47	
02261	REF	123	LAST	757	36,3446	1 5155 1	TCF	END-FJOB	
0227	REF	47	LAST	757	36,3447	0 5353 1	TC	PHASCHG	STARTP47
02391					36,3450	05014 1	OCT	05014	
02392					36,3451	77777 0	OCT	77777	
02393					36,3452	0 0006 1	EXTEND		
0240	REF	1			36,3453	3 3764 1	DCA	ACADIS	
0241	REF	7	LAST	755	36,3454	53'253 0	DXCH	AVEGEXIT	
0242	REF	5	LAST	737	36,3455	3 4736 1	CAF	PRI020	
0243	REF	32	LAST	756	36,3456	0 5105 0	TC	FINDVAC	
0244	REF	4	LAST	316	E7,1622		EBANK	DELVINU	
0245	REF	1			36,3457	03513 0	ZCADF	P47TBY	
0245	REF	1			36,3460	74067 0			
0246	REF	2	LAST	241	36,3461	1 2342 1	TCF	REDACT	CHECKS PHASE 5 AND 6 TO PHASE 4
A0247									SEE FIG-30 IN BURNBABY.
0248	REF	111	LAST	758	36,3462	0 6047 0	CALCNR3	TC	INTPRET
0249					36,3463	53'75 0	VLAD	VAD	
0250	REF	1			36,3464	03502 0		DELV TL	
0251	REF	2	LAST	147	36,3465	03527 1		DELVREF	
0252	REF	13	LAST	727	36,3466	03656 1	STORE	DELVSIN	TEMP STORAGE FOR RESTARTS

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0253					36,3467	77624 1		CALL	
0254	REF	4	LAST	757	36,3470	57267 0			S41.1
0255	REF	5	LAST	758	36,3471	03623 0		STORE	DELVIMU
0256					36,3472	77776 1		EXIT	
02561	REF	48	LAST	758	36,3473	0 5253 1		TC	PHASCHNG
02562					36,3474	10035 0		OCT	10035 REF EADAC AND HCH
02563	REF	112	LAST	758	36,3475	0 6037 0		TC	INTPRET
02564					36,3476	77775 1		VLOAD	
02565	REF	14	LAST	758	36,3477	03656 1			DELVSIR
02566	REF	2	LAST	758	36,3500	03502 0		STORE	DELVCTL
02567					36,3501	77776 1		EXIT	
0257	REF	43	LAST	757	36,3502	0 4635 0		TC	POSTJUMP
0258	REF	4	LAST	757	36,3503	65770 1		CADR	SERVEXIT
0259	REF	1			36,3504	3 3762 1	P47BOD	CAP	V1683
0260	REF	214	LAST	758	36,3505	0 4616 1		TC	BANKCALL
0261	REF	5	LAST	754	36,3506	20635 0		CADR	GOFLASHR
0262	REF	28	LAST	755	36,3507	0 6001 0		TC	GOFSPODH
0263	REF	29	LAST	759	36,3510	0 6001 0		TC	GOTUPODH
02631	REF	2	LAST	758	36,3511	1 3513 1		TCF	P47BODY
02632	REF	2	LAST	755	36,3512	1 3236 1		TCF	P40PHSI
0264	REF	113	LAST	759	36,3513	0 6037 0	P47BODY	TC	INTPRET
0265					36,3514	77775 1		VLOAD	
0266	REF	5	LAST	721	36,3515	06522 1			NICZEROS
0267	REF	6	LAST	759	36,3516	03623 0		STORE	DELVIMU
0268	REF	3	LAST	759	36,3517	03502 0		STORE	DELVCTL
0269					36,3520	77776 1		EXIT	
0270	REF	1			36,3521	0 3504 0		TC	P47BOD
0271	REF	6	LAST	749 TO 750:	12	615*		COUNT*	31/P40
0272	REF	7	LAST	747	36,3522	3 1517 0	IMPLBURN	CA	TGO +1
02721	REF	1			36,3523	0 3735 0		TC	GETDT
0273	REF	18	LAST	758	36,3524	0 5173 1		TC	TWIDDLE
0274	REF	2	LAST	241	36,3525	03542 1		ADRES	ENGOFPSK
0275	REF	65	LAST	754	36,3526	0 5516 0		TC	DOWNFLAG TURN OFF IONFLG
0276	REF	3	LAST	740	36,3527	00153 0		ADRES	IONFLG
0277	REF	66	LAST	759	36,3530	0 5516 0		TC	DOWNFLAG TURN OFF ASTNFLG
0278	REF	4	LAST	746	36,3531	00154 1		ADRES	ASTNFLG
0279	REF	67	LAST	759	36,3532	0 5516 0		TC	DOWNFLAG TURN OFF IMPULSW
0280	REF	1			36,3533	00044 1		ADRES	IMPULSW
0281	REF	49	LAST	759	36,3534	0 5353 1		TC	PHASCHNG RESTART PROTECT ENG OFPSK (ENSD OFF)
0282					36,3535	40114 1		OCT	40114
0283	REF	13	LAST	744	36,3536	0 5221 0		TC	FIXDELAY WAIT HALF A SECOND
0284					36,3537	00062 0		DEC	50

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0285	REF	3	LAST	746	36,3540	0 2653 0	TC	NOULLAGE	TURN OFF ULLAGE
0286	REF	50	LAST	744	36,3541	0 5261 1	TC	TASKOVER	
0287	REF	33	LAST	756	36,3542	0 4674 0	ENGOF TSK	TC	IBNKCALL
0288	REF	1			36,3543	75545 1	CADR	ENGINEOFF	THIS CODING ALLOWS ENGINEOFF FT AL TO BE USED BOTH BY WAITLIST AND BY TC-IBNKCALL
0289	REF	51	LAST	760	36,3544	0 5261 1	TC	TASKOVER	
0290	REF	3	LAST	746	36,3545	3 4644 0	ENGINEOFF	CAP	PP12
0291	REF	33	LAST	758	36,3546	0 5105 0	TC	FINEVAC	MUST BE LOWER PRIOR THAN CLOCKJOB
0292	REF	9	LAST	755	E7.1462		EBANK	TRKMACHT	
0293	REF	4	LAST	754	36,3547	03223 1	2CADR	POSTBURN	
0293					36,3550	74067 0			
0294	REF	37	LAST	747	36,3551	3 4753 1	ENGINEOFF2	CAP	BIT1
0295	REF	34	LAST	739	36,3552	0 5203 0	TC	WAITLIST	
0296	REF	4	LAST	732	E6,1422		EBANK	OMEGAQ	
0297	REF	1			36,3553	03606 1	2CADR	COASTSET	
0297	REF	1			36,3554	74066 1			
0298	REF	14	LAST	747	36,3555	4 0103 1	ENGINEOFF1	CS	FLASW07
0299	REF	1			36,3556	7 4745 1	MASK	IDLEFBIT	SET THE IDLE BIT.
0300	REF	15	LAST	760	36,3557	26 103 1	ADS	FLASW07	
0301	REF	4	LAST	760	36,3560	0 2653 0	TC	NOULLAGE	
0302					36,3561	0 0006 1	ENGINEOFF4	EXTEND	
0303	REF	22	LAST	745	36,3562	3 0025 0	DCA	TIME2	
0304	REF	5	LAST	738	36,3563	53 345 0	DXCH	TEVENT	
0305	REF	4	LAST	738	36,3564	4 4745 1	ENGINEOFF3	CS	ENGONBIT
03051	REF	22	LAST	739	36,3565	7 0101 0	MASK	FLASW05	INSURE ENGONF03 IS CLEAR.
03052	REF	23	LAST	760	36,3566	54 101 0	TS	FLASW05	
03053	REF	7	LAST	738	36,3567	4 4355 1	CS	PRI030	ENGINEOFF3 IS USED AS A PRE-ENGINE ARM
0306					36,3570	0 0006 1	EXTEND		SUBROUTINE.
0307	REF	24	LAST	738	36,3571	02 011 0	RAND	DSALMOUT	
0308	REF	6	LAST	758	36,3572	6 4736 1	AD	PH020	TURN OFF THE ENGINE - OPS OF AN
0309					36,3573	0 0006 1	EXTEND		
0310	REF	25	LAST	760	36,3574	01 011 0	WHITE	DSALMOUT	
0314	REF	25	LAST	753	36,3575	4 0111 1	CS	GAPB00LS	TURN OFF TRIM GIMBAL
0315	REF	1			36,3576	7 4736 0	MASK	USEG01TS	
0316	REF	26	LAST	760	36,3577	26 111 1	ADS	GAPB00LS	
0317	REF	1			36,3600	4 4737 1	CS	HIRTH0UT	ZERO AUTO-THROTTLE WHENEVER THE ENGINE
0319	REF	3	LAST	741	36,3601	54 055 0	TS	THRUST	IS TURNED OFF.
0320	REF	30	LAST	741	36,3602	3 4750 1	CAP	BIT4	THE HARDWARE DOES SO ONLY WHEN THE
0321					36,3603	0 0006 1	EXTEND		ENGINE IS DISARMED.
0322	REF	9	LAST	741	36,3604	05 014 1	WOR	CHAN14	
0323	REF	3	LAST	612	36,3605	0 4707 0	TC	ISHR01RN	

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Line	REF	LAST	Address	Value	Operation	Comments
0324	REF 34	LAST 760	36,3606	0 4674 0	COASTSET TC	DO GAP COASTING INITIALIZATION
0325	REF 4	LAST 747	36,3607	40204 0	CADR	
0326	REF 52	LAST 760	36,3610	0 5261 1	TC	TASKOVER
0327	REF 5	LAST 760	36,1422		EBANK=	OMEGAQ
0328			36,3611	45020 1	UPDATEVG	STQ
0329	REF 3	LAST 142	36,3612	03665 1		QTEMP1
0330	REF 1		36,3613	56447 0		540.8
0331			36,3614	43014 0	BUN	BUN
03311	REF 6	LAST 727	36,3615	01307 1		XDELVFLG
03312	REF 4	LAST 761	36,3616	03665 1		QTEMP1
03313	REF 3	LAST 687	36,3617	03705 0		NORMSW
03314	REF 1		36,3620	75633 0		180SETUP
03315			36,3621	45345 1	DLOAD	DSU
03316	REF 6	LAST 706	36,3622	01235 1		PIPTIME
03317	REF 1		36,3623	03763 0		TIGSAVE
03318			36,3624	50025 0	DSU	RAM
03319	REF 1		36,3625	03432 1		TNEWA
0332	REF 1		36,3626	75656 0		GETTRANS
03321			36,3627	43345 1	DLOAD	DAD
03322	REF 2	LAST 761	36,3630	03763 0		TIGSAVE
03323	REF 2	LAST 761	36,3631	03432 1		TNEWA
0333	REF 1		36,3632	03765 0	STORE	TIGSAVEP
0336			36,3633	77776 1	180SETUP	EXIT
03361	REF 1		36,3634	10 755 1	CCS	PHASE2
03362	REF 1		36,3635	1 3663 0	TLF	RC.7
0337	REF 4	LAST 297	36,3636	3 4737 0	CAP	PRIO10
0338			36,3637	0 0004 0	INHIBIT	
0339	REF 34	LAST 760	36,3640	0 5105 0	TC	FINDVAC
0340	REF 2	LAST 143	E7.1706		EBANK=	VG
0341	REF 1		36,3641	02707 0	2CADR	540.9
0341	REF 1		36,3642	56067 0		
0342	REF 8	LAST 756	36,3643	0 5327 1	TC	PHSCHK
0343			36,3644	00172 0	HLT	00172
0344			36,3645	10035 0	UCT	10035
0347	REF 114	LAST 759	36,3646	0 6037 0	ENDSTEER	TC
034701			36,3647	77745 1	DLOAD	
034702	REF 2	LAST 761	36,3650	03765 0		TIGSAVEP
03471	REF 3	LAST 761	36,3651	27763 0	STOVL	TIGSAVE
03472	REF 7	LAST 717	36,3652	01221 1		RF
03473	REF 9	LAST 692	36,3653	26323 1	STOVL	RINIT
03474	REF 7	LAST 717	36,3654	01227 1		VR
03475	REF 8	LAST 692	36,3655	02331 1	STORE	VINIT
03476			36,3656	45345 1	GETTRANS	DLOAD
03477	REF 9	LAST 675	36,3657	03631 0		TPASS4
03478	REF 7	LAST 761	36,3660	01235 1		PIPTIME
0348	REF 7	LAST 689	36,3661	37452 0	STCALL	DELLT4
0349	REF 5	LAST 761	36,3662	03665 1		QTEMP1

X-PRODUCT STEERING

LAMBERT-VTOGAIN

2.175POT FOR 540.9
HERE AND REPEADAC AFTER RESTORE

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03491	REF 115	LAST 761	36,3663	0 6037 0	NO.9	TC	INTPRET	
03492			36,3664	77650 1		GOTO		
03493	REF 6	LAST 761	36,3665	03665 1			QTEMP1	
0350	REF 116	LAST 762	36,3666	0 6037 0	STEERING	TC	INTERPT	
0351			36,3667	77624 1		CALL		
0352	REF 2	LAST 757	36,3670	75611 0			UPDATEVG	
0353			36,3671	77776 1		EXIT		
0354	REF 30	LAST 758	E7,1515			EBANK	DYCNTR	
0355			36,3672	0 0004 0	NSTEER	INHINT		
0356	REF 5	LAST 740	36,3673	3 5016 0		CA	EBANK7	
0357	REF 23	LAST 740	36,3674	54 003 0		TS	EBANK	
0359	REF 19	LAST 740	36,3675	4 0076 1		CS	FLAGGED	CHECK IMPULSE SWITCH. IT IS SET EITHER BY S40.13 IF TBURN<6 SECS OR BY S40.8 IF STEERING IS ALMOST DONE.
0360	REF 2	LAST 740	36,3676	7 4743 1		MASK	IMPULBIT	
0361	REF 228	LAST 757	36,3677	10 000 0		CCS		
0362			36,3700	1 3705 1		TC	+5	IMPULSW = 0 EXIT
0363	REF 16	LAST 760	36,3701	4 0103 1		CS	FLAGGED7	IMPULSW = 1 WHY? CHECK IDLEFLAG
0364	REF 2	LAST 760	36,3702	7 4745 1		MASK	IDLEFBIT	(IDLEFLAG = 0 --> DVMON ON)
0365	REF 229	LAST 762	36,3703	10 000 0		CCS	A	
0366			36,3704	1 3707 0		TC	+3	DVMON ON-->THRUSTING-->IMPULSW VIA S40.8
0367	REF 44	LAST 759	36,3705	0 4635 0		TC	POSTJMP	DVMON OFF-->IMPULSW ON VIA S40.12-->EXIT
0368	REF 5	LAST 759	36,3706	65770 1		CADR	SERVEXIT	
03681	REF 35	LAST 761	36,3707	0 4674 0		TC	IBNKCALL	
03682	REF 3	LAST 363	36,3710	40165 1		CADR	TORPATE	
0369	REF 68	LAST 759	36,3711	0 5516 0		TC	DONRFLAG	TURN OFF IMPULSW
0370	REF 2	LAST 759	36,3712	00044 1		ADRES	IMPULSW	
0371	REF 46	LAST 746	36,3713	0 5504 0		TC	UPFLAG	
0372	REF 4	LAST 742	36,3714	00161 1		ADRES	IDLEFLAG	TURN OFF DVMON
0373			36,3715	0 0004 0		INHINT		
0374			36,3716	0 0006 1		EXTEND		
0375	REF 35	LAST 744	36,3717	3 1442 1		DCA	TIG	
0376	REF 290	LAST 758	36,3720	52 155 1		DXCH	MPAC	
0377			36,3721	0 0006 1		EXTEND		
0378	REF 23	LAST 760	36,3722	4 0025 1		DCS	TIME2	
0379	REF 291	LAST 762	36,3723	20 155 1		DAS	MPAC	
0380	REF 8	LAST 744	36,3724	0 7257 0		TC	TPAGREE	
0381	REF 292	LAST 762	36,3725	30 155 0		CAF	MPAC +1	
0382	REF 2	LAST 759	36,3726	0 3735 0		TC	GETDT	
0391	REF 19	LAST 759	36,3727	0 5173 1		TC	TWIDDLE	
0392	REF 3	LAST 759	36,3730	03542 1		ADRES	ENGOFTHSK	
0393	REF 9	LAST 761	36,3731	0 5327 1		TC	2PHSCHNG	
0394			36,3732	40114 1		OCT	40114	ENGOFTHSK (ENGINEOFF)
0395			36,3733	00035 1		OCT	00035	SERVICER--REREADAC

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0396	REF 124	LAST 758	36,3734	1 5155 1	TCF	ENDOFJOB
0397	REF 230	LAST 762	36,3735	10 000 0	GETDT	CCS
0398			36,3736	1 3741 1	TCF	+2
0399			36,3737	1 3741 1	TCF	+2
0400	REF 139	LAST 755	36,3740	3 4755 1	CAF	ZERO
0401	REF 84	LAST 725	36,3741	6 4753 1	AD	ONE
0402	REF 107	LAST 751	36,3742	56 001 0	XCH	1
0403	REF 140	LAST 763	36,3743	3 4755 1	CAF	ZERO
0404	REF 8	LAST 759	36,3744	53 517 1	DXCH	TGD
0405	REF 9	LAST 763	36,3745	3 1517 0	CA	TGD +1
0406	REF 193	LAST 751	36,3746	0 0002 0	TC	0

R0424 *****

0425			36,3747	00000 1	SEC150P	DCT	00000	DON'T SEPARATE
0426			36,3750	02734 0	SEC15	DEC	1500	DON'T SEPARATE
0427			36,3751	00000 1	SEC300P	2DEC	3000	
0427			36,3752	05670 0				
0428			36,3753	00000 1	SEC450P	DCT	00000	DON'T MOVE FROM JUST BEFORE SEC45
0429			36,3754	10624 0	SEC45	DEC	4500	
0430			36,3755	00000 1	5SECDP	DCT	00000	DON'T MOVE FROM JUST BEFORE 1 SEC
0431			36,3756	00764 1	5SEC	DEC	500	
0432			36,3757	05050 1	26SECS	DEC	2600	
0437			36,3760	04050 0	V16N40	VN	1640	
0438			36,3761	04125 0	V16N85B	VN	1685	
0439			36,3762	04123 0	V1683	VN	1683	
0440	REF 19	LAST 757	4777		SEC01	=	1 SEC	
0441	REF 2	LAST 749	36,2055		ACADN85	=	P41TABLE +2	
0442	REF 7	LAST 759	E7.1622		EDANK	=	DELVINU	
0443	REF 1		36,3763	03462 1	ACADN83	2CADR	CALCN83	
0443	REF 1		36,3764	74067 0				

R0444 *****

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P0445 PROGRAM DESCRIPTION S40.1 DATE 15 NOV 66
R0446 MOD NO2 LOG SECTION P40-P47
R0447 MOD BY ZELDIN AND ADAPTED BY TALAYCO
R0448 FUNCTIONAL DESCRIPTION
R0449 COMPUTE INITIAL THRUST DIRECTION(UT) AND INITIAL VALUE OF V0
R0450 VECTOR(VGTIG).
R0451 CALLING SEQUENCE
R0452 L CALL
R0453 L+1 S40.1
R0454 NORMAL EXIT MODE
R0455 AT L+2 OF CALLING SEQUENCE (GOTO L+2) NORMAL RETURN OR
R0456 ERROR RETURN IF NOSOFLAG =1
R0457 SUBROUTINES CALLED
R0458 LEMPREC
R0459 INITVEL
R0460 CALCGRAY
R0461 MIDGIM
R0462 ALARM OR ABORT EXIT MODES
R0463 L+2 OF CALLING SEQUENCE, UNSOLVABLE CONIC IF NOSOFLAG=1
R0464 ERASABLE INITIALIZATION REQUIRED
R0465 WEIGHT/G ANTICIPATED VEHICLE MASS DP 816KGM
R0466 XDELVLFC 1-DELTA-V MANEUVER, 0-AIMPT STEER
R0467 F THRUST FOR ENGINE USED
R0468 IF DELTA-V MANEUVER
R0469 DELVSIN SPECIFIED DELTA-V REQUIRED IN
R0470 INERTIAL COORDS. OF ACTIVE VEHICLE
R0471 AT TIME OF IGNITION VECTOR-B7M/CS
R0472 DELVSAB MAG. OF DELVSIN DP 87M/CS
R0473 RTIG POSITION AT TIME OF IGNITION VECTOR-B29M
R0474 VTIG VELOCITY AT TIME OF IGNITION VECTOR-B7M/CS
R0475 IF AIMPT STEER
R0476 TIG TIME OF IGNITION DP 828CS
R0477 RTARG POSITION TARGET TIME VECTOR-B29M
R0478 CSTEER C FOR STEER LAW DP 142
R0479 DLTARG TARGET TIME-IGNITION TIME DP 828CS
R0480 OUTPUT
R0481 UT DESIRED THRUST DIRECTION VECT. 82M/(CS.CS)
R0482 VGTIG INITIAL VALUE OF VELOCITY
R0483 TO BE GAINED (INERT. COORD.) VECTOR-B7M/CS
R0484 DELVLVC VGTIG IN LOC. VERT. COORDS. 87M/CS
R0485 BDT V REQUIRED AT TIG -V REQUIRED AT (TIG-2SEC)
R0486 -GDT FOR S40.13 VECT-B7M/CS
R0487 RTIG CALC IN S40.18(AIMPT) FOR S40.2,3 VECTOR B29M
R0488 POSITION AT TIME OF IGNITION
R0489 DEBRIS QTEMP1
R0490 MPAC, QPRET
R0491 PUSHLIST
R0492 14.2347 BANK 14
R0493 REF 4 LAST 750 27,2000 SETLOC-P40S1-
R0494 27,2246 BANK

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Line	Label	Value	Address	Count	Operation	Comment
0495	REF 1		27,2246	71220 1	STQ	DELTA
0496			27,2247	03632 0		QTEMP
0497	REF 3 LAST 617		27,2250	03442 0		TIG
0498	REF 36 LAST 762		27,2251	03763 0	STORE	TIGSAVE
04981	REF 4 LAST 761		27,2252	77614 1	DELVTEST	BOFF
0499			27,2253	01347 0		XDELVFLG
0500	REF 7 LAST 761		27,2254	56336 1		S40.15
0501	REF 1		27,2255	77201 1	CALCTHET	SETPD
0502			27,2256	00001 0		0
0503			27,2257	03650 1		VTIG
0504	REF 6 LAST 652		27,2260	02331 1	STORE	VINIT
0505	REF 9 LAST 761		27,2261	53435 0	VXV	UNIT
0506			27,2262	03642 1		FTIG
0507	REF 8 LAST 653		27,2263	27673 0	STOVL	UT UP IN UT
0508	REF 3 LAST 144		27,2264	03642 1		FTIG
0509	REF 9 LAST 765		27,2265	02323 1	STORE	FINIT
0510	REF 10 LAST 761		27,2266	65236 0	VSO	PDDL
0511			27,2267	00045 0		36D
0512			27,2270	56205 0	DMP	DDV
0513			27,2271	16412 1		THETACDN
0514	REF 1		27,2272	41205 0	DMP	DMP
0515			27,2273	03664 0		DELVJAB
0516	REF 4 LAST 645		27,2274	01245 0		WEIGHT/G
0517	REF 1		27,2275	77671 1	DDV	
0518			27,2276	03735 0		F
0519	REF 6 LAST 758		27,2277	24017 1	STOVL	14D
0520			27,2300	03656 1		DELVSIN
0521	REF 15 LAST 759		27,2301	74241 0	DOT	VXSC
0522			27,2302	03673 0		UT
0523	REF 4 LAST 765		27,2303	03673 0		UT
0524	REF 5 LAST 765		27,2304	41552 0	VSL2	PUSH
0525			27,2305	65245 1	BVSO	PDDL
0526			27,2306	03656 1		DELVSIN
0527	REF 16 LAST 765		27,2307	00017 1		14D
0528			27,2310	63356 1	SIN	PDVL
0529			27,2311	00007 0		00
0530			27,2312	53435 0	VXV	UNIT
0531			27,2313	03673 0		UT
0532	REF 6 LAST 765		27,2314	45561 1	VXSC	STADR
0533			27,2315	56076 0	STOVL	VGTIG
0534	REF 4 LAST 756		27,2316	65256 0	UNIT	PDDL
0535			27,2317	00017 1		14D
0536			27,2320	74346 0	COS	VXSC
0537			27,2321	74255 0	VAD	VXSC
0538			27,2322	03701 1		VGTIG
0539	REF 5 LAST 765		27,2323	00045 0		36D
0540			27,2324	53352 0	VSL2	VAD
0541			27,2325	77626 0	STADR	
0542						

(DELTA.VP)UP-SCALED-AT-2(+7)-P.D.L. 0
DELTA VP SCALED AT 2(+7) P.D.L. 6

UNIT(VPXOP) SIN(THETAT/2) IN VGTIG.
UNIT(DELTA VP) IN P.D.L. 6

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0543	REF	6	LAST	765	27.2326	74076 0	STORE	VG TIG	VG IGNITION SCALED AT 2(+7)M/CS
0544					27.2327	77656 1	UNIT		
0545	REF	7	LAST	765	27.2330	27673 0	STOVL	UT	THRUST DIRECTION SCALED AT 2(+1)
0546	REF	7	LAST	766	27.2331	03701 1		VG TIG	
0547					27.2332	45006 0	PUSH	CALL	
0548	REF	2	LAST	653	27.2333	15733 1		GET.LVC	VG TIG IN LV COOR AT 2(+7)M/CS IN RELVEL
0552					27.2334	77650 1	GOTO		
0553	REF	4	LAST	765	27.2335	03632 0		QTEMP	
0554					27.2336	77745 1	S40.18	DLOAD	
0555	REF	37	LAST	765	27.2337	03442 0		TIG	
0556	REF	47	LAST	734	27.2340	00041 1	STORE	TDELT	
0557					27.2341	77621 1	BDSU		
0558	REF	10	LAST	761	27.2342	03631 0		TPASS4	
0559	REF	8	LAST	761	27.2343	37452 0	STCALL	DELT4	INTERCEPT TIME = TIG.
0560	REF	9	LAST	730	27.2344	27057 0		LENPREC	
0561					27.2345	40375 1	VLOAD	SETPD	LOAD STATE VECTOR AT TIG FOR INTVECT.
0562	REF	27	LAST	727	27.2346	00001 0		RATT	
0563					27.2347	00001 0		0	
0564	REF	10	LAST	765	27.2350	03642 1	STORE	RTIG	
0565	REF	11	LAST	765	27.2351	02323 1	STORE	RINIT	
05651					27.2352	77656 1	UNIT		
05652	REF	2	LAST	147	27.2353	27537 0	STOVL	UNIT/F/	
0566	REF	22	LAST	726	27.2354	00007 0		VATT	
05665	REF	7	LAST	765	27.2355	03650 1	STORE	VTIG	
0567	REF	10	LAST	765	27.2356	02331 1	STORE	VINIT	
0568					27.2357	65345 0	DLOAD	PDOL	NUMIT = 0
0569	REF	11	LAST	677	27.2360	06522 1		ZEROVECS	
0570	REF	1			27.2361	16406 1		EPS1	
0571					27.2362	43214 1	BOFF	DAD	
0572	REF	4	LAST	761	27.2363	03745 1		NORMSW	
0573	REF	1			27.2364	56366 1		SMALLEPS	
0574	REF	1			27.2365	16410 0		EPS2	EPSILON4 = 10 DEGREES OR 45 DEGREES.
0575					27.2366	66006 1	SMALLEPS	PUSH	
0576	REF	13	LAST	698	27.2367	02776 0		SXA,1	
0577					27.2370	45134 0	SXA,2	CALL	
0578	REF	12	LAST	699	27.2371	02777 1		RTX2	
0579	REF	3	LAST	674	27.2372	22000 1		INITVEL	
0580					27.2373	41575 0	VLOAD	PUSH	
0581	REF	14	LAST	727	27.2374	02366 0		DELVECT	VG TIG = VR - VN.
0582	REF	8	LAST	766	27.2375	03701 1	STORE	VG TIG	
0583					27.2376	77656 1	UNIT		UT = UNIT (VG TIG)
0584	REF	8	LAST	766	27.2377	17673 0	STOVL	UT	
0585					27.2400	00045 0		160	
0586	REF	4	LAST	653	27.2401	37664 1	STCALL	VGDISP	CONVERT VG TIG (IN PUSHLIST) TO LOCAL
0587	REF	3	LAST	766	27.2402	15733 1		GET.LVC	VERTICAL COORDINATES.
0588					27.2403	77650 1	GOTO		
0589	REF	5	LAST	766	27.2404	03632 0		QTEMP	
0590					27.2405	00707 1	EPS1	2DELT	2.777777778 E-2* 10 DEGREES AT 1 REVOLUTION.
0590					27.2406	03434 1			

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0591	27.2407	03070 0	EPS2	2DEC	9.722222222 E-2	35 DEGREES AT 1 REVOLUTION.
0591	27.2410	34344 0				
0592	27.2411	00024 1	THETACON	2DEC	.31830989 E-8	
0592	27.2412	13714 1				

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R0593 SUBROUTINE NAME: S40.2.3 MOD. NO. 3 DATE: APRIL 4, 1967

R0594 MODIFICATION BY: JONATHAN D. ADDELSTON (ADAMS ASSOCIATES)

R0595 MOD. NO. 4: JULY 18, 1967: PETER ADLER (MIT/IL)

R0596 MOD. NO. 5: OCTOBER 18, 1967: PETER ADLER (MIT/IL)

R0597 ORIGINALLY BY: SAYDEAN ZELDIN (MIT INSTRUMENTATION LAB) AND RICHARD TALAYCO (SYSTEM DEVELOPMENT CORP)

R0599 S40.2.3 COMPUTES "POINTVSM" WHICH IS THE HALF-UNIT DESIRED THRUST VECTOR IN STABLE-MEMBER COORDINATES FROM "UT"
 R0601 WHICH IS THE SAME VECTOR IN REFERENCE COORDINATES. IT DETERMINES THE CORRECT VALUES FOR "SCAXIS" USING THE +X
 R0603 AXIS FOR DPS, APS, AND RCS BURNS. THE "WINGS-LEVEL HEADS-UP" LM ORIENTATION IS THEN COMPUTED IN REFERENCE
 R0605 COORDINATES. THESE VECTORS ALSO DEFINE THE "PREFERRED IMU ORIENTATION". UPON COMPLETION OF THIS CALCULATION,
 R0607 THE "PREFERRED ATTITUDE COMPUTED" FLAG IS SET (PPRATFLG).

R0608 CALLING SEQUENCE:

A0609	L	CALL	INTERPRETIVE CALL.
A0610	L +1	S40.2.3	
A0611	L +2	(RETURN)	GIMBAL ANGLE VECTOR IN APAC.

R0612 SUBROUTINES CALLED: NONE.

R0613 NORMAL RETURN: L +2 (SEE CALLING SEQUENCE ABOVE).

R0614 ALARM/ABORT MODES: NONE.

R0615 INPUT:

R0616	1. REFSMMAT	MATRIX FROM REFERENCE TO STABLE-MEMBER COORDINATES SCALED AT 2.
R0618	2. UT	HALF-UNIT-DESIRED-THRUST-DIRECTION.
R0619	3. RTIG	POSITION AT TIG IN REFERENCE COORDINATES.

R0621 OUTPUT:

R0622	1. : XSCREF :	WINGS-LEVEL-HEADS-UP-LM-ORIENTATION
R0623	: YSCREF :	IN-REFERENCE-COORDINATES
R0624	: ZSCREF :	(PREFERRED IMU ORIENTATION).
R0625	2. POINTVSM	DESIRED-THRUST-DIRECTION-IN-STABLE-MEMBER-COORDINATES.
R0627	3. SCAXIS	HALF-UNIT OF AXIS TO ALIGN IN STABLE-MEMBER COORDINATES.
R0629	4. PPRATFLG	INTERPRETIVE FLAG. ON: PREFERRED ORIENTATION COMPUTED; OFF: NOT COMPUTED.

R0631 DEBRIS: NONE.

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0632	REF	1					COUNT*	337540.2		
0633				27,2413	77775	1	540.2,3	VLOAD	UT	UT: DESIRED THRUST DIRECTION (HALF-UNIT)
0634	REF	9	LAST	766	27,2414	03673	0		UT	(PUT INTO TOP OF PUSH-DOWN-LIST.)
0635				27,2415	76521	0		XXV	VSL1	TRANSFORM THRUST DIRECTION TO STABLE-
0636	REF	22	LAST	734	27,2416	01734	0		REFMMAT	MEMBER FROM REFERENCE COORDS (RESCALE).
0637	REF	5	LAST	518	27,2417	27773	1		POINTVSM	SAVE FOR "VECPINT" ROUTINE (LEMMA 1).
0638	REF	6	LAST	580	27,2420	06520	0		UNITX	SCAXIS-SET TO +X, FOR P40 AND P42 AND
0639	REF	22	LAST	518	27,2421	27765	0		SCAXIS	FOR P41 IF ECS NOT -X,+Y,-Y,+Z,-Z.
0640	REF	10	LAST	769	27,2422	03673	0		UT	ASSUME +X BURN ALWAYS, EVEN FOR ECS.
0641	REF	1			27,2423	03607	0	PLUSX	STORE	XSCREF = UT (DESIRED THRUST DIRECTION).
0642					27,2424	53435	0		XXV	UNIT
0643	REF	11	LAST	766	27,2425	03642	1		RTIG	RTIG = POSITION AT TIME-OF-IGNITION.
06431					27,2426	46125	0		PDDL	BHIZ
06432					27,2427	00045	0			360
06433	REF	1			27,2430	56441	0		FIXY	TEST MAGNITUDE OF UT X RTIG
06434					27,2431	45575	1	STORY	VLOAD	IF SHALL, USE UT X VTIG AS YSC
0644	REF	1			27,2432	74162	1		STORE	YSCREF
0645					27,2433	76435	1		XXV	VSL1
0646	REF	2	LAST	769	27,2434	03607	0			XSCREF
0647					27,2435	77676	0		VCMP	COMPUTE (YSCREF X XSCREF), BUT FOR A
0648	REF	1			27,2436	03623	0		STORE	Z-REF
										RIGHT HANDED SYSTEM. NEED (X CROSS Y).
										ZSCREF = - (YSCREF X XSCREF)
										= + (XSCREF X YSCREF)
0649					27,2437	43414	1		SET	PVS
0650	REF	1			27,2440	01073	1			PFRTFLG
06501					27,2441	47375	0	FIXY	VLOAD	XXV
06502	REF	3	LAST	769	27,2442	03607	0			XSCREF
06503	REF	8	LAST	766	27,2443	03650	1			VTIG
06504					27,2444	41456	0		UNIT	PUSH
06505					27,2445	77650	1		GOTO	
06506	REF	1			27,2446	56431	1			STORY

IN THIS CASE,
YSCREF = UNIT(XSCREF X VTIG)

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R0651 SUBROUTINE S40.8

R0652 MODIFIED APRIL 3, 1968 BY PETER ADLER MIT/IL

R0653 DESCRIPTION

R0654 S40.8 UPDATES THE VELOCITY-TO-BE-GAINED VECTOR, VG, (AND FOR LAMBERT TARGETTED BURNS ALSO EXTRAPOLATES VG
 R0656 USING THE BDT VECTOR) COMPUTES THE TIME FOR ISSUING THE ENGINE OFF COMMAND, TGO, AND CALLS THE ROUTINE
 R0658 "FINDCDUW", WHICH GENERATES STEERING COMMANDS FOR THE GAP.

R0659 CALLING SEQUENCE

R0660 L-1 CALL

R0661 L S40.8

R0662 L+1 INTERPRETIVE RETURN

R0663 ALARM

R0664 IF VG . DELVREF IS NEGATIVE (VG AND DELVREF OVER 90 DEGREES APART), BYPASS TGO AND STEERING COMPUTATION
 R0666 AND SET ALARM 1407. RETURN TO CALLER NORMALLY.

R0667 INPUT AND INITIALIZATION

R0668 VGPREV REFERENCE 2(7) M/CS

R0669 DELVREF REFERENCE 2(7) M/CS

R0670 BDT REFERENCE 2(7) M/CS

R0671 TDECAY TAIL-OFF TIME 2(28) CS

R0672 XDELVFLG 1 = EXTERNAL DELTA-V; 0 = LAMBERT (A1MPDINT)

R0673 STEERSW 1 = DO STEERING AND TGO COMPUTATIONS; 0 = VG UPDATE ONLY

R0674 FIRSTFLG 1 = GONE TO LAMBERT AT LEAST ONCE; 0 = HAVEN'T GONE TO LAMBERT YET

R0676 NOTE: VGTIG EQUALS VGPREV

R0677 OUTPUT

R0678 STEERSW SEE INPUT

R0679 IMPULSW 1 = ENGINE OFF IN TGO CENTISECONDS; 0 = CONTINUE BURN

R0680 TGO TIME TO CUT-OFF 2(28) CS

R0681 SEE FINDCDUW FOR STEERING OUTPUTS.

R0682 SUBROUTINE CALLED

R0683 FINDCDUW

R0684 DEBRIS

R0685 MPACS, PUSHLIST

0686 REF 1

COUNT = 34/S40.8

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GENERATE VR IF NOT EXTERNAL DELTA-V BURN

VELOCITY TO BE GAINED SCALED AT (7) G/CS

DELV IS MORE THAN 90 DEGREES FROM VG.

400 CS

0687				27.2447	77614 1	S40.8	BUF	
0688	REF	8	LAST	765	27.2450	01347 0		XDELVFLG
0689	REF	1			27.2451	56731 1		RASTEER1
0690					27.2452	52575 1	VLOAD	VSO
0691	REF	6	LAST	757	27.2453	03701 1		VGPREV
0692	REF	3	LAST	758	27.2454	03527 1		DELVREF
0693	REF	3	LAST	761	27.2455	03707 1	VGAIN*	VG
0694					27.2456	76521 0	MXV	VSL1
0695	REF	23	LAST	769	27.2457	01734 0		REFSMMAT
0696	REF	3	LAST	200	27.2460	03254 1	STORE	UNFL/2
0707					27.2461	51575 1	BDTRK	VLOAD
0708	REF	4	LAST	771	27.2462	03707 1		VG
0709	REF	5	LAST	766	27.2463	03664 0	STORE	VCDISP
0710					27.2464	77201 1	TGOCALC	SETPD
0711					27.2465	00001 0		0
0712	REF	5	LAST	771	27.2466	03707 1		VG
0713	REF	7	LAST	771	27.2467	27701 1	STOVL	VGPREV
0714	REF	4	LAST	771	27.2470	03527 1		DELVREF
0715					27.2471	57414 1	BOFF	VCOMP
0716	REF	1			27.2472	01344 0		STEERSW
0717	REF	5	LAST	711	27.2473	00052 0		OPRET
0718					27.2474	77650 1	UNIT	
0719					27.2475	41441 0	DOT	PUSH
0720	REF	6	LAST	771	27.2476	03707 1		VG
0721					27.2477	56244 0	BPL	DDV
0722	REF	1			27.2500	56526 0		ALARMIT
0723	REF	2	LAST	754	27.2501	03743 1		VEX
0724					27.2502	41215 1	DAD	DMP
0725	REF	12	LAST	669	27.2503	06520 0		DPHALF
0726					27.2504	56261 1	SR	DDV
0727					27.2505	20613 1		IGD
0728					27.2506	00045 0		36D
0729					27.2507	43205 1	DMP	DAD
0730	REF	1			27.2510	16535 0		-FOURDT
0731	REF	1			27.2511	03741 0		TDECAY
0732	REF	10	LAST	763	27.2512	03517 1	STORE	TGO
0733					27.2513	77615 0	DAD	
0734	REF	8	LAST	761	27.2514	01235 1		PIPTIME
0735	REF	38	LAST	766	27.2515	17442 0	STOVL	TIG
0736	REF	11	LAST	771	27.2516	03517 1		TGM
0737					27.2517	51025 1	DSU	BPL
0738	REF	1			27.2520	16537 1		FOURSECS
0739	REF	1			27.2521	61111 1		FINDCOW -2
0740					27.2522	43014 0	SET	CLRGD
0741	REF	3	LAST	762	27.2523	01066 0		IMPULSW
0742	REF	2	LAST	771	27.2524	01224 1		STEERSW
0743	REF	6	LAST	771	27.2525	00052 0		OPRET

0744 27.2526 77776 1 ALARMIT EXIT

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0745	REF 30	LAST 748	27.2527	0 5567 0	TC	ALARM	
0746			27.2530	01407 0	OCT	01407	
0747	REF 117	LAST 762	27.2531	0 6037 0	TC	INTERPT	
0748			27.2532	77650 1	GOTO		
07485	REF 2	LAST 771	27.2533	61111 1		FINDCOW -2	SKIP TGO COMPUTATION BUT CALL FINDCOW. FINDCOW WILL EXIT TO UPDATEV6 +.
0749			27.2534	77715 1	-FOUPDT 2DEC	-800 B-18	-4 (200 CS.) 8 (-18)
0749			27.2535	77777 0			
0751			27.2536	00000 1	FOURSECS 2DEC	400	400 CS SCALED AT 2 (+28)CS
0751			27.2537	00620 0			
07515	REF 3	LAST 771	27.1742		2VEXHUST =	VEX	

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P0752 NAME S40.13 - TIMEBURN
 R0753 FUNCTION (1) DETERMINE WHETHER A GIVEN COMBINATION OF VELOCITY TO
 R0754 BE GAINED AND ENGINE CHOICE RESULT IN A BURN TIME
 R0755 SUFFICIENT TO ALLOW STEERING AT THE VEHICLE DURING THE
 R0756 BURN
 R0757 (2) THE MAGNITUDE OF THE RESULTING BURN TIME -- IF IT
 R0758 IS SHORT -- AND THE ASSOCIATED TIME OF THE ENGINE OFF
 R0759 SIGNAL
 R0760 CALLING SEQUENCE VIA FINDVAC AS A NEW JOB
 R0761 INPUT VGTIG VELOCITY TO BE GAINED VECTOR (METERS/CS) AT +7
 R0762 WEIGHT/G MASS OF VEHICLE IN KGM AT +16
 R0763 F APS ENGINE THRUST IN M. NEWTONS AT +7
 R0764 AND ALSO FOR RCS ENGINE
 R0765 MDOT RATE OF DECREASE OF VEHICLE MASS DURING ENGINE
 R0766 BURN IN KILOGRAMS/CS AT +3. THIS SCALING MAY
 R0767 REQUIRE MODIFICATION FOR SATURN BURNS.
 R0768 ENGIFLAG SWITCH TO DECIDE WHETHER APS OR DPS ENGINE IS USED
 R0769 =0 DPS
 R0770 =1 APS
 R0771 OUTPUT IMPULSW ZERO FOR STEERING
 R0772 ONE FOR ATTITUDE HOLD
 R0773 NOTHROTL ZERO FOR THROTTLING
 R0774 ONE TO INHIBIT THROTTLING
 R0775 TGO TIME TO BURN IN CS
 R0776 THE QUANTITY M. NEWTON = 10000 NEWTONS WILL BE USED TO EXPRESS
 R0777 FORCE

0778	REF 12	LAST 771	E7.1516	EBANK= TGO	
0779	REF 1			COUNT# 43/40.13	
0780	REF 118	LAST 772	27.2540 0 6037 0 S40.13	TC	INTPRET
0781			27.2541 43001 1	SETPD	CLEAR
0782			27.2542 00001 0		000
0783	REF 4	LAST 771	27.2543 01266 1	IMPULSW	ASSUME NO STEERING UNTIL FORCED OTHERWISE
0784			27.2544 51575 1	VLOAD	ABVAL
0785	REF 9	LAST 766	27.2545 03701 1	VGTIG	VELOCITY TO BE GAINED AT +7
0786			27.2546 41325 0	PDDL	DMP
0787	REF 1		27.2547 21021 1		4SEC(17)
0788	REF 2	LAST 756	27.2550 34017 0		FRCS2
0789			27.2551 72471 0	BDV	SET
0790	REF 2	LAST 765	27.2552 01245 0		SCALE
0791			27.2553 41421 0	BDSU	PUSH
0792			27.2554 43014 0	BUFF	SET
0793	REF 1		27.2555 05342 1		APSFLAG
0794	REF 1		27.2556 56626 0		S40.13D
0795	REF 2	LAST 754	27.2557 02463 1		FOR DPS ENGINE
0796			27.2560 56345 0		NOTHROTL
0797	REF 1		27.2561 16001 1	OLOAD	DEV
0798	REF 3	LAST 773	27.2562 01245 0		000 = MAG OF VGTIG CORRECTED
0799			27.2563 50021 1	BDSU	M. NEWTONS-CS AT +24

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0800		27,2564	00001 0		OGD	
0801	REF 1	27,2565	56610 0		S40.131	TGD LESS THAN 100 CS
0802		27,2566	41325 0	PDDL	DMP	02D = TEMP1 AT +7
0803	REF 2 LAST 143	27,2567	03737 1		DDT	

R0804 MDOT REPRESENTS THE RATE OF DECREASE OF VEHICLE MASS DURING ENGINE
 R0805 BURN IN KILOGRAMS/CS. WHEN SATURN IS USED, THE SCALING MAY
 R0806 REQUIRE ADJUSTMENT

0807	REF 1	27,2570	16700 1		3.55EC	350 CS AT +14
0808		27,2571	65221 0	BDSU	PDDL	
0809	REF 4 LAST 773	27,2572	01245 0		WEIGHT/G	
0810	REF 7 LAST 765	27,2573	03735 0		F	
0811		27,2574	60405 0	DMP	SR2	SCALE
0812	REF 1	27,2575	16702 0		5SECS	
0813		27,2576	41471 0	DDV	PUSH	04D = TEMP2
0814		27,2577	51021 0	BDSU	BPL	
0815		27,2600	00003 1		02D	
0816	REF 2 LAST 773	27,2601	56626 0		S40.13D	
0817		27,2602	55345 0	DLOAD	BDDV	
0818		27,2603	43205 1	DMP	DAD	
0819	REF 2 LAST 774	27,2604	16702 0		1SECS	
0820	REF 1	27,2605	16676 1		1SECS	100 CS AT +14
0821		27,2606	77650 1	GOTO		
0822	REF 1	27,2607	56616 0		S40.132	
0823		27,2610	41345 0	S40.131	DLOAD	DMP
0824	REF 5 LAST 774	27,2611	01245 0		WEIGHT/G	
0825		27,2612	41542 1	SR1	PUSH	
0826		27,2613	56215 1	DAD	DDV	
0827	REF 1	27,2614	16003 0		K2VAL	M. NEWTON CS AT +24
0828	REF 1	27,2615	16005 0		K4VAL	M. NEWTON CS AT +10
0829		27,2616	77414 0	S40.132	SET	EXIT
0830	REF 5 LAST 773	27,2617	01066 0		IMPULSW	
0831	REF 9 LAST 762	27,2620	0 7257 0	S40.132*	TC	TPAGREE
0832	REF 293 LAST 762	27,2621	3 0154 1	CA	PPAC	
0833	REF 108 LAST 763	27,2622	56 001 0	XCH	L	
0834	REF 141 LAST 763	27,2623	3 4755 1	CA	ZERO	
0835	REF 13 LAST 773	27,2624	53 517 1	DXCH	TGD	
0836	REF 1	27,2625	1 2650 1	TCF	S40.134	
0837		27,2626	41345 0	S40.13D	DLOAD	DMP
0838		27,2627	00001 0		DDV	FOR DPS ENGINE
0839	REF 6 LAST 774	27,2630	01245 0		WEIGHT/G	
0840		27,2631	43006 0	PUSH	BON	
0841	REF 2 LAST 773	27,2632	05302 0		APSFLAG	
0842	REF 1	27,2633	56671 1		APSTG	
0843		27,2634	43071 0	DDV	CLEAR	
0844	REF 1	27,2635	16007 1		S40.136	
0845	REF 3 LAST 773	27,2636	02663 0		NOTHRTL	
0846		27,2637	41400 0	DDV	PUSH	

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0847	REF	1		27,2640	56653	1		S40.130V	
0848				27,2641	51025	1	S40.137	DSU	BPL
0849	REF	1		27,2642	16704	0			6SEC
0850	REF	1		27,2643	56661	0			S40.138
0851				27,2644	52015	1		DAD	GOTO
0852	REF	2	LAST	775	27,2645	16704	0		6SEC
0853	REF	2	LAST	774	27,2646	56616	0		S40.132
0854				27,2647	77776	1	S40.133	EXIT	
0855	REF	50	LAST	759	27,2650	0 5353	1	S40.134	TC
0856				27,2651	00003	1		HCT	00003
0857	REF	125	LAST	763	27,2652	0 5155	0		TC
0858				27,2653	40545	1	S40.130V	DLAD	SR4
0859				27,2654	77671	1		DDV	
0860	REF	1		27,2655	16011	0			S40.136
0861	REF	14	LAST	774	27,2656	03517	1		STORE
0862				27,2657	77776	1		EXIT	TGO
0863	REF	2	LAST	774	27,2660	1 2650	1		TCF
									S40.134
									REJOIN COMMON CODING FLP RESTART PROTECT
0864				27,2661	51025	1	S40.138	DSU	BPL
0865	REF	1		27,2662	16706	1			89SECS
0866	REF	1		27,2663	56666	1			STORETGO
0867				27,2664	77614	1		SET	
0868	REF	4	LAST	774	27,2665	02463	1		NOTHROTL
0869				27,2666	77745	1	STORETGO	DLAD	
0870				27,2667	77776	1		EXIT	
0871	REF	1		27,2670	1 2620	0		TCF	S40.132*
0872				27,2671	62471	1	APSTGO	DDV	SE2
0873	REF	2	LAST	758	27,2672	34007	1		FAP5
08735				27,2673	77650	1		GOTO	
0874	REF	2	LAST	775	27,2674	56667	0		STORETGO +1
0876				27,2675	00144	0	1SEC20	2DEC	100.0 B-14
									100.0 CS AT +14
0878				27,2676	00000	1			
0879				27,2677	01274	1	3.5SEC	2DEC	50.0 B-13
									50.0 CS AT +13
0879				27,2700	00000	1			
0880				27,2701	00764	1	5SECS	2DEC	500.0 B-14
									500.0 CS AT +14
0880				27,2702	00000	1			
0881				27,2703	01130	1	6SEC	2DEC	600.0 B-14
									600.0 CS AT +14
0881				27,2704	00000	1			
0886				27,2705	21304	0	89SECS	2DEC	8900.0 B-14
0886				27,2706	00000	1			
R0888	FUNCTION			(1) GENERATES REQUIRED VELOCITY AND VELOCITY-TO-BE-GAINED					
R0889				VECTORS FOR USE DURING AIMPOINT MANEUVERS EVERY TWO					
R0890				COMPUTATION CYCLES (4 SECONDS).					
R0891				(2) UPDATES THE B VECTOR WHICH IS USED IN THE FINAL					
R0892				CALCULATION OF EXTRAPOLATING THE VELOCITY-TO-BE-GAINED					
R0893				THROUGH ONE 2-SECOND INTERVAL INTO THE FUTURE.					
R0894	CALLING SEQ			VIA FINDVAC AS NEW JOB.					
R0895	INPUT			RN	- ACTIVE VEHICLE RADIUS VECTOR IN METERS AT +29.				
R0896				VN	- ACTIVE VEHICLE VELOCITY VECTOR IN METERS/CS AT +7				

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R0897      VRPREV - LAST COMPUTED VELOCITY REQUIRED VECTOR IN
R0898      METERS/CS AT +7.
R0899      TIG - TIME OF IGNITION IN CS AT +28.
R0900      DLTARG - COMPUTATION CYCLE INTERVAL = 200 CS AT +28.
R0901      PIPTIME - TIME OF RN AND VN IN CS AT +28.
R0902      GDT/2 - HALF OF VELOCITY GAINED IN DELTA T TIME DUE TO
R0903      ACCERERATION OF GRAVITY IN METERS/CS AT +7.
R0904      DELVREF - CHANGE IN VELOCITY DURING LAST 2 SEC IN
R0905      METERS/CS AT +7.
R0906      OUTPUT VGPREV - VELOCITY TO BE GAINED VECTOR IN METERS/CS AT +7.
R0907      VGDISP - MAG OF VGPREV FOR DISPLAY PURPOSES.
R0908      VRPREV - VELOCITY REQUIRED VECTOR IN METERS/CS AT +7.
R0909      BDT - B VECTOR IN METERS/CS AT +7.
R0910      SUBROUTINES USED - INITVEL
0911      REF 8 LAST 771 27,2700 EBANK= VGPREV
0912      REF 2 LAST 44 TO 44 2 2* COUNT= 44/540.9
0913      REF 119 LAST 773 27,2707 0 6037 0 540.9 TC INTPRET
0914      27,2710 77601 0 SETPD
0915      27,2711 00001 0 OGD
0925      27,2712 71214 0 SET DLOAD
0926      REF 7 LAST 758 27,2713 01072 0 AVFLAG SET AVFLAG FOR LFM ACTIVE
0927      REF 6 LAST 759 27,2714 06522 1 HIGZERLS
0928      27,2715 77725 1 PDDL
0929      REF 2 LAST 766 27,2716 16406 1 EPS1
0930      27,2717 43214 1 BUFF DAD EPSILON4 = 10 OR 45 DEGREES.
0931      REF 5 LAST 766 27,2720 03745 1 NORMSW
0932      REF 1 27,2721 56723 1 EPSSMALL
0933      REF 2 LAST 766 27,2722 16410 0 EPS2
0934      27,2723 45006 0 EPSSMALL PUSH CALL
0935      REF 1 27,2724 22002 0 HAVEGUES
0936      27,2725 77776 1 ENDS40.9 EXIT
0937      REF 51 LAST 775 27,2726 0 5353 1 TC PHASCHNG
0938      27,2727 00002 0 DCT 2
0939      REF 126 LAST 775 27,2730 1 5155 1 TCF END OF JLF

0940      27,2731 51575 1 RASTEER1 VLOAD ABVAL
0941      REF 8 LAST 761 27,2732 01221 1 RN
0942      27,2733 53744 0 LXC.2 SL*
0943      REF 13 LAST 766 27,2734 02777 1 RTX2
0944      27,2735 57576 1 0.2
0945      REF 2 LAST 143 27,2736 27715 1 STOVL RMAG
0946      REF 8 LAST 690 27,2737 03444 0 RTARG
0947      27,2740 47051 0 VSU RTB
0948      REF 9 LAST 776 27,2741 01221 1 RN
0949      REF 3 LAST 705 27,2742 21724 0 NORMUNX1
0950      REF 1 27,2743 17656 1 STODL IC
0951      27,2744 00045 0 360 C(360) = ABVAL(IC)
0952      27,2745 53674 1 XAD.2 SL*
0953      REF 16 LAST 726 27,2746 00046 0 X1

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0954				27,2747	57576 1		0.2
0955				27,2750	00037 0	STORE	300
0956				27,2751	41301 0	NORM	DMP
0957	REF	13	LAST	714	27,2752		X2
0958	REF	3	LAST	776	27,2753		R MAG
0959				27,2754	57101 0	NORM	XAD, 2
0960	REF	17	LAST	776	27,2755		X1
0961	REF	18	LAST	777	27,2756		X1
0962				27,2757	77734 1	SXA, 2	
0963	REF	1		27,2760	03766 0		MUSCALE
0964	REF	2	LAST	143	27,2761	STOOL	RIC 2(+55 -Y)
0965				27,2762	00037 0		300
0966				27,2763	65342 1	SR1	PDDL
0967	REF	4	LAST	777	27,2764		R MAG
0968				27,2765	65342 1	SR1	PDDL
0969	REF	4	LAST	686	27,2766		R MAG
0970				27,2767	43342 0	SR1	DAD
0971				27,2770	45415 0	DAD	STADR
0972	REF	1		27,2771	74044 1	STORE	SS SS = (R1 + R2 + C) / 2
0973				27,2772	41225 1	DSU	DMP
0974				27,2773	00037 0		300
0975	REF	3	LAST	690	27,2774		MU/A
0976				27,2775	77621 1	BDSU	
0977	REF	3	LAST	690	27,2776		MUASTEER
0978				27,2777	45325 1	PDDL	DSU
0979	REF	2	LAST	777	27,3000		SS
0980	REF	5	LAST	777	27,3001		R MAG
0981				27,3002	70501 1	NORM	SR1
0982	REF	19	LAST	777	27,3003		X1
0983				27,3004	41271 0	DDV	DMP
0984	REF	3	LAST	777	27,3005		RIC
0985				27,3006	53664 0	XSU, 2	SL*
0986	REF	20	LAST	777	27,3007		X1
0987				27,3010	57575 1		1, 2
0988				27,3011	77754 1	LXA, 2	
0989	REF	2	LAST	777	27,3012		MUSCALE
0990				27,3013	75366 0	SQRT	SIGN
0991	REF	3	LAST	688	27,3014		GEOMSON
0992				27,3015	00041 1	STORE	320 + UR - A
0993				27,3016	41345 0	DLOAD	DMP
0994	REF	3	LAST	777	27,3017		SS
0995	REF	4	LAST	777	27,3020		MU/A
0996				27,3021	77621 1	BDSU	
0997	REF	4	LAST	777	27,3022		MUASTEER
0998				27,3023	45325 1	PDDL	DSU
0999	REF	4	LAST	777	27,3024		SS
1000	REF	5	LAST	777	27,3025		R MAG
1001				27,3026	70501 1	NORM	SR1
1002	REF	21	LAST	777	27,3027		X1
1003				27,3030	41271 0	DDV	DMP

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1004	REF	4	LAST	777	27,3031	03725 1			
1005					27,3032	53664 0	XSU,2	SL*	
1006	REF	22	LAST	777	27,3033	00046 0		X1	
1007					27,3034	57575 1		1.2	
1008					27,3035	65366 1	SQRT	PDDL	-3 (NO SIGN)
1009	REF	5	LAST	777	27,3036	03733 0		SS	
1010					27,3037	56225 1	DSU	DDV	
1011					27,3040	00037 0		300	
1012	REF	6	LAST	778	27,3041	03733 0		SS	
1013					27,3042	41566 1	SQRT	PUSH	
1014					27,3043	67542 0	SR1	ASIN	
1015					27,3044	65205 0	DMP	PDDL	
1016	REF	1			27,3045	17216 1		2PI+3	
1017					27,3046	56325 0	PDDL	DDV	
1018					27,3047	00037 0		300	
1019	REF	7	LAST	778	27,3050	03733 0		SS	
1020					27,3051	77600 1	DDV		
1021					27,3052	57053 0		+1	
1022					27,3053	41366 1	SQRT	DMP	
1023					27,3054	44242 0	SR3	BDSU	
1024					27,3055	65365 1	SIGN	PDDL	
1025	REF	4	LAST	777	27,3056	02673 1		GEOMSGN	
1026	REF	2	LAST	778	27,3057	17216 1		2PI+3	
1027					27,3060	45302 1	SR2	DSU	
1028					27,3061	65205 0	DMP	PDDL	
1029	REF	8	LAST	778	27,3062	03733 0		SS	
1030	REF	9	LAST	778	27,3063	03733 0		SS	
1031					27,3064	75442 1	SR3	SQRT	
1032					27,3065	77605 1	DMP		
1033					27,3066	52525 1	PDDL	SL3	
1034	REF	5	LAST	777	27,3067	03717 0		QUARTER	
1035					27,3070	55366 1	SQRT	BDDV	
1036					27,3071	43225 0	DSU	DAD	
1037	REF	11	LAST	766	27,3072	03631 0		TPASS4	
1038	REF	9	LAST	771	27,3073	01235 1		FIFTEEN	
1039					27,3074	14037 0	STDDL	300	
1040					27,3075	77765 0	SIGN		
1041					27,3076	00037 0			3 WITH SIGN
1042					27,3077	00037 0	STORE	300	
1043					27,3100	77214 0	BON	VLOAD	
1044	REF	6	LAST	776	27,3101	03705 0		NORMSW	
1045	REF	1			27,3102	57123 0		180MESS	
1046	REF	2	LAST	776	27,3103	03656 1		IC	
1047					27,3104	53451 1	VSD	UNIT	
1048	REF	3	LAST	766	27,3105	03537 0		UNIT/R/	
1049					27,3106	63361 0	VXSC	PDDL	
1050					27,3107	00037 0		300	
1051	REF	3	LAST	778	27,3110	03656 1		IC	
1052					27,3111	53455 0	VAD	UNIT	
1053	REF	4	LAST	778	27,3112	03537 0		UNIT/R/	

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1054			27.3113	53361 0	GETVRVG1 VXSC	VAD	
1055			27.3114	00041 1		32D	
1056			27.3115	53744 0	GETVRVG2 LXC,2	VSR*	
1057	REF	14	LAST	776	27.3116	02777 1	RTX2
1058			27.3117	57177 1		0 -1.2	
1059	REF	9	LAST	727	27.3120	02337 1	STORE VIPRIME
1060			27.3121	77650 1		GOTO	
1061	REF	1			27.3122	57166 1	ASTREND -2
1062			27.3123	50375 0	180MESS	VLOAD	DOT
1063	REF	4	LAST	778	27.3124	03656 1	IC
1064	REF	5	LAST	778	27.3125	03537 0	UNIT/R/
1065			27.3126	77240 1	BMN	VLOAD	
1066	REF	1			27.3127	57146 0	NEGPRDD
1067	REF	5	LAST	779	27.3130	03656 1	IC
1068			27.3131	63362 0	VSR1	PDVL	
1069	REF	6	LAST	779	27.3132	03537 0	UNIT/R/
1070			27.3133	53362 0	VSR1	VAD	
1071			27.3134	77656 1	UNIT		
1072			27.3135	57406 1	PUSH	VCOMP	FOR A
1073			27.3136	75235 1	VXV	SIGN	
1074	REF	4	LAST	687	27.3137	02674 0	UN
1075	REF	5	LAST	778	27.3140	02673 1	GEOMSGN
1076			27.3141	74256 0	UNIT	VXSC	
1077			27.3142	00037 0		30D	
1078			27.3143	77715 1	PDVL		UNIT(IC-14) +-3
1079			27.3144	77650 1	GOTO		
1080	REF	1			27.3145	57113 0	GETVRVG1
1081			27.3146	74575 0	NEGPRDD	VLOAD	VSR1
1082	REF	7	LAST	779	27.3147	03537 0	UNIT/R/
1083			27.3150	74515 0	PDVL	VSR1	
1084	REF	6	LAST	779	27.3151	03656 1	IC
1085			27.3152	53451 1	VSU	UNIT	
1086			27.3153	77606 1	PUSH		
1087			27.3154	75235 1	VXV	SIGN	
1088	REF	5	LAST	779	27.3155	02674 0	UN
1089	REF	6	LAST	779	27.3156	02673 1	GEOMSGN
1090			27.3157	74256 0	UNIT	VXSC	
1091			27.3160	00041 1		32D	
1092			27.3161	77715 1	PDVL		
1093			27.3162	53361 0	VXSC	VAD	
1094			27.3163	00037 0		30D	
1095			27.3164	77650 1	GOTO		
1096	REF	1			27.3165	57115 0	GETVRVG1
1097			27.3166	77651 0	VSU		
1098	REF	3	LAST	735	27.3167	03553 1	VHL
1099	REF	15	LAST	766	27.3170	02366 0	ASTREND STORE
1100			27.3171	53135 0	FIRSTTME	SLOAD	HZE
1101	REF	15	LAST	779	27.3172	03000 1	RTX2
1102	REF	1			27.3173	57177 1	GETGURL
1103			27.3174	52175 0	VLOAD	GOTO	NO FLATNESS COMP IF IN MOON SPHERE

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1104	REF	16	LAST	779	27,3175	02366 0		DELVECT	
1105	REF	1			27,3176	57212 1		NOGOBL	
1106					27,3177	53575 0	GETGOBL	VLOAD	UNIT
1107	REF	10	LAST	776	27,3200	01221 1		RN	
1108					27,3201	45345 1		DLOAD	DSU
1109	REF	10	LAST	778	27,3202	01255 1		PIPTIME	
1110	REF	3	LAST	733	27,3203	03512 1		GOBLTIME	
1111					27,3204	56205 0	DRP	POV	
1112	REF	1			27,3205	16023 1		EARTH	
1113					27,3206	00043 0		340	
1114					27,3207	53361 0	VXSC	VAD	
1115	REF	1			27,3210	03521 1		UNITGOBL	
1116	REF	17	LAST	780	27,3211	02366 0		DELVECT	
1117	REF	18	LAST	780	27,3212	02366 0	NOGOBL	STORE	DELVECT
1118					27,3213	77650 1		GUTO	
1119	REF	1			27,3214	56455 0		VGATE	

CALCULATE OBLATENESS TERM.

$$C = - (MU/E) (UNITGOBL) (T - TIG)$$

$$340 = 7447 (2) \text{ FROM UNIT OPERATION.}$$

$$\text{OUTPUT FROM INITVEL } VG = VR - VN$$

$$VG = VR + GOBL - VN$$

1120					27,3215	31103 1	2PI+3	2DEC	3.141592653 B-2
1120					27,3216	56652 0			

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1169	REF	1		27.3255	02323 1
1169	REF	1		27.3256	02067 1
1170	REF	53	LAST 761	27.3257	0 5261 1
1171	REF	30	LAST 606	27.3260	4 4742 0
1172				27.3261	0 0006 1
1173	REF	48	LAST 781	27.3262	03 012 1
1174	REF	1		27.3263	1 3247 1
1175	REF	47	LAST 762	27.3264	0 5504 0
1176	REF	2	LAST 781	27.3265	00137 1
1177	REF	54	LAST 782	27.3266	0 5261 1

2CADR THIMMOHE

TC TASKOVER

CS PITCH

EXTEND

WAND CHAN12

TCF ROLLOVER

TC RFFLAG

ADRES G-DRVSW

TC TASKOVER

SHUT OFF PITCH

SEE IF ROLL HAS FINISHED ALSO.

ROLL DONE; OF PITCH DONE; BUT NOT BOTH.

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P1178 SUBROUTINE NAME: S41.1 MOD. NO. 0 DATE: FEBRUARY 18, 1967

R1179 MOD. NO. 1 DATE: JANUARY 23, 1968: BY PETER ADLER (MIT/IL)

R1181 AUTHOR: JONATHAN D. ADDELSTON (ADAMS ASSOCIATES)

R1182 S41.1 PERFORMS THE COORDINATE SYSTEM TRANSFORMATION FROM THE REFERENCE FRAME TO THE BODY OF THE LM.
 R1184 SPECIFICALLY, IT IS USED TO TRANSFORM A VELOCITY (SCALED AT 2(+7) METERS/CENTISECOND) FROM REFERENCE TO LM AXIS
 R1186 COORDINATES. FIRST THE VECTOR IS TRANSFORMED TO THE STABLE MEMBER COORDINATES BY THE MATRIX REF5MAT. THIS
~~R1188 LEAVES THE VECTOR IN MPAC, SCALED AT 2(+8) METERS/CENTISECOND. THEN~~
 R1189 THE SUBROUTINE COUTRIG IS CALLED TO SET UP THE DOUBLE-PRECISION CDU VECTOR ALONG WITH ITS SINES AND COSINES.
 R1191 THE VECTOR IS THEN TRANSFORMED FROM STABLE MEMBER COORDINATES TO SPACECRAFT (OR LM) COORDINATES BY THE
 R1192 SUBROUTINE *SHNB*. FINALLY, THE VECTOR IS RESCALED TO 2(+7) METERS/CENTISECOND, AND CONTROL IS RETURNED TO THE
 R1195 CALLER WITH C(MPAC) = VELOCITY(LM).

R1196 CALLING SEQUENCE:

A1197	L	VLOAD	CALL	
A1198	L +1		VELOCITY(REF)	SCALED AT 2(+7)M/CS IN REFERENCE COORDS.
A1199	L +2		S41.1	
A1200	L +3	STOP	VELOCITY(LM)	SCALED AT 2(+7)M/CS IN LM BODY AXIS SYS.

R1201 SUBROUTINES CALLED:

R1202 1. COUTRIG,
 R1203 WHICH CALLS CDULOGIC.
 R1204 2. *SHNB*

R1205 NORMAL RETURN: L +3 (SEE CALLING SEQUENCE, ABOVE.)

R1206 ALARM/ABORT MODES: NONE.

R1207 RESTART PROTECTION: NONE.

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P1208 INPUT:

R1209 1. REFSMMAT.
 R1210 2. CDUX, CDUY, CDUZ.
 R1211 3. VELOCITY (REF) IN MPAC.

R1212 OUTPUT:

R1213 1. CDUSPOT: DOUBLE PRECISION CDU VECTOR, ORDERED Y,Z,X.
 R1214 2. SINCDU: HALF SINES OF CDUSPOT COMPONENTS.
 R1215 3. COSCDU: HALF COSINES OF CDUSPOT COMPONENTS.
 R1216 4. MPAC: VELOCITY(LH) (SCALED AT 2(+7) METERS/CENTISECOND)

R1217 DEBRIS: NONE.

R1218 CHECKOUT STATUS: CODED.

1219	REF	1					COUNT#	33/S41.1
1220			27,3267	76521 0	S41.1		MAXV	VSL 1
1221	REF	24	LAST 771	27,3270	01734 0			REFSMMAT
1222				27,3271	77650 1		GOTO	
1223	REF	2	LAST 516	27,3272	47646 0			CDU*SMNB
A1224								

CONVERT VECTOR IN MPAC FROM REF AT 2(+7)
 TO SR AND RESCALE DUE TO HALFUNIT MATRIX
 CONVERT TO BODY AT 2(+7) USING PRESENT
 CDU ANGLES. CDU*SMNB WILL RETURN
 VIA RVC TO THE CALLER OF S41.1

L THE LUNAR LANDING

USER'S PAGE NO. 1 EU-53-

Address	REF	Count	Last	Value 1	Value 2	Value 3	Value 4	Label
0001				32,2776				BANK = 32
0002	REF	3	LAST	600	32,2000			SETLOC FLOPS*32
0003					32,2776			BANK
0004	REF	1			E7.1621			EBANK = ELOPS
R0005					*****			
R0006					P63: THE LUNAR LANDING BRAKING PHASE			
R0007					*****			
0008	REF	1						COUNT* \$\$/P63
0009	REF	52	LAST	776	32,2776	0 5353	1	P63LM TC PHASCHNG
0010					32,2777	04024	0	DCT C4024
0011	REF	215	LAST	759	32,3000	0 4616	1	TC BANKCALL DO IMU STATUS CHECK ROUTINE R02
0012	REF	9	LAST	758	32,3001	11254	1	CADR RG2BOTH
0013	REF	1			32,3002	3 3253	0	CAP P63ADRES INITIALIZE WHICH FOR BURNBABY
0014	REF	26	LAST	758	32,3003	55'455	0	TS WHICH
00141	REF	1			32,3004	3 2000	0	CAP DPSTHRSH INITIALIZE DVMON
00142	REF	4	LAST	758	32,3005	55'251	1	TS DVTHRUSH
00143	REF	13	LAST	758	32,3006	3 4751	0	CAP FOUR
00144	REF	31	LAST	762	32,3007	55'515	0	TS DVCNTR
0015	REF	85	LAST	763	32,3010	4 4753	0	CS UPH INITIALIZE WCHPHASE AND FLPASS
0016	REF	2	LAST	739	32,3011	55'351	0	TS WCHPHASE
0017	REF	142	LAST	774	32,3012	3 4755	1	CA ZERR
00175	REF	3	LAST	739	32,3013	55'623	0	TS FLPASSC
0018	REF	56	LAST	606	32,3014	4 4736	0	CS INIT4
0019					32,3015	0 0006	1	EXTEND
0020	REF	49	LAST	762	32,3016	03 012	1	WARD CHAN12 REMOVE TRACK-ENABLE DISCRETE.
0023	REF	120	LAST	776	32,3017	0 6037	0	FLAGURGY TC INTERPRET DIDNYSIAN FLAG WAVINC
0024					32,3020	43014	0	CLEAR CLEAR
0025	REF	5	LAST	775	32,3021	02663	0	NOTHROTIL
0026	REF	1			32,3022	03271	0	FEDFLAG
0030					32,3023	43014	0	CLEAR SET
0031	REF	1			32,3024	05660	1	LBPYPASS
0032	REF	4	LAST	734	32,3025	03067	0	MUNFLAG
0033					32,3026	43014	0	CLEAR CLEAR
0034	REF	3	LAST	502	32,3027	00266	0	P25FLAG TERMINATE P25 IF IT IS RUNNING.
0035	REF	4	LAST	565	32,3030	00270	1	PNDVZFLG TERMINATE P20 IF IT IS RUNNING
A0036					*****			
0037					32,3031	77201	1	SIGNALG SETPD VLOAD FIRST SET-UP INPUTS FOR RP-TU-R

L THE LUNAR LANDING

USER'S PAGE NO. 2 E7-53

0038				32,3032	00001 0	0	AT 00-LANDING-SITE-IN MOON-FIXED-FRAME	
0039	REF	6	LAST	717	32,3033	02023 1	AT 60 ESTIMATED TIME OF LANDING	
0040				32,3034	41525 0	PDDL	PUSH MPAC-NON-ZERO TO INDICATE LUNAR CASE	
0041	REF	3	LAST	200	32,3035	02401 0	TLAND	
0042	REF	2	LAST	149	32,3036	57625 1	STCALL	TRIP ALSO SET TRIP FOR FIRST GUIDANCE PASS
0043	REF	1			32,3037	55716 1	RP-TO-R	
0044				32,3040	64312 0	VSL4	MXV	
0045	REF	25	LAST	784	32,3041	01734 0	REFSMAT	
0046	REF	3	LAST	200	32,3042	37635 0	STCALL	LAND
0047	REF	1			32,3043	46432 0	GUIDINIT	GUIDINIT INITIALIZES W4 AND /LAND/
0048				32,3044	45345 1	DLOAD	DSU	
0049	REF	4	LAST	786	32,3045	02401 0	TLAND	
0050	REF	1			32,3046	25260 1	GUIDDURN	
0051	REF	48	LAST	766	32,3047	54041 0	STCALL	TOEC1 INTEGRATE STATE FORWARD TO THAT TIME
0052	REF	10	LAST	766	32,3050	27057 0	LEMPREC	
0053				32,3051	77331 0	SSP	VLOAD	
00531	REF	1			32,3052	03647 1	NIGNLOOP	
00532				32,3053	00050 1	40D		
0057	REF	7	LAST	769	32,3054	06520 0	UNITX	
0058	REF	2	LAST	122	32,3055	26603 0	STOVL	CG
0059	REF	4	LAST	580	32,3056	06516 0	UNITY	
0060	REF	3	LAST	786	32,3057	26611 0	STOVL	CG +6
0061	REF	7	LAST	705	32,3060	06514 1	UNITZ	
0062	REF	4	LAST	786	32,3061	16617 0	STOVL	CG +14
00621	REF	1			32,3062	25256 1	99999CUN	
00622	REF	4	LAST	315	32,3063	27665 1	STOVL	DELTAH INITIALIZE DELTAH FOR VIGN68 OF PLAT
00623	REF	12	LAST	766	32,3064	06522 1	ZEROVECS	
00624	REF	4	LAST	771	32,3065	17254 1	STOVL	DELTAZ INITIALIZE DELTAZ FOR VIGN68 OF PLAT
0063	REF	7	LAST	776	32,3066	06522 1	H16ZERDS	
0065	REF	3	LAST	200	32,3067	03643 0	STOFF	TTF/4
0066				32,3070	77745 1	IGNALOOP	DLOAD	
0067	REF	15	LAST	734	32,3071	00015 0	TAT	
0068	REF	4	LAST	734	32,3072	27561 0	STOVL	PIPTIME1
0073	REF	10	LAST	734	32,3073	00017 1	KATT1	
0074				32,3074	64312 0	VSL4	MXV	
0075	REF	26	LAST	786	32,3075	01734 0	REFSMAT	
0076	REF	5	LAST	598	32,3076	37521 0	STCALL	R
0077	REF	2	LAST	734	32,3077	67130 1	MUNGRAV	
0078	REF	4	LAST	678	32,3100	35237 1	STCALL	GDT/2
0079	REF	1			32,3101	62454 0	7GUIDSUB	WHICH DELIVERS N-PASSES OF GUIDANCE

00080 DDUMCALC IS PROGRAMMED AS FOLLOWS:-

00081
 00083 $(RIGNZ - PDU) / 16 + 16(RGU) KIGNY/88 + (RGU - RIGNX) KIGNX/84 + (ABVAL(VGU) - VIGN) KIGNV/44$
 00085
 00086 DDUM =
 00088 10
 00089 2 $(VGU - 16 VGU) KIGNX/84$

L THE LUNAR LANDING

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R0090

2

R0091 THE NUMERATOR IS SCALED IN METERS AT 2(28). THE DENOMINATOR IS A VELOCITY IN UNITS OF 2(10)M/IS.
 R0093 THE QUOTIENT IS THUS A TIME IN UNITS OF 2(16) CENTISECONDS. THE FINAL SHIFT RESCALES TO UNITS OF 2(24) IS.
 R0095 THERE IS NO DAMPING FACTOR. THE CONSTANTS KIGNX/B4, KIGNY/B4 AND KIGNV/B4 ARE ALL NEGATIVE IN SIGN.

0097	REF	2	LAST	786	32.3102	55.646 0	DDUMCALC	TS	NIGHTDUP	
00971	REF	121	LAST	786	32.3103	0.6037 0		TC	INTERPET	
00972					32.3104	57345 1		DLOAD	DATA	FROM DENOMINATOR *1ST
0098	REF	3	LAST	200	32.3105	0.627 1			VGN	
0099	REF	2	LAST	121	32.3106	0.2501 1			KIGNX/B4	
0100					32.3107	44232 1		SL4R	DSU	
0101	REF	4	LAST	787	32.3110	0.5633 1			VGN +4	
0102					32.3111	45325 1		PDDL	DSU	
0103	REF	2	LAST	121	32.3112	0.2477 1			KIGNZ	
0104	REF	2	LAST	200	32.3113	0.2643 1			RGU +4	
0105					32.3114	65222 0		SL4R	PDDL	
0106	REF	3	LAST	787	32.3115	0.2641 0			RGU +2	
0107					32.3116	57316 1		DSQ	DATA	
0108	REF	2	LAST	121	32.3117	0.2503 0			KIGNY/B4	
0109					32.3120	65232 1		SL4R	PDDL	
0110	REF	4	LAST	787	32.3121	0.2637 1			RGU	
0111					32.3122	57225 0		DSU	DATA	
0112	REF	2	LAST	121	32.3123	0.2475 0			KIGNX	
0113	REF	3	LAST	787	32.3124	0.2501 1			KIGNX/B4	
0114					32.3125	51515 1		PDDL	ABVAL	
0115	REF	5	LAST	787	32.3126	0.3627 1			VGN	
0116					32.3127	57225 0		DSU	DATA	
0117	REF	2	LAST	121	32.3130	0.2473 0			VGN	
0118	REF	2	LAST	121	32.3131	0.2505 0			KIGNV/B4	
0119					32.3132	43215 0		DAD	DAD	
0120					32.3133	56215 1		DAD	DATA	
0121					32.3134	77661 0		SRR		
0122					32.3135	21613 0			100	
0123					32.3136	43206 1		PUSH	DAD	
0124	REF	5	LAST	786	32.3137	0.561 0			PIPTIME1	
0125	REF	49	LAST	786	32.3140	14041 1		STCOL	DATA	STORE NEW GUESS FOR NEXT INTEGRATION
0126					32.3141	45246 0		ABS	DSU	
0127	REF	1			32.3142	25262 0			DDUMCRIT	
0128					32.3143	45040 1		PRN	CALL	
0129	REF	1			32.3144	65163 0			DDUMGDD	
0130	REF	26	LAST	710	32.3145	27414 0			INTSTALL	
0131					32.3146	43014 0		SET	SET	
0132	REF	14	LAST	710	32.3147	01473 0			INTYPFLG	
0133	REF	13	LAST	711	32.3150	00063 1			DDUMELAC	
0134					32.3151	77745 1		DLOAD		
0136	REF	6	LAST	787	32.3152	0.561 0			PIPTIME1	
0137	REF	12	LAST	710	32.3153	25517 0		STCOL	DATA	HOPEFULLY ?GUISUB DID NOT Clobber DATA AND VATT
0138	REF	11	LAST	786	32.3154	00017 1			DATA	

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0139	REF	12	LAST	710	32,3155	25535 0	STOVL	RCV	
0140	REF	13	LAST	734	32,3156	00025 0		VATT1	
0141	REF	10	LAST	710	32,3157	35543 0	STCALL	VCV	
0142	REF	7	LAST	710	32,3160	27107 1		INTEGRVS	
0143					32,3161	77650 1	GOTO		
0144	REF	1			32,3162	65070 0		IGNALOOP	
0145					32,3163	54335 0	DDURG000	SLOAD	SP
0146	REF	4	LAST	739	32,3164	03423 1		ZOOMTIME	
0147					32,3165	20617 0		140	
0148					32,3166	77621 1	BDSU		
0149	REF	50	LAST	787	32,3167	00041 1		TDECI	
0150	REF	39	LAST	771	32,3170	27442 0	STOVL	116	COMPUTE DISTANCE LANDING SITE WILL BE
0151	REF	3	LAST	598	32,3171	03527 1		V	OUT OF LM'S ORBITAL PLANE AT IGNITION:
0152					32,3172	53435 0	VXV	UNIT	SIGN IS + IF LANDING SITE IS TO THE
0153	REF	6	LAST	786	32,3173	03521 1			RIGHT, NORTH; - IF TO THE LEFT, SOUTH.
0154					32,3174	72441 0	LOUT	RE	
0155	REF	4	LAST	786	32,3175	03635 1		LAND	
0156	REF	3	LAST	315	32,3176	26627 0	P60INIT	STOVL	INITIALIZATION FOR CALCMANU
0157	REF	5	LAST	786	32,3177	03254 1		UNFC/2	
0158	REF	3	LAST	122	32,3200	02631 1	STORE	R60VSAVE	STORE UNFC/2 TEMPORARILY IN R60VSAVE
0162					32,3201	77776 1	EXIT		
A0163									*****
0164	REF	53	LAST	785	32,3202	0 5353 1	IGNALORT	TC	PHASCHAG
0165					32,3203	04024 0	OCT	04024	PREVENT REPEATING IGNALG
0166	REF	1			32,3204	4 4362 0	ASTNCLK	CS	ASTROEX
0167	REF	216	LAST	785	32,3205	0 4616 1		TC	BANKCALL
0168	REF	2	LAST	734	32,3206	74664 0	CADR	STCLOCK2	
0169	REF	127	LAST	776	32,3207	1 5155 1	TCF	ENDFEJOB	RETURN IN NEW JOB AND IN EBANK FIVE
0170	REF	122	LAST	787	32,3210	0 6037 0	ASTNRET	TC	INTERET
0171					32,3211	47131 1	SSP	RFB	GO PICK UP DISPLAY AT END OF R51:
0172	REF	2	LAST	124	32,3212	02747 1		ORAD	"PROCEED" WILL DO A FINE ALIGNMENT
0173	REF	1			32,3213	65215 1	FCADR	P63SPDT2	"ENTER" WILL RETURN TO P63SPDT2
0174	REF	1			32,3214	31135 1		R51P63	
0175					32,3215	53575 0	P63SPDT2	VLOAD	INITIALIZE KALCMANU FOR BURN ATTITUDE
01751	REF	4	LAST	788	32,3216	02631 1		R60VSAVE	
01752	REF	6	LAST	769	32,3217	27773 1	STOVL	POINTVSR	
01753	REF	8	LAST	786	32,3220	06520 0		UNITX	
01754	REF	23	LAST	769	32,3221	03765 0	STORE	SCAXIS	
01755					32,3222	77776 1	EXIT		
01756	REF	6	LAST	762	32,3223	3 5016 0	CAP	EBANK7	
01757	REF	24	LAST	762	32,3224	54 003 0	TS	EBANK	
0176					32,3225	0 0004 0	INHINT		
0177	REF	36	LAST	762	32,3226	0 4674 0	TC	IBNKCALL	
0178	REF	2	LAST	754	32,3227	40142 1	CADR	PFLITEDB	

L-----THE LUNAR LANDING-----

-----USER'S PAGE NO.-----5-----E7-52-----

0179				32,3230	0 0000 1	REFLINT		
0180	REF 217	LAST 788		32,3231	0 4616 1	TC	BANKCALL	
0181	REF 5	LAST 754		32,3232	54123 0	CA	BANKCALL	
0182	REF 54	LAST 788		32,3233	0 5353 1	TC	BANKCALL	PREVENT RECALLING P60
0183				32,3234	04024 0	TC	BANKCALL	
0184	REF 32	LAST 661		32,3235	3 4746 0	P63SPJTS	CA	IS THE LF ANTENNA IN POSITION 1 YET
0185				32,3236	0 0006 1	EXTEND		
0186	REF 21	LAST 604		32,3237	02 033 0	RAND	CHAN33	
0187				32,3240	0 0006 1	EXTEND		
0188	REF 1			32,3241	1 5247 1	B7F	P63SPJTS	BRANCH IF ANTENNA ALREADY IN POSITION 1
0189	REF 1			32,3242	3 3254 1	CAF	CODE 500	ASTRONAUT: PLEASE CHECK THE
0190	REF 218	LAST 789		32,3243	0 4616 1	TC	BANKCALL	SILLY THING ABOUT
0191	REF 4	LAST 748		32,3244	20623 1	CAF	CODE 500	
0192	REF 30	LAST 759		32,3245	1 6001 1	TC	BANKCALL	TERMINATE
0193	REF 1			32,3246	1 3235 1	TC	BANKCALL	PROCEED SEE IF HE'S LYING
0194	REF 219	LAST 789		32,3247	0 4616 1	P63SPJTS	TC	ENTER INITIALIZE LANDING RADAR
0195	REF 1			32,3250	67721 1	CA	BANKCALL	
0196	REF 45	LAST 762		32,3251	0 4616 0	TC	BANKCALL	OFF TO SEE THE WIZARD...
0197	REF 2	LAST 754		32,3252	74126 1	CA	BURNBABY	

0198

0199

CONSTANTS FOR P63LM AND IGNALG

0200	REF 2	LAST 749		32,3253	02076 1	P63ADRES	GENADR	P63TABLE
0202	REF 2	LAST 458		4582		ASTINDEX		OCT 25: INDEX FOR CLONTASK
0203				32,3254	00500 1	CODE500	OCT	00500
02035				32,3255	00035 1	99999999	2010	00479.7 2-24
02035				32,3256	50373 0			
0204				32,3257	00004 0	GUIDORUN	2010	+0.5440031411
0204				32,3260	01610 1			
0205				32,3261	00000 1	00000011	2010	CRITERION FOR IGNALG CONVERGENCE
0205				32,3262	00010 0			

GAP: ASSEMBLE REVISION 001 OF AGC PROGRAM LMY99 BY NASA 2021112-061

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R0206

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P0207

R0208

R0209

P681-LANDING CONFIRMATION

0210 31.2144
 0211 REF 2 LAST 39 31.2000
 0212 31.2144

BANK 31
 SETLOC F2DPS*31
 BANK

0213 REF 1

COUNT* 33/P0567

0214 REF 55 LAST 789 31.2144 0 5353 1
 0215 31.2145 04024 0

LANDJUNK TC PHASCHNG
 OCT 04024

02151 31.2146 0 0004 0
 0216 REF 220 LAST 789 31.2147 0 4616 1
 0217 REF 6 LAST 756 31.2150 40153 1

THHINT
 TC BANKCALL ZERO-ATTITUDE ERROR
 CADR ZATTEROR

0219 REF 221 LAST 791 31.2151 0 4616 1
 0220 REF 1 31.2152 40127 1

TC BANKCALL SET 5 DEGREE DEADBAND
 CADR SETMAXDB

0221 REF 123 LAST 788 31.2153 0 6037 0
 0222 31.2154 43014 0

TC INTERPRET TO INTERPRETIVE AS TIME IS NOT CRITICAL
 SET CLEAR

0223 REF 14 LAST 656 31.2155 04067 1
 0224 REF 1 31.2156 04666 0

SURFFLAG
 LETABORT

0225 31.2157 77214 0
 0226 REF 3 LAST 774 31.2160 05062 0

SET VLOAD
 APSFLAG

0230 REF 11 LAST 780 31.2161 01221 1
 0231 REF 3 LAST 697 31.2162 16032 1

RN
 STOODL ALPHAV

0232 REF 11 LAST 780 31.2163 01235 1
 0233 31.2164 45014 0

PIPTIME
 SET CALL

0234 REF 3 LAST 656 31.2165 01463 1
 0235 REF 2 LAST 657 31.2166 26351 1

LUNAFLAG
 LAT-LONG

0236 31.2167 77201 1
 0237 31.2170 00001 0

SETPD VLOAD COMPUTE PLS AND STORE IT AWAY
 0

0238 REF 12 LAST 791 31.2171 01221 1
 0239 31.2172 65352 0

RR
 VSL2 PDDL

0240 REF 12 LAST 791 31.2173 01235 1
 0241 31.2174 45006 0

PIPTIME
 PUSH CALL

0242 REF 1 31.2175 51670 1
 0243 REF 7 LAST 786 31.2176 02023 1

R-TO-RP
 STORE PLS

0244 31.2177 77776 1
 0245 REF 1 31.2200 3 2215 0

EXIT
 CAF V06045

0246 REF 222 LAST 791 31.2201 0 4616 1
 0247 REF 22 LAST 748 31.2202 20476 0

ASTRONAUT: NOW LOOK WHERE YOU FLEE
 TC BANKCALL
 CADR GFLASH

0248 REF 31 LAST 789 31.2203 1 6001 1
 0249 31.2204 1 2206 0

TCF GOTOPDDH TERMINATE
 TCF +2 PROCEED

0250 31.2205 1 2200 0

TCF -5 RECYCLE

0251 REF 124 LAST 791 31.2206 0 6037 0

TC INTERPRET

L THE LUNAR LANDING

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0252 31.2207 77775 1
0253 REF 9 LAST 788 31.2210 06520 0
0254 REF 5 LAST 202 31.2211 36231 1
0255 REF 1 31.2212 33506 1
0256 31.2213 77776 1

VLOAD

INITIALIZE OSAY AND (USING REFREF)

UNITX

YNBSAV, ZNDSAV AND ATTFLAG FOR 157

STCALL 4SAV

REFREF

EXIT

0257 REF 32 LAST 791 31.2214 1 6001 1

TCF 00000000

ASTRONAUT: PLEASE SELECT P57

0258 31.2215 01453 1 V06N43* VN 0643

L THROTTLE CONTROL ROUTINES

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```

0001          31.2216          BANK 31
0002 REF 2 LAST 40 31.2000          SETLOC FTHRUT
0003          31.2216          BANK
0004 REF 2 LAST 149 E7.1612          EBANK= PIF
0005 REF 2 LAST 40 TO 40: 5 5*          COUNT= 15/THRUT
R0006 *****
R0008      HERE FC, DESIRED THRUST, AND FP, PRESENT THRUST, UNWEIGHTED, ARE COMPUTED.

0010 REF 3 LAST 211 31.2216 3 1246 0 THROTTLE CA ABDELV          COMPUTE PRESENT ACCELERATION IN UNITS OF
0011          31.2217 0 0006 1          EXTEND          2(-4) M/CS/CS, SAVING SERVICE- 1-1600
0012 REF 1          31.2220 7 2417 0          MP /AF/CNST
0013          31.2221 0 0006 1          +3 EXTEND
0014 REF 2 LAST 149 31.2222 23 607 1          QXCH RTNHOLD
0015 REF 1          31.2223 0 2400 1          AFDUMP TC MASSMULT
0016 REF 1          31.2224 53 470 1          DXCH FP          FP = PRESENT THRUST
0017          31.2225 0 0006 1          EXTEND
0018 REF 2 LAST 140 31.2226 3 1464 0          DCA /AF/
0019 REF 2 LAST 793 31.2227 0 2400 1          TC MASSMULT
0020 REF 3 LAST 200 31.2230 55 615 0          TS FC          FC = THRUST DESIRED BY GUIDANCE
0021 REF 2 LAST 140 31.2231 53 466 0          DXCH FCDD          FCDD = WHAT IT IS GOING TO BE

```

R0022 IF IT HAS BEEN LESS THAN 3 SECONDS SINCE THE LAST THROTTLING, AUGMENT FP USING THE FREIGHT CALCULATED THEN.

```

0024 REF 2 LAST 149 31.2232 4 1617 1          CS TTHROT          THIS CODING ASSUMES A FLATOUT WITHIN
0025 REF 8 LAST 744 31.2233 6 0025 0          AD TIME1          80 SECONDS BEFORE FIRST THRITTLE CALL
0026 REF 13 LAST 557 31.2234 7 4733 0          MASK POSMAX
0027          31.2235 4 0000 0          COM
0028 REF 1          31.2236 6 5002 0          AD 3SECS
0029          31.2237 0 0006 1          EXTEND
0030 REF 1          31.2240 6 2244 1          BZMF WHERETO          BRANCH IF (TIME1-TTHROT +1) > 3 SECONDS
0031          31.2241 0 0006 1          EXTEND
0032 REF 2 LAST 149 31.2242 3 1611 0          DCA FREIGHT
0033 REF 2 LAST 793 31.2243 21 470 1          DAS FP

```

R0034 THIS LOGIC DETERMINES THE THROTTLING IN THE REGION 10% - 94%. THE MANUAL THROTTLE, NOMINALLY SET AT
R0036 MINIMUM BY ASTRONAUT OR MISSION CONTROL PROGRAMS, PROVIDES THE LOWER BOUND. A STOP IN THE THROTTLE HARDWARE
R0038 PROVIDES THE UPPER.

```

0039 REF 5 LAST 781 31.2244 3 5014 1 WHERETO CA L*WCR*T          INITIALIZE L*WCR*T AND H*GHCRT FROM
0040 REF 25 LAST 788 31.2245 54 003 0          TS FBANK          PAD LOADED ERASABLES IN H-MATRIX

```


L THROTTLE CONTROL ROUTINES

USER'S PAGE NO. 2

0041	REF	2	LAST	121	E5.1506		EBANK=	LOWCRIT	
0042					31.2246	0 0006 1	EXTEND		
0043	REF	3	LAST	794	31.2247	3 1507 1	DCA	LOWCRIT	
0044	REF	1			31.2250	52 131 0	DXCH	L*WCR*1	
0045	REF	7	LAST	788	31.2251	3 5016 0	CA	EBANK7	
0046	REF	26	LAST	793	31.2252	54 003 0	TS	EBANK	
0047	REF	3	LAST	793	E7.1612		EBANK=	PIF	
0048	REF	143	LAST	785	31.2253	4 4755 0	CS	ZER	INITIALIZE PIFSET
0049	REF	2	LAST	149	31.2254	55 606 1	TS	PIFSET	
0050	REF	1			31.2255	4 0131 0	CS	H*GHCR*1	
0051	REF	2	LAST	149	31.2256	6 1620 1	AD	FCOLD	
0052					31.2257	0 0006 1	EXTEND		
0053	REF	1			31.2260	6 2272 1	BZMF	LOWFCOLD	BRANCH IF FCOLD < DR = HIGHCRIT
0054	REF	2	LAST	794	31.2261	4 0130 1	CS	L*WCR*1	
0055	REF	3	LAST	793	31.2262	6 1465 1	AD	FCOLD	
0056					31.2263	0 0006 1	EXTEND		
0057	REF	1			31.2264	6 2267 0	BZMF	FCOMPSET	BRANCH IF FC < DR = LOWCRIT
0058	REF	3	LAST	793	31.2265	3 1467 0	CA	FP	SEE NOTE 1
0059	REF	1			31.2266	1 2277 0	TCF	FLATOUT1	
0060	REF	1			31.2267	4 2002 0	FCOMPSET	CS	FMAXODD
0061	REF	4	LAST	794	31.2270	6 1467 0	AD	FP	SEE NOTE 2
0062	REF	1			31.2271	1 2301 0	TCF	FLATOUT2	
0063	REF	2	LAST	794	31.2272	4 0131 0	LOWFCOLD	CS	H*GHCR*1
0064	REF	4	LAST	794	31.2273	6 1465 1	AD	FCOLD	
0065					31.2274	0 0006 1	EXTEND		
0066	REF	1			31.2275	6 2302 1	BZMF	DDPIF	BRANCH IF FC < DR = HIGHCRIT
0067	REF	1			31.2276	3 2003 0	CA	FMAXODD	NO: THROTTLE-IF
0068	REF	5	LAST	794	31.2277	53 466 0	FLATOUT1	DXCH	FCOLD
0069	REF	1			31.2300	3 4737 0	CA	FEXTRA	
0070	REF	3	LAST	794	31.2301	55 606 1	FLATOUT2	TS	PIFSET

A0071 NOTE 1 FC IS SET EQUAL TO FP SO PIF WILL BE ZERO. THIS IS DESIRABLE
 A0072 AS THERE IS ACTUALLY NO THROTTLE CHANGE.

A0073 NOTE 2 HERE, SINCE WE ARE ABOUT TO RETURN TO THE THROTTLEABLE REGION
 A0074 (BELOW 55%) THE QUANTITY $-(FMAXODD - FP)$ IS COMPUTED AND PUT
 A0075 INTO PIFSET TO COMPENSATE FOR THE DIFFERENCE BETWEEN THE
 A0076 NUMBER OF BITS CORRESPONDING TO FULL THROTTLE (FMAXODD) AND THE
 A0077 NUMBER CORRESPONDING TO ACTUAL THRUST (FP). THUS THE TOTAL
 A0078 THROTTLE COMMAND $PIF = FC - FP - (FMAXODD - FP) = FC - FMAXODD$.

0081	REF	1			31.2302	0 3740 1	DDPIF	TC	FASTCHNG
0082					31.2303	0 0006 1	EXTEND		
0083	REF	6	LAST	794	31.2304	3 1466 1	DCA	FCOLD	
0084	REF	3	LAST	794	31.2305	55 620 0	TS	FCOLD	
0085	REF	4	LAST	794	31.2306	53 613 0	DXCH	PIF	
0086					31.2307	0 0006 1	EXTEND		

L THROTTLE CONTROL ROUTINES

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0087	REF	5	LAST	794	31.2310	4 1470 1	DCS	FP	
0088	REF	5	LAST	794	31.2311	21'613 0	DAS	PIF	PIF = FC - FP, NEVER EQUALS +0
0089	REF	6	LAST	795	31.2312	3 1612 0	DCIT	CA	PIF
0090	REF	4	LAST	794	31.2313	6 1606 0		AD	PIFSET
0091	REF	3	LAST	200	31.2314	55'614 1		TS	PSEUDO55
0092	REF	4	LAST	760	31.2315	54 055 0		TS	THRUST
0093	REF	31	LAST	760	31.2316	3 4750 1		CAF	BIT4
0094					31.2317	0 0006 1		EXTEND	
0095	REF	10	LAST	760	31.2320	05 014 1		WOR	CHAN14
0096	REF	9	LAST	793	31.2321	3 0025 0		CA	TIME1
0097	REF	3	LAST	793	31.2322	55'617 1		TS	THRUST

R0098 SINCE /AF/ IS NOT AN INSTANTANEOUS ACCELERATION, BUT RATHER AN "AVERAGE" OF THE ACCELERATION LEVELS DURING
 R0100 THE PRECEDING PIPA INTERVAL, AND SINCE FP IS COMPUTED DIRECTLY FROM /AF/, FP IN ORDER TO CORRESPOND TO THE
 R0102 ACTUAL THRUST LEVEL AT THE END OF THE INTERVAL MUST BE WEIGHTED BY

R0103
$$FWEIGHT = \frac{PIF(PPROCESS + TL)}{PGUID} + \frac{PIF / PIF}{2 PGUID FRATE}$$

 R0104
 R0105

R0106 WHERE PPROCESS IS THE TIME BETWEEN PIPA READING AND THE START OF THROTTLING. PGUID IS THE GUIDANCE PERIOD, AND
 R0108 FRATE IS THE THROTTLING RATE (32 UNITS PER CENTISECOND). PGUID IS EITHER 1 OR 2 SECONDS. THE "TL" IN THE
 R0110 FIRST TERM REPRESENTS THE ENGINE'S RESPONSE LAG. HERE FWEIGHT IS COMPUTED FOR USE NEXT PASS.

0112	REF	2	LAST	151	31.2323	3 1762 0	CA	THRSTPIP +1	INITIALIZE FWEIGHT COMP AS IF FOR P66
0113	REF	49	LAST	457	31.2324	54 130 1	TS	BUF	
0114	REF	12	LAST	683	31.2325	4 1011 1	CS	MODREG	ARE WE IN FACT IN P66?
0115	REF	1			31.2326	6 2501 1	AD	DEC66	
0116					31.2327	0 0006 1	EXTEND		
0117	REF	1			31.2330	1 2335 1	BZF	FWCOMP	YES
0118	REF	13	LAST	791	31.2331	3 1235 1	CA	PIPTIME +1	NO: INITIALIZE FOR TWO SECOND PERIOD
0119	REF	50	LAST	795	31.2332	54 130 1	TS	BUF	
0120	REF	2	LAST	165	31.2333	3 5003 1	CAF	4SECS	
0121	REF	2	LAST	795	31.2334	1 2336 1	TCF	FWCOMP +1	
0122	REF	5	LAST	605	31.2335	3 5000 1	CAF	2SECS	
0126	REF	194	LAST	763	31.2336	54 002 1	TS	Q	
01261					31.2337	0 0006 1	EXTEND		
01262	REF	40	LAST	789	31.2340	7 4746 1	MP	BIT6	
01263	REF	51	LAST	795	31.2341	22 131 1	LXCH	BUF +1	
0127	REF	52	LAST	795	31.2342	4 0130 1	CS	BUF	TIME OF LAST PIPA READING.
0128	REF	10	LAST	795	31.2343	6 0025 0	AD	TIME1	
0129	REF	1			31.2344	6 2004 1	AD	THRSTLAG	COMPENSATE FOR ENGINE RESPONSE LAG
0130	REF	4	LAST	460	31.2345	7 4357 0	MASK	L048	MAKE SURE SMALL AND POSITIVE
0131					31.2346	22 007 0	ZL		
0132					31.2347	0 0006 1	EXTEND		

L THROTTLE CONTROL ROUTINES

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0133	REF 195	LAST 795	31,2350	10 002 1	DV	Q
0134			31,2351	0 0006 1	EXTEND	
0135	REF 7	LAST 795	31,2352	7 1612 1	MP	PIF
0136			31,2353	6 0000 1	DOUBLE	
0137	REF 3	LAST 793	31,2354	53 611 1	DXCH	FWEIGHT
0138	REF 8	LAST 796	31,2355	11 612 1	CCS	PIF
0139	REF 86	LAST 785	31,2356	6 4753 1	AD	ONE
0140			31,2357	1 2361 0	TCF	+2
0141	REF 87	LAST 796	31,2360	6 4753 1	AD	ONE
0142			31,2361	0 0006 1	EXTEND	
0143	REF 9	LAST 796	31,2362	7 1612 1	MP	PIF
0144			31,2363	0 0006 1	EXTEND	
0145	REF 53	LAST 795	31,2364	10 131 0	DV	BUF +1
0146			31,2365	22 007 0	ZL	
0147	REF 4	LAST 796	31,2366	21 611 1	DAS	FWEIGHT

0148	REF 3	LAST 793	31,2367	0 1607 1	THDUMP	TC	RTHOLD
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R0149 FLATOUT THROTTLES UP THE DESCENT ENGINE, AND IS CALLED AS A BASIC SUBROUTINE.

0151	REF 28	LAST 741	31,2370	3 4737 0	FLATOUT	CAP	BIT13	4096 PULSES
0152	REF 5	LAST 795	31,2371	55 606 1	WHATOUT	TS	PIFSET	USE PIFSET SO FWEIGHT WILL BE 21-
0153	REF 144	LAST 794	31,2372	4 4755 0		CS	ZERO	
0154	REF 4	LAST 794	31,2373	55 620 0		TS	FCOLO	
0155	REF 10	LAST 796	31,2374	55 612 1		TS	PIF	
0156			31,2375	0 0006 1		EXTEND		
0157	REF 4	LAST 796	31,2376	23 607 1		DXCH	RTHOLD	
0158	REF 1		31,2377	1 2312 1		TCF	DOIT	

R0159 MASSMULT SCALES ACCELERATION, ARRIVING IN A AND L IN UNITS OF 2(-4) G/CS/CS, TO FORCE IN PULSE UNITS.

0161			31,2400	0 0006 1	MASSMULT	EXTEND		
0162	REF 54	LAST 796	31,2401	22 130 0		QXCH	BUF	
0163	REF 294	LAST 774	31,2402	52 155 1		DXCH	MPAC	
0164	REF 15	LAST 435	31,2403	0 7103 1		TC	DMP	
0165	REF 5	LAST 295	31,2404	01244 1		ADRES	MASS	
0166	REF 16	LAST 796	31,2405	0 7103 1		TC	DMP	LEAVES PROPERLY SCALED FORCE IN MPAC
0167	REF 1		31,2406	02005 0		ADRES	SCALEFAC	
0168	REF 10	LAST 774	31,2407	0 7257 0		TC	TPAGREE	
0169	REF 295	LAST 796	31,2410	3 0154 1		CA	MPAC	
0170			31,2411	0 0006 1		EXTEND		
0171			31,2412	1 2415 1		BZF	+3	
0172	REF 14	LAST 795	31,2413	3 4733 1		CAP	PUSMAX	
0173	REF 55	LAST 796	31,2414	0 0130 0		TC	BUF	
0174	REF 296	LAST 796	31,2415	52 156 1		DXCH	MPAC +1	
0175	REF 56	LAST 796	31,2416	0 0130 0		TC	BUF	

L THROTTLE CONTROL ROUTINES

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R0176 CONSTANTS:-

0177 REF 29 LAST 796 4737 FEXTRA = NIT13 FEXT +5.135090

0180 31.2417 04143 0 /AF/CNST DEC .13107

R0181 *****

L LUNAR LANDING GUIDANCE EQUATIONS

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P0001

0002 REF 2 LAST 785 E7.1621

EBANK = F2DPS

0003 REF 2 LAST 39 TO 40: 2 2*

COUNT = 33/F2DPS

R0004

R0006

R0007

LUNAR LANDING FLIGHT SEQUENCE TABLES

R0009

FLIGHT SEQUENCE TABLES ARE ARRANGED BY FUNCTION. THEY ARE REFERENCED USING AS AN INDEX THE REGISTER WCHPHASE:

A0011

A0012

A0013

A0014

WCHPHASE = -1	--->	IGNALG
WCHPHASE = 0	--->	BRKQUAD
WCHPHASE = 1	--->	APPRQUAD
WCHPHASE = 2	--->	VERTICAL

R0015

R0017

ROUTINES FOR STARTING NEW GUIDANCE PHASES:

0018 REF 1 31.2420 1 2641 1

TCF TTFINCR

IGNALG

0019 REF 2 LAST 798 31.2421 1 2641 1

NEWPHASE

TCF TTFINCR

BRKQUAD

0020 REF 1 31.2422 1 2630 1

TCF STARTP64

APPRQUAD

0021 REF 1 31.2423 1 2621 1

TCF P65START

VERTICAL

R0022

R0023

PRE-GUIDANCE COMPUTATIONS:

0024 REF 1 31.2424 1 3003 0

TCF CALCRGVG

IGNALG

0025 REF 1 31.2425 1 3013 1

PREGUIDE

TCF RGVCALC

BRKQUAD

0026 REF 1 31.2426 1 2704 1

TCF REDESIG

APPRQUAD

0027 REF 2 LAST 798 31.2427 1 3013 1

TCF RGVCALC

VERTICAL

R0028

R0029

GUIDANCE EQUATIONS:

0030 REF 1 31.2430 1 3061 1

TCF TTF/BCL

IGNALG

0031 REF 2 LAST 798 31.2431 1 3061 1

WHATGUID

TCF TTF/BCL

BRKQUAD

0032 REF 3 LAST 798 31.2432 1 3061 1

TCF TTF/BCL

APPRQUAD

0033 REF 1 31.2433 1 3531 1

TCF VERTGUID

VERTICAL

R0034

R0035

POST GUIDANCE EQUATION COMPUTATIONS:

0036 REF 1 31.2434 1 3245 0

TCF CGCALC

IGNALG

0037 REF 2 LAST 798 31.2435 1 3245 0

AFTPGUID

TCF CGCALC

BRKQUAD

0038 REF 3 LAST 798 31.2436 1 3245 0

TCF CGCALC

APPRQUAD

0039 REF 1 31.2437 1 3432 0

TCF STEER?

VERTICAL

R0040

L LUNAR LANDING GUIDANCE EQUATIONS

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R0041 WINDOW VECTOR COMPUTATIONS:

0042	REF	1		31.2440	1 3331 1	TCF	EXGSUB	IGNALG
0043	REF	1		31.2441	1 3352 1	WHATEXIT	TCF	EXBRAK
0044	REF	1		31.2442	1 3360 0	TCF	EXNORM	APPRQUAD

R0045

R0046 DISPLAY ROUTINES:

0047	REF	2	LAST	749	31.2443	1 3473 0	WHATDISP	TCF	P63DISPS	BRARQUAD
0048	REF	1			31.2444	1 3477 1	TCF	P64DISPS	APPRQUAD	
0049	REF	1			31.2445	1 3527 0	TCF	VERTDISP	VERTICAL	

R0050

R0051 ALARM ROUTINE FOR TTF COMPUTATION:

0052	REF	1			31.2446	1 3733 1	TCF	1406POD	IGNALG	
0053	REF	1			31.2447	1 3735 1	WHATALM	TCF	1406ALM	BRARQUAD
0054	REF	2	LAST	799	31.2450	1 3735 1	TCF	1406ALM	APPRQUAD	

R0055

R0056 INDICES FOR REFERENCING TARGET PARAMETERS:

0057					31.2451	00000 1	DCT	0	IGNALG	
0058					31.2452	00000 1	TARGETDEX	OCT	0	BRARQUAD
0059					31.2453	00034 0	OCT	34	APPRQUAD	

R0060

R0061 *****
R0063 ENTRY POINTS: 7GUIDSUB FOR THE IGNITION ALGORITHM, LUNLAND FOR SERVOUT
R0064 *****

R0066 IGNITION ALGORITHM ENTRY: DELIVERS N-PASSES OF QUADRATIC GUIDANCE

0067					31.2454	77776 1	7GUIDSUB	EXIT		
0068	REF	44	LAST	756	31.2455	3 4752 0	CAF	TWO	N = 3	
0069	REF	1			31.2456	55 647 1	TS	NGUIDSUB		
0070	REF	1			31.2457	1 2603 1	TCF	GUILDRET +2		

0071	REF	2	LAST	797	31.2460	55 647 1	GUIDSUB	TS	NGUIDSUB	ON SUCCEEDING PASSES SKIP TTF
0072	REF	2	LAST	798	31.2461	1 3003 0	TCF	CALCRGVG		

R0073 NORMAL ENTRY: CONTROL COMES HERE FROM SERVOUT

0074	REF	56	LAST	791	31.2462	0 5353 1	LUNLAND	TC	PHASCHNG	
0075					31.2463	00035 1	DCT	00035	GROUP 5: RETAIN ONLY PIPA TASK	
0076	REF	57	LAST	799	31.2464	0 5353 1	TC	PHASCHNG		
0077					31.2465	05023 0	OCT	05023	GROUP 3: PROTECT GUIDANCE WITH PRIO 21	
0078					31.2466	21000 1	OCT	21000	JUST HIGHER THAN SERVICE'S PRIORITY	

L LUNAR LANDING GUIDANCE EQUATIONS

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R0079 *****
 R0081 GULDENSTERN: AUTO-MODES MONITOR (R13)
 R0082 *****

0084 REF 1

COUNT* 33/R13

R0085 HERE IS THE PHILOSOPHY OF GULDENSTERN: ON EVERY APPEARANCE OR DISAPPEARANCE OF THE MANUAL THROTTLE
 R0087 DISCRETE TO SELECT P67 OR P66 RESPECTIVELY: ON EVERY APPEARANCE OF THE ATTITUDE-HOLD DISCRETE TO SELECT P6
 R0089 UNLESS THE CURRENT PROGRAM IS P67 IN WHICH CASE THERE IS NO CHANGE.

Address	Ref	Last	Value	Label	Operation	Comment
0090			31.2467 0 0006 1	GULDEN	EXTEND	IS UN-AUTO-THROTTLE DISCRETE PRESENT?
0091	REF 5	LAST 748	31.2470 00 030 1	STERN	READ CHAN30	
0092	REF 34	LAST 751	31.2471 7 4747 0		MASK BIT4	
0093	REF 231	LAST 763	31.2472 10 000 0		CCS A	
0094	REF 1		31.2473 1 2551 0		TCF STARTP67	YES
0095	REF 3	LAST 738	31.2474 0 5321 1	P67NOW?	TC CHECKMH	NO: ARE WE IN P67 NOW?
0096			31.2475 00103 0		DEC 67	
0097	REF 1		31.2476 1 2557 0		TCF STABL?	NO
0098	REF 2	LAST 794	31.2477 0 3740 1	STARTP66	TC FASTCHNG	YES
0099	REF 2	LAST 373	31.2500 0 5311 1		TC NEWINDEX	
0100			31.2501 00102 1	DEC66	DEC 66	
0101			31.2502 0 0006 1		EXTEND	
0102	REF 6	LAST 315	31.2503 3 1474 1		DCA HDTPDISP	SET DESIRED ALTITUDE RATE = CURRENT
0103	REF 1		31.2504 53 645 0		DXCH VDGVERT	ALTITUDE RATE.
0104	REF 125	LAST 791	31.2505 0 6037 0	STRTP66A	TC INTERPRET	
0105			31.2506 41535 1		SLOAD FUSH	
0106	REF 1		31.2507 01457 0		PBIASZ	
0107			31.2510 41535 1		SLOAD FUSH	
0108	REF 1		31.2511 01455 1		PBIASX	
0109			31.2512 55535 1		SLOAD VDEF	
0110	REF 2	LAST 109	31.2513 01453 1		PBIASX	
0111			31.2514 43161 0	VASC	SET	
0112	REF 1		31.2515 25537 1		BIASFACT	
0113	REF 1		31.2516 00463 0		RODFLAG	
0114	REF 1		31.2517 26631 1	STOVL	VDIAS	
0115	REF 2	LAST 105	31.2520 01255 1		TEMX	
0116			31.2521 77676 0	VCOMP		
0117	REF 2	LAST 151	31.2522 27764 1	STOVL	OLDPIPA	
0118	REF 13	LAST 786	31.2523 06522 1		ZERUVECS	
0119	REF 2	LAST 151	31.2524 17767 1	STOOL	DELVRD	
0120	REF 2	LAST 122	31.2525 02540 1		RODSCALE	
0121	REF 2	LAST 151	31.2526 17757 1	STOOL	RODSCALE	
0122	REF 14	LAST 795	31.2527 01235 1		FIPTIME	
0123	REF 2	LAST 151	31.2530 03760 0	STORE	LASTTIME	
0124			31.2531 77776 1	EXIT		
0125	REF 145	LAST 796	31.2532 3 4755 1	CAF	ZERO	
0126	REF 5	LAST 796	31.2533 55 620 0	TS	FCOIL	
0127	REF 5	LAST 796	31.2534 55 610 0	TS	FWEIGHT	
0128	REF 6	LAST 800	31.2535 55 611 1	TS	FWEIGHT +1	
0129	REF 1		31.2536 55 647 1	VRTSTART	TS	CONVERT

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0130	REF 45	LAST 799	31.2537	3 4752 0	CAF	TWO	WCHPHASE = 2 ---> VERTICAL: P65, P66, P67
0131	REF 3	LAST 739	31.2540	55.621 1	TS	WCHPHOLD	
0132	REF 3	LAST 785	31.2541	55.351 0	TS	WCHPHASE	
0133	REF 223	LAST 791	31.2542	0 4616 1	TC	BANKCALL	TEMPORARY, 1 HOPE HOPE H PE
0134	REF 4	LAST 762	31.2543	40165 1	CAOF	STOPRATE	TEMPORARY, 1 HOPE HOPE H PE
0135	REF 70	LAST 781	31.2544	0 5516 0	TC	DOWNFLAG	PERMIT X-AXIS-OVERRIDE
0136	REF 3	LAST 229	31.2545	00311 1	ADRES	XOVINFLG	
0137	REF 71	LAST 801	31.2546	0 5516 0	TC	DOWNFLAG	
0138	REF 2	LAST 785	31.2547	00143 1	ADRES	REDFLAG	
0139	REF 2	LAST 798	31.2550	1 3531 1	TCF	VERTGUID	
0140	REF 3	LAST 800	31.2551	0 5311 1	STARTP67	TC	NEEDINDEX
0141			31.2552	00103 0	DEC	67	NO HARM IN "STARTING" 7 OVER AND OVER
0142	REF 146	LAST 800	31.2553	3 4755 1	CAF	ZERO	SO NO NEED FOR A FASTCHNG AND NO NEED
0143	REF 1		31.2554	55.746 1	TS	RODCOUNT	TO SEE IF ALREADY IN P67.
0144	REF 6	LAST 467	31.2555	3 4363 0	CAF	TEN	
0145	REF 1		31.2556	1 2536 1	TCF	VRTSTART	
0146	REF 30	LAST 797	31.2557	3 4737 0	STABL?	CAF	BIT13
0147			31.2560	0 0006 1	EXTEND		IS UN-ATTITUDE-HOLD DISCRETE PRESENT?
0148	REF 3	LAST 476	31.2561	02 031 1	RAND	CHAN31	
0149	REF 232	LAST 800	31.2562	10 000 0	CCS	A	
0150	REF 2	LAST 799	31.2563	1 2601 0	TCF	GUILDRET	YES: ALL'S WELL
0151	REF 13	LAST 795	31.2564	4 1011 1	P66NOW?	CS	MODREG
0152	REF 2	LAST 795	31.2565	6 2501 1	AD	DEC66	
0153			31.2566	0 0006 1	EXTEND		
0154	REF 1		31.2567	1 2574 1	BZF	RESTART?	
0155	REF 2	LAST 801	31.2570	3 1746 0	CA	RODCOUNT	NO. HAS THE ROD SWITCH BEEN "CLICKED"?
0156			31.2571	0 0006 1	EXTEND		
0157	REF 3	LAST 801	31.2572	1 2601 0	BZF	GUILDRET	NO. CONTINUE WITH AUTOMATIC LANDING.
0158	REF 1		31.2573	1 2477 0	TCF	STARTP66	YES. SWITCH INTO THE RED MODE.
0159	REF 26	LAST 519	31.2574	3 0075 0	RESTART?	CA	FLAGR01
0160	REF 2	LAST 217	31.2575	7 4740 1	MASK	RODFLBIT	HAS THERE BEEN A RESTART?
0161			31.2576	0 0006 1	EXTEND		
0162	REF 1		31.2577	1 2505 1	BZF	SIRTP66A	YES. REINITIALIZE BUT LEAVE VOGVERT AS
A0163							IS.
0164	REF 3	LAST 801	31.2600	1 3531 1	TCF	VERTGUID	NO: CONTINUE WITH L.O.D.
R0165	*****						
R0167	INITIALIZATION FOR THIS PASS						
P0168	*****						
0170	REF 3	LAST 798	TC 800:	39 41*	COUNT*	33/F2DPS	
0171	REF 147	LAST 801	31.2601	3 4755 1	GUILDRET	CAF	ZERO
0172	REF 3	LAST 801	31.2602	55.746 1	TS	RODCOUNT	

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0173					31.2603	0 0006 1	+2	EXTEND	
0174	REF	3	LAST	786	31.2604	3 1625 1		DCA	TRIP
0175	REF	1			31.2605	53'574 1		DXCH	TRIPOLD
0176	REF	3	LAST	800	31.2606	0 3740 1		TC	FASTCHNG
0177					31.2607	0 0006 1		EXTEND	
0178	REF	7	LAST	787	31.2610	3 1561 1		DCA	PIPTIME1
0179	REF	4	LAST	802	31.2611	53'625 0		DXCH	TRIP
0180					31.2612	0 0006 1		EXTEND	
0181	REF	4	LAST	786	31.2613	3 1643 1		DCA	TTF/8
0182	REF	2	LAST	149	31.2614	53'553 1		DXCH	TTF/8TMP
0183	REF	4	LAST	785	31.2615	11'623 0		CCS	FLPSSO
0184	REF	3	LAST	798	31.2616	1 2641 1		TCF	TTFINCR
0185	REF	4	LAST	801	31.2617	51'351 1	BRSPOT1	INDEX	FLUPHASE
0186	REF	1			31.2620	1 2421 0		TCF	NEWPHASE

R0187

R0189 ROUTINES TO START NEW PHASES

R0190

0192	REF	4	LAST	801	31.2621	0 5311 1	P65START	TC	NEWINDEX
0193					31.2622	00101 1		DEC	65
0194	REF	46	LAST	801	31.2623	4 4752 1		CS	TWO
0195	REF	2	LAST	800	31.2624	55'647 1		TS	WCHVERT
0196	REF	72	LAST	801	31.2625	0 5516 0		TC	DOWNFLAG
0197	REF	4	LAST	801	31.2626	00311 1		ADRES	XOVINFLG
0198	REF	4	LAST	802	31.2627	1 2641 1		TCF	TTFINCR

PERMIT X-AXIS OVERRIDE

0199	REF	5	LAST	802	31.2630	0 5311 1	STARTP64	TC	NEWINDEX
0200					31.2631	00100 0		DEC	64
0201	REF	1			31.2632	3 1425 0		CA	DELTTAP
0202	REF	3	LAST	802	31.2633	27'552 0		ADS	TTF/8TMP
0203	REF	28	LAST	781	31.2634	3 4740 0		CA	BIT12
0204					31.2635	0 0006 1		EXTEND	
0205	REF	15	LAST	557	31.2636	05 013 0		WGR	CHAN13
0206	REF	73	LAST	802	31.2637	0 5516 0		TC	DOWNFLAG
0207	REF	3	LAST	801	31.2640	00143 1		ADRES	FEOLAG

AUGMENT TTF/8
ENABLE RUPTID
INITIALIZE REDESIGNATION FLAG

R0208 (CONTINUE TO TTFINCR)

R0209

R0211 INCREMENT TTF/8, UPDATE LAND FOR LUNAR ROTATION, DO OTHER USEFUL THINGS

R0212

R0214 TTFINCR COMPUTATIONS ARE AS FOLLOWS:-

L LUNAR LANDING GUIDANCE EQUATIONS

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R0215 TTF/B UPDATED FOR TIME SINCE LAST PASS:

R0216 $TTF/B = TTF/B + (TPIP - TPIPOLD)/B$

R0217 LANDING SITE VECTOR UPDATED FOR LUNAR ROTATION:

R0218
R0220 $LAND = /LAND/ UNIT(LAND - LAND(TPIP - TPIPOLD) * RH)$

R0222 SLANT RANGE TO LANDING SITE FOR DISPLAY:

R0223
R0224 $RANGEDSP = ABVAL(LAND - R)$

0225	REF 126	LAST	800	31,2641	0 6037 0	TTFINCR	TC	INTPPET	
0226				31,2642	45345 1		ELUAD	DSU	
0227	REF 5	LAST	802	31,2643	03625 0			TPIP	
0228	REF 2	LAST	802	31,2644	03574 1			TPIPOLD	
0229				31,2645	41461 1		SLK	PUSH	SHIFT SCALES DELTA TIME TO 2(17) CSECS
0230				31,2646	21214 0			110	
0231				31,2647	47361 0		VXSC	VXV	
0232	REF 5	LAST	788	31,2650	03635 1			LAND	
0233	REF 2	LAST	120	31,2651	02325 1			WM	
0234				31,2652	47045 0		BVSU	RTB	
0235	REF 6	LAST	803	31,2653	03635 1			LAND	
0236	REF 2	LAST	339	31,2654	21726 1			NORMUNIT	
0237				31,2655	76561 1		VXSC	VSL1	
0238	REF 3	LAST	120	31,2656	02333 0			/LAND/	
0239	REF 2	LAST	149	31,2657	17545 0		STGDL	LANDTEMP	
0240				31,2660	77776 1		EXIT		
0241	REF 297	LAST	796	31,2661	52 155 1		DXCH	MPAC	
0242	REF 4	LAST	802	31,2662	21 553 1		DAS	TTF/8TMP	NOW HAVE INCREMENTED TTF/8 IN TTF/8TMP
0243	REF 4	LAST	802	31,2663	0 3740 1		TC	FASTCHNG	
0244				31,2664	0 0006 1		EXTEND		
0245	REF 5	LAST	803	31,2665	3 1553 0		DCA	TTF/8TMP	
0246	REF 5	LAST	802	31,2666	53 643 0		DXCH	TTF/8	
0247				31,2667	0 0006 1		EXTEND		
0248	REF 5	LAST	803	31,2670	3 1545 1		DCA	LANDTEMP	
0249	REF 7	LAST	803	31,2671	53 635 1		DXCH	LAND	
0250				31,2672	0 0006 1		EXTEND		
0251	REF 4	LAST	803	31,2673	3 1547 0		DCA	LANDTEMP +2	
0252	REF 8	LAST	803	31,2674	53 637 0		DXCH	LAND +2	
0253				31,2675	0 0006 1		EXTEND		
0254	REF 5	LAST	803	31,2676	3 1551 1		DCA	LANDTEMP +4	
0255	REF 9	LAST	803	31,2677	53 641 1		DXCH	LAND +4	

L LUNAR LANDING GUIDANCE EQUATIONS

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0256	REF	1		31.2700	0 3704 1	TC	TOTSPSET	
0257	REF	5	LAST	803	31.2701	0 3740 1	TC	PASTCHNG

SINCE REDESIG MAY CHANGE LANDTEMP

0258	REF	5	LAST	802	31.2702	51.351 1	BRSPOT2	INDEX	WCHPHASE
0259	REF	1			31.2703	1 2425 1	TCF	PREGUIDE	

R0260

R0262

R0263

LANDING SITE PERTURBATION EQUATIONS

0265	REF	4	LAST	781	31.2704	3 0102 1	REDESIG	CA	FLAGWDR6	IS REDFLAG SET?
0266	REF	1			31.2705	7 4746 1		MASK	REDFLBIT	
0267					31.2706	0 0006 1		EXTEND		
0268	REF	3	LAST	798	31.2707	1 3013 1		BZF	MOVGCALC	NO: SKIP REDESIGNATION LOGIC
0269	REF	1			31.2710	3 1666 0		CA	TREDES	YES: HAS TREDES REACHED ZERO?
0270					31.2711	0 0006 1		EXTEND		
0271	REF	4	LAST	804	31.2712	1 3013 1		BZF	MOVGCALC	YES: SKIP REDESIGNATION LOGIC

0272					31.2713	0 0004 0		INHINT		
0273	REF	1			31.2714	3 1267 0		CA	ELINCR1	
0274	REF	2	LAST	149	31.2715	55.554 0		TS	ELINCR	
0275	REF	2	LAST	106	31.2716	3 1266 1		CA	AZINCR1	
0276	REF	2	LAST	149	31.2717	55.556 1		TS	AZINCR	
0277	REF	6	LAST	804	31.2720	0 3740 1		TC	PASTCHNG	

0278	REF	148	LAST	801	31.2721	3 4755 1		CA	ZERO	
0279	REF	2	LAST	804	31.2722	55.267 1		TS	ELINCR1	
0280	REF	3	LAST	804	31.2723	55.266 0		TS	AZINCR1	
0281	REF	3	LAST	804	31.2724	55.555 1		TS	ELINCR +1	
0282	REF	3	LAST	804	31.2725	55.557 0		TS	AZINCR +1	

0283	REF	19	LAST	601	31.2726	3 0120 1		CA	FIXLOC	SET PD TO 0
0284	REF	6	LAST	603	31.2727	54 166 1		TS	PUSHLOC	

0285	REF	127	LAST	803	31.2730	0 6037 0		TC	INTERPRET	
0286					31.2731	52375 1		VLOAD	VSU	
0287	REF	10	LAST	803	31.2732	03635 1			LAND	
0288	REF	7	LAST	788	31.2733	03521 1				
0289					31.2734	41434 1		PTB	PUSH	PUSH DOWN UNIT (LAND - R)
0290	REF	3	LAST	803	31.2735	21726 1			NORMUNIT	
0291					31.2736	76435 1		VXV	VSL3	
0292	REF	2	LAST	114	31.2737	02154 0			YNBPIP	
0293					31.2740	65361 0		VXSC	PDDL	PUSH DOWN -- ELINCR(YNB * UNIT(LAND - R))
0294	REF	4	LAST	804	31.2741	03555 1			ELINCR	
0295	REF	4	LAST	804	31.2742	03557 0			AZINCR	
0296					31.2743	52361 1		VXSC	VSL	
0297	REF	3	LAST	804	31.2744	02154 0			YNBPIP	
0298					31.2745	41455 0		VAD	PUSH	RESULTING VECTOR IS 1/2-REAL SIZE

L LUNAR LANDING GUIDANCE EQUATIONS

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0299				31.2746	45345 1	DLOAD	DSU	MAKE SURE REDESIGNATION IS NOT
0300				31.2747	00001 0		0	TOO CLOSE TO THE HORIZON
0301	REF	1		31.2750	05660 1		DEPRCRIT	
0302				31.2751	71240 1	BHN	DLOAD	
0303	REF	1		31.2752	62755 1		REDESI	
0304	REF	2	LAST	805	31.2753		DEPRCRIT	
0305				31.2754	00001 0	STORE	0	
0306				31.2755	45345 1	DLOAD	DSU	
0307	REF	11	LAST	804	31.2756		LAND	
0308	REF	8	LAST	804	31.2757		R	
0309				31.2760	74271 0	DOV	VXSC	
0310				31.2761	00001 0		0	
0311				31.2762	53455 0	VAD	UNIT	
0312	REF	9	LAST	805	31.2763		R	
0313				31.2764	76561 1	VXSC	VSL1	
0314	REF	4	LAST	803	31.2765		/LAND/	
0315	REF	6	LAST	803	31.2766	STORE	LANDTEMP	
0316				31.2767	77776 1	EXIT		LOOKANGL WILL BE COMPUTED AT RGVGCALC
0317	REF	7	LAST	804	31.2770	0 3740 1	TC	FASTCHNG
0318				31.2771	0 0000 1	EXTEND		
0319	REF	7	LAST	805	31.2772	3 1545 1	DCA	LANDTEMP
0320	REF	12	LAST	805	31.2773	53'635 1	DXCH	LAND
0321				31.2774	0 0000 1	EXTEND		
0322	REF	8	LAST	805	31.2775	3 1547 0	DCA	LANDTEMP +2
0323	REF	13	LAST	805	31.2776	53'637 0	DXCH	LAND +2
0324				31.2777	0 0000 1	EXTEND		
0325	REF	9	LAST	805	31.3000	3 1551 1	DCA	LANDTEMP +4
0326	REF	14	LAST	805	31.3001	53'641 1	DXCH	LAND +4
0327	REF	5	LAST	804	31.3002	1 3013 1	TCF	RGVGCALC

R0328 *****
 R0330 COMPUTE STATE IN GUIDANCE COORDINATES
 R0331 *****

R0333 RGVGCALC COMPUTATIONS ARE AS FOLLOWS:-

R0334 VELOCITY RELATIVE TO THE SURFACE:

R0335 - - - - -
 R0336 ANGTERM = V + R + WM

R0337 STATE IN GUIDANCE COORDINATES:

R0338 - * - - -
 R0339 PGU = CG (R - LAND)

R0340 - * - - -

L LUNAR LANDING GUIDANCE EQUATIONS

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R0341 $VOD = CG (V - WM * R)$

R0342 HORIZONTAL VELOCITY FOR DISPLAY:

R0343 $VHORIZ = 8 ABVAL (0, VO, VG)$ R0344 $\frac{2}{1}$

R0345 DEPRESSION ANGLE FOR DISPLAY:

R0346
R0347 $LOOKANGL = \text{ARCSIN}(\text{UNIT}(R - \text{LAND}) \cdot \text{XMRPIP})$

0348	REF 128	LAST	804	31,3003	0 6037 0	CALCROVG	TC	INTERPRET	IN IGNALG. COMPUTE V FROM INTEGRATION
0349				31,3004	64375 1		VLOAD	MXV	OUTPUT AND TRIM CORRECTION TERM
0350	REF 14	LAST	788	31,3005	00025 0			VATTI	COMPUTED LAST PASS AND LEFT IN UNFC/2
0351	REF 27	LAST	786	31,3006	01734 0			RFSMAT	
0352				31,3007	53362 0		VSR1	VAD	
0353	REF 6	LAST	788	31,3010	03254 1			UNFC/2	
0354	REF 4	LAST	788	31,3011	03527 1		STORE	V	
0355				31,3012	77776 1		EXIT		
0356	REF 129	LAST	806	31,3013	0 6037 0	RGVGCALL	TC	INTERPRET	ENTER HERE TO RECOMPUTE RG AND VG
0357				31,3014	47375 0		VLOAD	VXV	
0358	REF 10	LAST	805	31,3015	03521 1			R	
0359	REF 3	LAST	803	31,3016	02325 1			WM	
0360				31,3017	76455 1		VAD	VSR2	RESCALE TO UNITS OF 2(9) M/CS
0361	REF 5	LAST	806	31,3020	03527 1			V	
0362	REF 2	LAST	119	31,3021	02265 1		STORE	ANGTERM	
0363				31,3022	77721 0		MXV		
0364	REF 5	LAST	786	31,3023	02603 0			RG	NO SHIFT SINCE ANGTERM IS DOUBLE SIZED
0365	REF 6	LAST	787	31,3024	03627 1		STORE	VGR	
0366				31,3025	55525 0		PDUL	VDEF	FORM (0, VG, VG) IN UNITS OF 2(9) M/CS
0367	REF 14	LAST	800	31,3026	06522 1			ZEROVECS	$\frac{2}{1}$
0368				31,3027	52446 0		ABVAL	SLB	
0369	REF 3	LAST	315	31,3030	26263 1		STOVL	VHORIZ	VHORIZ FOR DISPLAY DURING P65.
0370	REF 11	LAST	806	31,3031	03521 1			R	
0371				31,3032	41451 1		VSD	PUSH	PUSH DOWN R - LAND
0372	REF 15	LAST	805	31,3033	03635 1			LAND	
0373				31,3034	76521 0		MXV	VSL1	
0374	REF 6	LAST	806	31,3035	02603 0			CG	
0375	REF 5	LAST	787	31,3036	02637 1		STORE	RGU	
0376				31,3037	77646 0		ABVAL		
0377	REF 3	LAST	315	31,3040	26625 1		STOVL	RANGEDSP	
0378				31,3041	50234 1		RTB	DET	FOR IN MPAC IS SINE(LOOKANGL)/4
0379	REF 4	LAST	804	31,3042	21726 1			NORMUNIT	
0380	REF 2	LAST	114	31,3043	02146 0			ANBPIP	
0381				31,3044	77776 1		EXIT		
0382	REF 20	LAST	804	31,3045	3 0120 1		CA	FIXLOC	RESET PUSH-DOWN POINTER
0383	REF 7	LAST	804	31,3046	54 166 1		TS	PUSHLOC	

L LUNAR LANDING GUIDANCE EQUATIONS

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0384	REF 298	LAST 803	31.3047	3 0154 1	CA	MPAC	COMPUTE LOOKANGL ITSELF
0385			31.3050	6 0000 1	DOUBLE		
0386	REF 224	LAST 801	31.3051	0 4616 1	TC	BANKCALL	
0387	REF 1		31.3052	61672 0	CADR	SPARCSTH -1	
0388	REF 1		31.3053	6 3753 0	AD	1/2DEG	
0389			31.3054	0 0006 1	EXTEND		
0390	REF 1		31.3055	7 3752 0	MP	180DEGS	
0391	REF 1		31.3056	55 667 0	TS	LOOKANGL	LOOKANGL FOR DISPLAY DURING P04

0392	REF 6	LAST 804	31.3057	51 351 1	BRSPOTS	INDEX	WCHPHASE
0393	REF 1		31.3060	1 2431 1	TCF	CHATSID	

R0394 *****
 R0396 TTF/8 COMPUTATION
 R0397 *****

0399	REF 1		31.3061	0 3677 1	TTF/8CL	TC	INTERPCTA
0400			31.3062	77743 1	DL0AD*		
0401	REF 1		31.3063	02431 0		J0G2TTF,1	
0402	REF 2	LAST 149	31.3064	23571 0	ST0DL*	TABLTTF +0	A(1) = 8 J0G TO TABLTTF
0403	REF 1		31.3065	02427 1		ADG2TTF,1	2
0404	REF 3	LAST 807	31.3066	17567 0	ST0DL	TABLTTF +4	A(2) = 6 ADG TO TABLTTF
0405	REF 7	LAST 806	31.3067	03613 1		V0G +4	2
0406			31.3070	42605 1	DMP	DAD*	
0407	REF 1		31.3071	05656 1		3/4DP	
0408	REF 1		31.3072	02425 0		V0G2TTF,1	
0409	REF 4	LAST 807	31.3073	23565 0	ST0DL*	TABLTTF +2	A(1) = (6 V0G + 16 V0G)/8 TO TABLTTF
0410	REF 1		31.3074	02407 0		R0G +4,1	2 2
0411			31.3075	41225 1	DSU	DMP	
0412	REF 6	LAST 806	31.3076	02643 1		RCU +4	
0413	REF 1		31.3077	05654 0		3/8DP	
0414	REF 5	LAST 807	31.3100	03563 1	ST0RE	TABLTTF	A(3) = -24(RCU - R0G)/64 TO TABLTTF
0415			31.3101	77776 1	EXIT		2 2

0416	REF 27	LAST 813	31.3102	3 4744 1	CA	PITS	
0417	REF 6	LAST 807	31.3103	55 572 1	TS	TABLTTF +10	FRACTIONAL PRECISION FOR TTF TO TABLE

0418			31.3104	0 0006 1	EXTEND		
0419	REF 6	LAST 803	31.3105	3 1643 1	DCA	TTF/8	
0420	REF 299	LAST 807	31.3106	52 155 1	DXCH	MPAC	LOADS TTF/8 (INITIAL GUESS) INTO MPAC
0421	REF 47	LAST 802	31.3107	3 4752 0	CAF	1/2	DEGREE - ONE
0422	REF 109	LAST 774	31.3110	54 001 1	TS	L	
0423	REF 1		31.3111	3 3746 1	CAF	TABLTTF	
0424	REF 1		31.3112	0 3553 1	TC	ROOTSRS	YIELDS TTF/8 IN MPAC
0425	REF 7	LAST 807	31.3113	51 351 1	INDEX	WCHPHASE	
0426	REF 1		31.3114	1 2447 0	TCF	CHATSID	

0427			31.3115	0 0006 1	EXTEND		GOOD RETURN
0428	REF 300	LAST 807	31.3116	3 0155 0	DCA	MPAC	FETCH TTF/8 KEEPING IT IN MPAC
0429	REF 7	LAST 807	31.3117	55 643 0	DXCH	TTF/8	CORRECTED TTF/8

L LUNAR LANDING GUIDANCE EQUATIONS

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17 53

0430 REF 2 LAST 804 31,3120 0 3704 1 TC TDISPSET

A0431

(CONTINUE TO QUADGUID)

R0432 *****
 R0434 MAIN GUIDANCE EQUATION
 R0435 *****

R0437 AS PUBLISHED:-

R0438

R0439

R0440

R0441

$$ACG = ADG + \frac{6(VDG + VG)}{TTF} + \frac{12(RDG - RG)}{(TTF)(TTF)}$$

R0442

AS HERE PROGRAMMED:-

R0443

R0444

R0445

R0446

R0447

R0448

$$ACG = \frac{3 \left(\frac{1}{4}(RDG - RG) + VDG + VG \right)}{TTF/8} + ADG$$

0449	REF	8	LAST	807	31,3121	4 1642 1	QUADGUID	CS	TTF/8	
0450	REF	1			31,3122	6 1426 0		AD	LEADTIME	LEADTIME IS A NEGATIVE NUMBER
0451	REF	15	LAST	796	31,3123	6 4733 1		AD	POS MAX	SAFEGUARD THE COMPUTATIONS THAT FOLLOW
0452	REF	110	LAST	807	31,3124	54 001 1		TS	L	BY FORCING -TTF+LEADTIME > OR = ZERO-
0453	REF	111	LAST	808	31,3125	4 0001 1		CS	L	
0454	REF	112	LAST	808	31,3126	6 0001 0		AD	L	
0455					31,3127	22 007 0		ZL		
0456					31,3130	0 0006 1		EXTEND		
0457	REF	9	LAST	808	31,3131	11 642 1		DV	TTF/8	
0458	REF	57	LAST	796	31,3132	54 130 1		TS	BUF	- RATIO OF LAG-DIMINISHED TTF TO TTF
0459					31,3133	0 0006 1		EXTEND		
0460					31,3134	7 0000 0		SQUARE		
0461	REF	58	LAST	808	31,3135	54 131 0		TS	BUF +1	
0462	REF	59	LAST	808	31,3136	6 0130 0		AD	BUF	
0463	REF	60	LAST	808	31,3137	56 131 1		XCH	BUF +1	RATIO SQUARED = RATIO
0464	REF	61	LAST	808	31,3140	6 0131 1		AD	BUF +1	
0465	REF	301	LAST	807	31,3141	54 154 0		TS	HPAC	COEFFICIENT FOR VGU TERM
0466	REF	62	LAST	808	31,3142	6 0131 1		AD	BUF +1	
0467	REF	21	LAST	806	31,3143	50 120 1		INDEX	FIXLOC	
0468					31,3144	54 032 1		TS	26D	COEFFICIENT FOR RDG-RGU TERM
0469	REF	63	LAST	808	31,3145	6 0131 1		AD	BUF +1	
0470	REF	22	LAST	808	31,3146	50 120 1		INDEX	FIXLOC	
0471					31,3147	54 034 1		TS	26D	COEFFICIENT FOR VDG TERM
0472	REF	64	LAST	808	31,3150	6 0130 0		AD	BUF	
0473	REF	16	LAST	808	31,3151	6 4733 1		AD	POS MAX	

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0474	REF	65	LAST	808	31.3152	6 0131 1	AD	BUF +1	
0475	REF	66	LAST	809	31.3153	6 0131 1	AD	BUF +1	
0476	REF	23	LAST	808	31.3154	50 120 1	INDEX	FIXLOC	
0477					31.3155	54 036 0	TS	-00	COEFFICIENT FOR ADG TERM
0478	REF	149	LAST	804	31.3156	3 4755 1	CAF	ZERO	
0479	REF	8	LAST	603	31.3157	54 163 1	TS	MODE	
0480	REF	2	LAST	807	31.3160	0 3677 1	TC	INTERPRET	
0481					31.3161	65361 0	VXSC	PDDL	
0482	REF	8	LAST	807	31.3162	03627 1		VGU	
0483					31.3163	00035 1		28D	
0484					31.3164	62757 0	VXSC*	PDVL*	
0485	REF	1			31.3165	02411 1		VDG,1	
0486	REF	2	LAST	807	31.3166	02403 1		RDG,1	
0487					31.3167	70251 0	VSU	V/SC	
0488	REF	7	LAST	807	31.3170	02637 1		RCU	
0489	REF	10	LAST	808	31.3171	03643 0		TTF/H	
0490					31.3172	74342 1	VSR2	VXSC	
0491					31.3173	00033 1		26D	
0492					31.3174	53255 0	VAD	VAD	
0493					31.3175	74341 1	V/SC	VXSC	
0494	REF	11	LAST	809	31.3176	03643 0		TTF/B	
0495	REF	2	LAST	807	31.3177	05656 1		3/4DP	
0496					31.3200	73725 0	PDDL	VXSC*	
0497					31.3201	00037 0		30D	
0498	REF	1			31.3202	02417 1		ADG,1	
0499					31.3203	77655 1	VAD		
0500					31.3204	76505 0	AFCCALC1 VXH	VSL1	VERTGTD COMES HERE
0501	REF	7	LAST	806	31.3205	02603 0		CG	
0502					31.3206	70315 1	PDVL	V/SC	
0503	REF	5	LAST	786	31.3207	01237 0		GDT/2	
0504	REF	1			31.3210	05652 0		GSCALE	
0505					31.3211	45445 0	BVSU	STADR	
0506	REF	7	LAST	806	31.3212	74523 0	STDR	UNFC/2	UNFC/2 NEED NOT BE INITIALIZED
0507					31.3213	77646 0	ABVAL		
0508	REF	3	LAST	793	31.3214	17464 1	AFCCALC2 STODL	UNFC/2	MAGNITUDE OF APC FOR THRUST
0509	REF	8	LAST	809	31.3215	03254 1		UNFC/2	VERTICAL COMPONENT
0510					31.3216	65316 0	DSQ	PDDL	
0511	REF	9	LAST	809	31.3217	03256 0		UNFC/2 +2	OUT-OF-PLANE
0512					31.3220	65316 0	DSQ	PDDL	
0513	REF	1			31.3221	05650 1		HIGHESTF	
0514					31.3222	63471 0	DDV	DSQ	
0515	REF	6	LAST	796	31.3223	01245 0		AS	
0516					31.3224	45225 0	DSU	DSU	AMAXHORIZ = SORT(ATOTAL - A - A)
0517					31.3225	71244 0	BPL	OLGAD	
0518	REF	1			31.3226	63230 0		AFCCALC3	
0519	REF	15	LAST	806	31.3227	06522 1		ZERDVECS	
0520					31.3230	45366 0	AFCCALC3 SORT	GAD	
0521	REF	10	LAST	809	31.3231	03260 0		UNFC/2 +4	

L LUNAR LANDING GUIDANCE EQUATIONS

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0522					31.3232	44244 0	BPL	BDSU	
0523	REF	1			31.3233	63236 0		AFCCLEND	
0524	REF	11	LAST	809	31.3234	03260 0		UNFC/2	+4
0525	REF	12	LAST	810	31.3235	03260 0	STORE	UNFC/2	+4
0526					31.3236	77776 1	AFCCLEND	EXIT	
0527	REF	8	LAST	805	31.3237	0 3740 1	TC	FASTCHNG	
0528	REF	8	LAST	807	31.3240	3 1351 1	CA	WCHPHASE	PREPARE FOR PHASE SWITCHING LOGIC
0529	REF	4	LAST	801	31.3241	55'621 1	TS	WCHPHOLD	
0530	REF	5	LAST	802	31.3242	25'623 1	INCR	FLPASSG	INCREMENT PASS COUNTER
0531	REF	9	LAST	810	31.3243	51'351 1	BRSPOT4	INDEX	WCHPHASE
0532	REF	1			31.3244	1 2435 0	TCF	AFTRGUID	

R0533 *****
 R0535 ERECT GUIDANCE-STABLE MEMBER TRANSFORMATION MATRIX
 R0536 *****

0538	REF	6	LAST	793	31.3245	3 5014 1	CGCALC	CAF	EBANK5
0539	REF	27	LAST	794	31.3246	54 003 0	TS	EBANK	
0540	REF	2	LAST	121	E5.1435			EBANK	TCGIBRAK
0541					31.3247	0 0006 1	EXTEND		
0542	REF	10	LAST	810	31.3250	5 1351 1	INDEX	WCHPHASE	
0543	REF	1			31.3251	5 2452 0	INDEX	TARGETDEX	
0544	REF	2	LAST	121	31.3252	3 1435 1	DCA	TCGFBRK	
0545	REF	17	LAST	750	31.3253	24 006 1	INCR	BBANK	
0546	REF	18	LAST	810	31.3254	24 006 1	INCR	BBANK	
0547	REF	12	LAST	809	E7.1642			EBANK	TTF/4
0548	REF	13	LAST	810	31.3255	6 1642 0	AD	TTF/8	
0549	REF	113	LAST	808	31.3256	56 001 0	XCH	L	
0550	REF	14	LAST	810	31.3257	6 1642 0	AD	TTF/4	
0551	REF	233	LAST	801	31.3260	10 000 0	CCS	A	
0552	REF	114	LAST	810	31.3261	10 001 1	CCS	L	
0553	REF	1			31.3262	1 3313 1	TCF	EXTLOGIC	
0554	REF	2	LAST	810	31.3263	1 3313 1	TCF	EXTLOGIC	
0555					31.3264	13 265 1	NOOP		

0556	REF	3	LAST	809	31.3265	0 3677 1	TC	INTPRETX	
0557					31.3266	53575 0	VLOAD	UNIT	
0558	REF	16	LAST	806	31.3267	03635 1		LAND	
0559	REF	8	LAST	809	31.3270	16603 0	STOOL	CG	
0560	REF	15	LAST	810	31.3271	03643 0		TTF/8	
0561					31.3272	74203 0	DMP*	VXSC	
0562	REF	2	LAST	121	31.3273	02435 1		GATIBRAK,I	NUMBER HYSTERIC
0563	REF	3	LAST	806	31.3274	02265 1		ANGTERM	
0564					31.3275	77655 1	VAD		
0565	REF	17	LAST	810	31.3276	03635 1		LAND	
0566					31.3277	47051 0	VSU	FTB	
0567	REF	12	LAST	806	31.3300	03521 1			
0568	REF	5	LAST	806	31.3301	21726 1		NORMUNIT	

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0569				31.3302	47035 1	VXV	RTB	
0570	REF	18	LAST	810	31.3303	03635 1	LAND	
0571	REF	6	LAST	810	31.3304	21726 1	NORMUNIT	
0572	REF	9	LAST	810	31.3305	26611 0	STOVL	CG +0 SECOND ROW
0573	REF	10	LAST	811	31.3306	02603 0	CG	
0574				31.3307	76435 1	VXV	VSL1	
0575	REF	11	LAST	811	31.3310	02611 0	CG	+6
0576	REF	12	LAST	811	31.3311	02617 0	STORE	CG +14
0577				31.3312	77776 1	EXIT		

A0578

(CONTINUE TO EXTLOGIC)

R0579 *****
R0581 PREPARE TO EXIT
R0582 *****

R0584 DECIDE (1) HOW TO EXIT, AND (2) WHETHER TO SWITCH PHASES

0585	REF	11	LAST	810	31.3313	51'351 1	EXTLOGIC	INDEX	WCHPHASE	WCHPHASE = 1	APPRQUAD
0586	REF	2	LAST	139	31.3314	3 1423 0	CA	FENDBRK	WCHPHASE = 0	BRKQUAD	
0587	REF	16	LAST	810	31.3315	6 1642 0	AD	TTF/B			
0588				31.3316	0 0006 1	EXSPOT1	EXTEND				
0589	REF	12	LAST	811	31.3317	5 1351 1	INDEX	WCHPHASE			
0590	REF	1		31.3320	6 2441 1	BZMF	WHATEXIT				
0591	REF	9	LAST	810	31.3321	0 3740 1	TC	FASTCHNG			
0592	REF	5	LAST	810	31.3322	3 1621 0	CA	WCHPHOLD			
0593	REF	88	LAST	796	31.3323	6 4753 1	AD	ONE			
0594	REF	13	LAST	811	31.3324	55'351 0	TS	WCHPHASE			
0595	REF	150	LAST	809	31.3325	3 4755 1	CA	ZERR			
0596	REF	6	LAST	810	31.3326	55'623 0	TS	FLPASSO	RESET FLPASSO		
0597	REF	6	LAST	811	31.3327	51'621 0	INDEX	WCHPHOLD			
0598	REF	2	LAST	811	31.3330	1 2441 0	TCF	WHATEXIT			

R0599 *****
R0601 ROUTINES FOR EXITING FROM LANDING GUIDANCE
R0602 *****

R0604 1. EXGSUB IS THE RETURN WHEN GUIDSUB IS CALLED BY THE IGNITION ALGORITHM.
R0606 2. EXBRK IN THE EXIT USED DURING THE BRAKING PHASE. IN THIS CASE UNIT(R) IS THE WINDOW POINTING VECTOR.
R0608 3. EXNORM IS THE EXIT USED AT OTHER TIMES DURING THE TURN.
R0609 (EXOVFLOW IS A SUBROUTINE OF EXBRK AND EXNORM CALLED WHEN OVERFLOW OCCURRED ANYWHERE IN GUIDANCE.)
0611 REF 130 LAST 806 31.3321 0 6037 0 EXGSUB TC INTERPRET COMPUTE TRIM VELOCITY CORRECTION TERM

L LUNAR LANDING GUIDANCE EQUATIONS

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0612				31.3332	47175 1		VLOAD	RTB	
0613	REF	13	LAST	810	31.3333	03254 1		UNFC/2	
0614	REF	7	LAST	811	31.3334	21726 1		NORMUNIT	
0615				31.3335	74361 0		VXSC	VXSE	
0616	REF	5	LAST	788	31.3336	03423 1		ZOOMTIME	
0617	REF	1			31.3337	22001 0		TRIMACCL	
0618	REF	14	LAST	812	31.3340	03254 1	STORE	UNFC/2	
0619				31.3341	77776 1		EXIT		
0620	REF	3	LAST	799	31.3342	11'647 1	CCS	PGUIDSUB	
0621	REF	1			31.3343	1 2460 0	TCF	GUIDSUB	
0622	REF	3	LAST	787	31.3344	11'646 0	CCS	HIGNLOOP	
0623				31.3345	1 3350 0		TCF	+3	
0624	REF	31	LAST	772	31.3346	0 5567 0	TC	ALARM	
0625				31.3347	01412 1		OCT	01412	
0626	REF	46	LAST	789	31.3350	0 4635 0	+3	TC	POSTJUMP
0627	REF	1			31.3351	65102 1	CADR	DDUMCALC	
0628	REF	131	LAST	811	31.3352	0 6037 0	EXBRK	TC	INTPRET
0629				31.3353	77775 1		VLOAD		
0630	REF	8	LAST	779	31.3354	03537 0		UNIT/R/	
0631	REF	2	LAST	136	31.3355	03262 1	STORE	UNWC/2	
0632				31.3356	77776 1		EXIT		
0633	REF	2	LAST	798	31.3357	1 3432 0	TCF	STEE-7	
0634	REF	132	LAST	812	31.3360	0 6037 0	EXNORM	TC	INTPRET
0635				31.3361	52375 1		VLOAD	VSU	
0636	REF	19	LAST	811	31.3362	03635 1		LAND	
0637	REF	13	LAST	810	31.3363	03521 1		K	
0638				31.3364	77634 0		RTB		
0639	REF	8	LAST	812	31.3365	21726 1		NORMUNIT	
0640	REF	3	LAST	812	31.3366	03262 1	STORE	UNWC/2	UNIT(LAND - R) IS TENTATIVE CHOICE
0641				31.3367	50235 0		VXV	BUT	
0642	REF	3	LAST	806	31.3370	02146 0		XNBPIP	
0643	REF	13	LAST	811	31.3371	02611 0		CG +6	
0644				31.3372	77776 1		EXIT		WITH PROJ IN MPAC 1/2 REAL SIZE
0645	REF	302	LAST	808	31.3373	4 0154 0	CS	MPAC	GET COEFFICIENT FOR CG +14
0646	REF	1			31.3374	6 3754 1	AD	PROJMAX	
0647	REF	17	LAST	808	31.3375	6 4733 1	AD	POSHAX	
0648	REF	67	LAST	809	31.3376	54 130 1	TS	BUF	
0649	REF	68	LAST	812	31.3377	4 0130 1	CS	BUF	
0650	REF	69	LAST	812	31.3400	26 130 1	ADS	BUF	RESULT IS 0 IF PROJMAX -- PROJ NEGATIVE
0651	REF	1			31.3401	4 3755 1	CS	PROJMIN	GET COEFFICIENT FOR UNIT(LAND - R)
0652	REF	303	LAST	812	31.3402	6 0154 1	AD	MPAC	
0653	REF	18	LAST	812	31.3403	6 4733 1	AD	POSHAX	
0654	REF	70	LAST	812	31.3404	54 131 0	TS	BUF +1	
0655	REF	71	LAST	812	31.3405	4 0131 0	CS	BUF +1	

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0656	REF	72	LAST	812	31.3406	26 131 0		ADS	BUF +1	RESULT IS 0 IF PROJ - PROJMIN NEGATIVE
0657	REF	14	LAST	785	31.3407	3 4751 0		CAF	FOUR	
0658	REF	16	LAST	725	31.3410	7 6242 1	UNWLOOP	MASK	SIX	
0659	REF	196	LAST	796	31.3411	54 002 1		TS	Q	
0660	REF	7	LAST	810	31.3412	3 5014 1		CA	EBANK5	
0661	REF	28	LAST	810	31.3413	54 003 0		TS	EBANK	
0662	REF	14	LAST	812	E5.1602			EBANK	CG	
0663	REF	73	LAST	813	31.3414	3 0130 0		CA	BUF	
0664					31.3415	0 0006 1		EXTEND		
0665	REF	197	LAST	813	31.3416	5 0002 0		INDEX	Q	
0666	REF	15	LAST	813	31.3417	7 1616 0		MP	CG +14	
0667	REF	19	LAST	810	31.3420	24 006 1		INCR	BBANK	
0668	REF	4	LAST	812	E6.1661			EBANK	UNWC/2	
0669	REF	198	LAST	813	31.3421	50 002 0		INDEX	Q	
0670	REF	5	LAST	813	31.3422	53 662 0		DXCH	UNWC/2	
0671					31.3423	0 0006 1		EXTEND		
0672	REF	74	LAST	813	31.3424	7 0131 0		MP	BUF +1	
0673	REF	199	LAST	813	31.3425	50 002 0		INDEX	Q	
0674	REF	6	LAST	813	31.3426	21 662 0		DAS	UNWC/2	
0675	REF	200	LAST	813	31.3427	10 002 1		CCS	Q	
0676	REF	1			31.3430	1 3410 0		TCF	UNWLOOP	
0677	REF	20	LAST	813	31.3431	24 006 1		INCR	BBANK	
0678	REF	11	LAST	796	E7.1612			EBANK	PIF	
0679	REF	20	LAST	762	31.3432	3 0076 0	STEER?	CA	FLAG02	IF STEER IN DOWN AND OUTPUTS
0680	REF	1			31.3433	7 4741 0		MASK	STEERBIT	
0681					31.3434	0 0006 1		EXTEND		
0682	REF	1			31.3435	1 3443 0		BZF	PATESTOP	
0683	REF	1			31.3436	3 0121 0	EXVERT	CA	OVFLND	IF OVERFLOW ANYWHERE IN GUIDANCE
0684					31.3437	0 0006 1		EXTEND		DON'T CALL THROTTLE OR FINDCDW
0685					31.3440	1 3453 1		BZF	+13	
0686	REF	32	LAST	812	31.3441	0 5567 0	EXGVFLOW	TC	ALARM	SOUND THE ALARM NON-ABORTIVELY.
0687					31.3442	01410 0		DCT	01410	
0688	REF	31	LAST	801	31.3443	3 4737 0	RATESTOP	CAF	TTT13	ARE WE IN ATTITUDE-HOLD?
0689					31.3444	0 0006 1		EXTEND		
0690	REF	4	LAST	801	31.3445	02 031 1		PAND	CHATT1	
0691					31.3446	0 0006 1		EXTEND		
0692	REF	1			31.3447	1 3460 1		BZF	DISPEXIT	YES
0693	REF	225	LAST	807	31.3450	0 4416 1		TC	BANKCALL	NO: DO A PT RATE
0694	REF	5	LAST	801	31.3451	40165 1		CADR	STOPRATE	
0695	REF	2	LAST	813	31.3452	1 3460 1		TCF	DISPEXIT	
0696	REF	1			31.3453	0 2216 0	GDUMP1	TC	THROTTLE	

L- LUNAR LANDING GUIDANCE EQUATIONS

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0697	REF 133	LAST 812	31,3454	0 6037 0	TC	INTPRET
0698			31,3455	77624 1	CALL	
0699	REF 3	LAST 772	31,3456	61111 1		FINDCDUW -2
0700			31,3457	77776 1	EXIT	

A0701

(CONTINUE TO DISPEXIT)

R0702

R0704

GUIDANCE LOOP DISPLAYS

R0705

0707			31,3460	0 0006 1	DISPEXIT	EXTEND	KILL GROUP 3: DISPLAYS WILL BE
0708	REF 14	LAST 744	31,3461	3 4755 1	DCA	NEGO	RESTORED BY NEXT GUIDANCE CYCLE
0709	REF 3	LAST 737	31,3462	52 757 0	DXGH	-PHASE3	
0710	REF 11	LAST 739	31,3463	4 0104 0	CS	FLACRDOB	IF FLONDISP IS SET, NO DISPLAY THIS PASS
0711	REF 2	LAST 739	31,3464	7 4742 0	MASK	FLONDRIT	
0712			31,3465	0 0006 1	EXTEND		
0713	REF 1		31,3466	1 3476 0	BZF	ENDLLJOB	TO PICK UP THE TAG
0714	REF 7	LAST 811	31,3467	51 621 0	INDEX	WCHPHOLD	
0715	REF 1		31,3470	1 2443 1	TCF	WHATDISP	
0716	REF 58	LAST 799	31,3471	0 5353 1	TC	PHASCHNG	KILL GROUP 5
0717			31,3472	00035 1	DCT	00035	
0718	REF 1		31,3473	3 3756 0	P63DISPS	CAF	VO6RDS
0719	REF 226	LAST 813	31,3474	0 4616 1	DISPCOMN	TC	BANKCALL
0720	REF 1		31,3475	20470 0	CADR	REGLOSER	
0721	REF 128	LAST 788	31,3476	1 5155 1	ENDLLJOB	TCF	ENDLLJOB
0722	REF 2	LAST 804	31,3477	3 1666 0	P64DISPS	CA	TREDES
0723			31,3500	0 0006 1	EXTEND		HAS TREDES REACHED ZERO?
0724	REF 1		31,3501	1 3523 1	BZF	RED-OVER	YES: CLEAR REDESIGNATION FLAG
0725	REF 5	LAST 804	31,3502	4 0102 0	CS	FLACRDOB	NO: IS REDFLAG SET?
0726	REF 2	LAST 804	31,3503	7 4746 1	MASK	REDFLBIT	
0727			31,3504	0 0006 1	EXTEND		
0728	REF 1		31,3505	1 3525 1	BZF	REDES-OK	YES: DO STATIC DISPLAY
0729	REF 1		31,3506	3 3757 1	CAF	VO6RDS	OTHERWISE USE FLASHING DISPLAY
0730	REF 227	LAST 814	31,3507	0 4616 1	TC	BANKCALL	
0731	REF 2	LAST 755	31,3510	20462 0	CADR	REFLASH	
0732	REF 33	LAST 792	31,3511	1 6001 1	TCF	GOTOPDOH	TERMINATE
0733	REF 1		31,3512	1 3515 1	TCF	P64CEED	PROCEED PERMIT REDESIGNATIONS
0734	REF 2	LAST 799	31,3513	1 3477 1	TCF	P64DISPS	RECYCLE

L LUNAR LANDING GUIDANCE EQUATIONS

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0735	REF	2	LAST	814	31,3514	1 3476 0	TCF	ENDLLJOB	TO PICK UP THE TAG
0736	REF	151	LAST	811	31,3515	3 4755 1	P64CEED	CAF	ZERO
0737	REF	3	LAST	804	31,3516	55'267 1	TS	FLINCR1	
0738	REF	4	LAST	804	31,3517	55'266 0	TS	AZINCR1	
0739	REF	48	LAST	782	31,3520	0 5504 0	TC	UPFLAG	ENABLE REDESIGNATION LOGIC
0740	REF	4	LAST	802	31,3521	00143 1	ADRES	REDFLAG	
0741	REF	129	LAST	814	31,3522	1 5155 1	TCF	ENDPFJOB	
0742	REF	74	LAST	802	31,3523	0 5516 0	RED-OVER	TC	DOWNFLAG
0743	REF	5	LAST	815	31,3524	00143 1	ADRES	REDFLAG	
0744	REF	2	LAST	814	31,3525	3 3757 1	REDES-OK	CAF	VO6N64
0745	REF	1			31,3526	1 3474 1	TCF	DISPCOMN	
0746	REF	1			31,3527	3 3760 0	VERTDISP	CAF	VO6N60
0747	REF	2	LAST	815	31,3530	1 3474 1	TCF	DISPCOMN	

R0748 *****
R0750 GUIDANCE FOR P65
R0751 *****

0753	REF	3	LAST	802	31,3531	11'647 1	VERTGUID	CCS	WENVERT	
0754	REF	1			31,3532	1 3545 1	TCF	P67VERT	POSITIVE NON-ZERO ---> P67	
0755	REF	1			31,3533	1 3543 1	TCF	P66VERT	+0	

R0756 THE P65 GUIDANCE EQUATION IS AS FOLLOWS:-

R0757
R0758 $V2FG - VGU$
R0759 $ACG =$
R0760 $TAUVERT$

0761	REF	134	LAST	814	31,3534	0 6037 0	P65VERT	TC	INTPRET	
0762					31,3535	52375 1		VLOAD	VSD	
0763	REF	2	LAST	121	31,3536	02511 0			V2FG	
0764	REF	9	LAST	809	31,3537	02627 1			VSD	
0765					31,3540	52141 1		V/SC	GOTO	
0766	REF	2	LAST	121	31,3541	02517 0			TAUVERT	
0767	REF	1			31,3542	63204 1			AFCCALC1	

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P0768 *****
 R0770 GUIDANCE FOR P66
 R0771 *****

0773	REF	47	LAST	812	31,3543	0 4635 0	P66VERT	TC	POSTJUMP	
0774	REF	1			31,3544	65270 1		CADP	P66VERTA	
0775	REF	59	LAST	814	31,3545	0 5353 1	P67VERT	TC	PHASCHNG	TERMINATE GROUP 3
0776					31,3546	00003 1		OCT	00003	
0777	REF	135	LAST	815	31,3547	0 6037 0		TC	INTPAET	
0778					31,3550	52175 0		VLOAD	GUTD	
0779	REF	6	LAST	806	31,3551	03527 1			V	
0780	REF	1			31,3552	65517 1			VHORCOMP	
0781	REF	1			32,2000			SETLOC	P66LOC	
0782					32,3263			BANK		
0783	REF	2	LAST	40 TO	41:	1 1*		CGUNT*	33/F2DPS	
0784	REF	4	LAST	706	32,3263	3 7710 0	RODTASK	CAF	PRIC22	
0785	REF	35	LAST	761	32,3264	0 5105 0		TC	FINDVAC	
0786	REF	32	LAST	785	E7,1515			EBANK	DVENTR	
0787	REF	1			32,3265	03275 1		2CADR	RODCOMP	
0787	REF	1			32,3266	64067 1				
0788	REF	55	LAST	782	32,3267	1 5261 0		TCF	TASKOVER	
0789	REF	60	LAST	816	32,3270	0 5353 1	P66VERTA	TC	PHASCHNG	TERMINATE GROUP 3.
0790					32,3271	00003 1		OCT	00003	
0791	REF	16	LAST	763	32,3272	3 4777 1		CAF	1SEC	
0792	REF	21	LAST	781	32,3273	0 5173 1		TC	TWIDDLE	
0793	REF	1			32,3274	03263 0		ADRES	RODTASK	
0794					32,3275	0 6004 0	RODCOMP	INHINT		
0795	REF	152	LAST	815	32,3276	3 4755 1		CAF	ZERO	
0796	REF	4	LAST	801	32,3277	57,746 0		XCH	RODCOUNT	
0797					32,3300	0 0006 1		EXTEND		
0798	REF	3	LAST	800	32,3301	7 1756 0		MP	POUSCALI	
0799	REF	2	LAST	800	32,3302	21,645 0		DAS	VDGVERT	UPDATE DESIRED ALTITUDE RATE.
0800					32,3303	0 0006 1		EXTEND		SET OLDPIPAZ.Y.Z = PIPAZ.Y.Z
0801	REF	8	LAST	384	32,3304	3 0040 0		OCA	PIPAZ	
0802	REF	3	LAST	800	32,3305	53,764 1		DXCH	OLDPIPAZ	
0803	REF	22	LAST	520	32,3306	52 071 0		DXCH	RUPTRREG1	SET RUPTRREG1,2,3 = OLDPIPAZ.Y,Z
0804	REF	3	LAST	384	32,3307	3 0041 1		CA	PIPAZ	
0805	REF	2	LAST	151	32,3310	57,765 1		XCH	OLDPIPAZ	
0806	REF	2	LAST	372	32,3311	56 072 1		XCH	RUPTRREG3	
0807					32,3312	0 0006 1		EXTEND		SNAPSHOT TIME OF PIPA READING.
0808	REF	24	LAST	762	32,3313	3 6025 0		OCA	TIME	

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0809	REF	3	LAST	795	32.3314	53.762 1	DXCH	THISTPIP	
0810	REF	4	LAST	816	32.3315	3 1763 1	CA	OLDPIPAZ	
0811	REF	1			32.3316	6 1160 1	AD	PIPATHPX	
0812	REF	304	LAST	812	32.3317	54 154 0	TS	MPAC	MPAC(X) = PIPAX + PIPATXPX
0813	REF	2	LAST	151	32.3320	3 1764 0	CA	OLDPIPAY	
0814	REF	1			32.3321	6 1161 0	AD	PIPATMPY	
0815	REF	305	LAST	817	32.3322	54 157 0	TS	MPAC +3	MPAC(Y) = PIPAY + PIPATMPY
0816	REF	3	LAST	816	32.3323	3 1765 1	CA	OLDPIPAZ	
0817	REF	1			32.3324	6 1162 0	AD	PIPATHPZ	
0818	REF	306	LAST	817	32.3325	54 161 0	TS	MPAC +5	MPAC(Z) = PIPAZ + PIPATHPZ
0819	REF	5	LAST	817	32.3326	4 1763 0	CS	OLDPIPAZ	
0820	REF	3	LAST	800	32.3327	6 1254 0	AD	TEMX	
0821	REF	23	LAST	816	32.3330	6 0070 0	AD	RUPTRRG1	
0822	REF	3	LAST	800	32.3331	55.766 0	TS	DELVRDD	
0823	REF	3	LAST	817	32.3332	4 1764 1	CS	OLDPIPAY	
0824	REF	2	LAST	105	32.3333	6 1255 1	AD	TEMY	
0825	REF	8	LAST	258	32.3334	6 0071 1	AD	RUPTRRG2	
0826	REF	4	LAST	817	32.3335	55.770 1	TS	DELVRDD +2	
0827	REF	4	LAST	817	32.3336	4 1765 0	CS	OLDPIPAZ	
0828	REF	2	LAST	105	32.3337	6 1256 1	AD	TEMZ	
0829	REF	3	LAST	816	32.3340	6 0072 1	AD	RUPTRRG3	
0830	REF	5	LAST	817	32.3341	55.772 0	TS	DELVRDD +4	
0831	REF	153	LAST	816	32.3342	3 4755 1	CAF	ZERO	
0832	REF	307	LAST	817	32.3343	54 155 1	TS	MPAC +1	ZERO LO-ORDER MPAC COMPONENTS
0833	REF	308	LAST	817	32.3344	54 160 1	TS	MPAC +4	
0834	REF	309	LAST	817	32.3345	54 162 0	TS	MPAC +6	
0835	REF	4	LAST	817	32.3346	55.254 1	TS	TEMX	ZERO TEMX, TEMY, AND TEMZ SHOULD BE WILL
0836	REF	3	LAST	817	32.3347	55.255 0	TS	TEMY	KNOW WHEN READACCS CHANGES THEM.
0837	REF	3	LAST	817	32.3350	55.256 0	TS	TEMZ	
0838	REF	89	LAST	811	32.3351	4 4753 0	CS	DNE	
0839	REF	9	LAST	809	32.3352	54 163 1	TS	MODE	
0840	REF	136	LAST	816	32.3353	0 6037 0	TC	INTERPRET	
0841					32.3354	65361 0	ITRPNT1	VXSC	SCALE MPAC TO M/CS #2(-7) AND PUSH (5)
0842	REF	1			32.3355	26022 0		KPIP1	
0843	REF	4	LAST	817	32.3356	03762 1		THISTPIP	
0844					32.3357	77625 0	DSU		
0845	REF	15	LAST	800	32.3360	01235 1		PIPTIME	
0846					32.3361	00037 0	STORE	POD	PO-310 CONTAINS TIME IN CS SINCE PIPTIME
0847					32.3362	63271 0	DDV	PDVL	(8)
0848	REF	1			32.3363	27153 0		4SEC(28)	
0849	REF	6	LAST	809	32.3364	01237 0		BDT/2	
0850					32.3365	74251 1	VSU	VXSC	(6)
0851	REF	2	LAST	800	32.3366	02631 1		VBIAS	
0852					32.3367	53352 0	VSL2	VAD	
0853	REF	7	LAST	816	32.3370	03527 1		V	
0854					32.3371	45455 1	VAD	STADP	(5)
0855					32.3372	53746 1	STOVL	240	STORE UPDATED VELOCITY IN 24-290

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0856	REF	14	LAST	812	32,3373	03521-1	R	
0857					32,3374	77656-1	UNIT	
0858					32,3375	00017-1	STORE	14D
0859					32,3376	72441-0	DOT	SL1
0860					32,3377	00031-0		24D
0861	REF	7	LAST	800	32,3400	17474-0	STOBL	HOOYDISP
0862					32,3401	00037-0		30D
0863					32,3402	41261-1	SL	DMP
0864					32,3403	20214-1		11D
0865	REF	8	LAST	818	32,3404	03474-0		HOOYDISP
0866					32,3405	45215-0	DAD	DSU
0867					32,3406	00045-0		36D
0868	REF	5	LAST	805	32,3407	02333-0		/LAND/
0869	REF	2	LAST	315	32,3410	17775-1	STOBL	HOCALCI
0870	REF	9	LAST	818	32,3411	03474-0		HOOYDISP
0871					32,3412	56221-0	BDSU	DEV
0872	REF	3	LAST	816	32,3413	03645-0		VDGVERT
0873	REF	2	LAST	122	32,3414	02541-0		TAURGD
0874					32,3415	51515-1	PDVL	ABVAL
0875	REF	7	LAST	817	32,3416	01237-0		GDT/2
0876					32,3417	60471-0	DDV	SR2
0877	REF	2	LAST	809	32,3420	05652-0		GSCALE
0878					32,3421	00025-0	STORE	20D
0879					32,3422	77615-0	DAD	
0880					32,3423	45115-0	PDVL	CALL
0881	REF	10	LAST	792	32,3424	06520-0		UNITX
0882	REF	2	LAST	705	32,3425	47661-0		CDU*NBSH
0883					32,3426	77641-1	DOT	
0884					32,3427	00017-1		14D
0885					32,3430	00027-1	STORE	22D
0886					32,3431	45465-1	BDOV	STADK
0887	REF	4	LAST	809	32,3432	50313-0	STOVL	/AFC/
0888	REF	6	LAST	817	32,3433	03767-1		DELVRD
0889					32,3434	53361-0	VXSC	VAD
0890	REF	2	LAST	817	32,3435	26022-0		KPIPI
0891	REF	3	LAST	817	32,3436	02631-1		VBIAS
0892					32,3437	65246-1	ABVAL	PDDL
0893	REF	5	LAST	817	32,3440	03762-1		THISTPIP
0894					32,3441	65225-1	DSU	PDDL
0895	REF	3	LAST	800	32,3442	03760-0		LASTPIP
0896	REF	6	LAST	818	32,3443	03762-1		THISTPIP
0897	REF	4	LAST	818	32,3444	17760-0	STOBL	LASTPIP
0898					32,3445	55271-0	DDV	BDOV
0899	REF	1			32,3446	25535-0		SHE1FACT
0900					32,3447	41325-0	PDDL	DMP
0901	REF	7	LAST	800	32,3450	03611-1		FWEIGHT
0902	REF	1			32,3451	25534-1		BIT1H
0903					32,3452	56271-0	DDV	BDOV
0904	REF	7	LAST	809	32,3453	01245-0		MASS
0905	REF	2	LAST	796	32,3454	22006-1		SCALEFAC

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0906				32.3455	65215 1	DAD	PDDL	(4)
0907				32.3456	00001 0		OD	
0908				32.3457	00025 0		20D	
0909				32.3460	45271 1	DDV	BDSU	(2)
0910				32.3461	00027 1		22D	
0911				32.3462	43205 1	DMP	DAD	
0912	REF	2	LAST	122	32.3463		LAG/TAU	
0913	REF	5	LAST	818	32.3464		//FC/	
0914				32.3465	56325 0	PDDL	DDV	(4)
0915	REF	2	LAST	122	32.3466		MAXFORCE	
0916	REF	8	LAST	818	32.3467		MASS	
0917				32.3470	56325 0	PDDL	DDV	(6)
0918	REF	2	LAST	122	32.3471		MINFORCE	
0919	REF	9	LAST	819	32.3472		MASS	
0920				32.3473	44206 0	PUSH	BDSU	(8)
0921				32.3474	00003 1		2D	
0922				32.3475	71240 1	BMN	DLOAD	(6)
0923	REF	1		32.3476	65504 0		AFCSPOT	
0924				32.3477	41545 0	DLOAD	PUSH	(6)
0925				32.3500	51021 0	BDSU	BPL	
0926				32.3501	00003 1		2D	
0927	REF	2	LAST	819	32.3502		AFCSPOT	
0928				32.3503	77745 1	DLOAD		(4)
0929				32.3504	77745 1	AFCSPOT	DLOAD	(2), (4), OR (6)
0930				32.3505	77601 0	SETPD		(2)
0931				32.3506	00003 1		2D	
0932	REF	6	LAST	819	32.3507		STUDL	(0)
0933				32.3510	77776 1	ITRPNT2	EXIT	
0934	REF	310	LAST	817	32.3511		DXCH	MPAC = MEASURED ACCELERATION.
0935	REF	228	LAST	814	32.3512		TC	BANKCALL
0936	REF	2	LAST	813	32.3513		CADR	THRUTTLE +3
0937	REF	137	LAST	817	32.3514		TC	INTPRET
0938				32.3515	77775 1	VLOAD		PICK UP UPDATED VELOCITY VECTOR.
0939				32.3516	00031 0		24D	
0940				32.3517	53352 0	VHORCOMP	VSL2	VAD
0941	REF	2	LAST	151	32.3520		DELVS	
0942				32.3521	63342 1	VSR2	PDVL	(6)
0943	REF	15	LAST	818	32.3522			
0944				32.3523	74256 0	UNIT	VXSC	
0945	REF	10	LAST	818	32.3524		HDOTDISP	
0946				32.3525	51372 0	VSL1	BVSU	(0)
0947				32.3526	77646 0	ABVAL		
0948	REF	4	LAST	806	32.3527		STORE	VHORIZ
0949				32.3530	77776 1	EXIT		
0950	REF	229	LAST	819	32.3531		TC	BANKCALL
0951	REF	3	LAST	813	32.3532		CADR	DISPEXIT +3
0952				32.3533	00001 0	BITIM	OUT	00001
0953				32.3534	00000 1	SHFTFACT	2DEC	1-B-17
0953				32.3535	04000 0			

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0954 32,3536 00000 1 BIASFACT ZI-EC 655.36 E-28
 0954 32,3537 -01217 1

0955 *****

0957 REDESIGNATOR TRAP

0958 *****

0960 11,2275 BANK 11
 0961 REF 1 11,2000 SETLOC F2DPS*11
 0962 11,2275 BANK

0963 REF 1 COUNT* 11/F2DPS

0964 REF 4 LAST 555 11,2275 56 016 0 PITFALL XCH BANKRUPT
 0965 11,2276 0 0006 1 EXTEND
 0966 REF 4 LAST 555 11,2277 22 012 1 QXCH QKRUPT

0967 REF 4 LAST 800 11,2300 0 5321 1 TC CHECKMM IF NOT IN P64, NO REASON TO CONTINUE
 0968 11,2301 00100 0 DEC 64
 0969 REF 18 LAST 557 11,2302 1 5270 0 TCF RESUME

0970 11,2303 0 0006 1 EXTEND
 0971 REF 5 LAST 813 11,2304 00 031 0 READ CHAN31
 0972 11,2305 4 0000 0 COM
 0973 REF 1 11,2306 7 2373 0 MASK ALL48BITS
 0974 REF 3 LAST 154 11,2307 55 265 0 TS ELVIRA
 0975 REF 48 LAST 807 11,2310 3 4752 0 CAF TWO
 0976 REF 2 LAST 106 11,2311 55 264 1 TS ZERLINA
 0977 REF 16 LAST 725 11,2312 3 4756 1 CAF FIVE
 0978 REF 22 LAST 816 11,2313 0 5173 1 TC TWIDDLE
 0979 REF 1 11,2314 02321 0 ADRES REDESIGNATOR
 0980 REF 19 LAST 820 11,2315 1 5270 0 TCF RESUME

0981 REDESIGNATION MONITOR (INITIATED BY PITFALL)

0982 REF 3 LAST 820 11,2316 55 264 1 PREMON1 TS ZERLINA
 0983 REF 9 LAST 555 11,2317 3 4757 0 PREMON2 CAF SEVEN
 0984 REF 7 LAST 781 11,2320 0 5224 0 TC VARDELAY
 0985 11,2321 0 0006 1 REDESIGNATOR EXTEND
 0986 11,2322 00 031 0 READ 31
 0987 11,2323 4 0000 0 COM
 0988 REF 2 LAST 820 11,2324 7 2373 0 MASK ALL48BITS
 0989 REF 4 LAST 820 11,2325 57 265 1 XCH ELVIRA
 0990 REF 115 LAST 810 11,2326 54 001 1 TS L
 0991 REF 5 LAST 820 11,2327 11 265 0 CCS ELVIRA
 0992 REF 1 11,2330 1 2317 1 TCF PREMON2

DO ANY BITS APPEAR THIS PASS?
 Y: CONTINUE MONITOR

0993 REF 116 LAST 820 11,2331 10 001 1 CCS L
 0994 REF 1 11,2332 1 2341 1 TCF COUNT 100. RESET RUPT, TERMINATE

NO ANY LAST PASS?

Y: COUNT 100. RESET RUPT, TERMINATE

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0995	REF	4	LAST	820	11.2333	11.264 1		CCS	ZERLINA	N: HAS ZERLINA REACHED ZERO YET?
0996	REF	1			11.2334	1 2316 0		TCP	PEEMOVI	N: DIMINISH ZERLINA. CONTINUE
0997	REF	29	LAST	802	11.2335	3 4740 0	RESETRPT	CAF	-BIT2	Y: RESET RUPT. TERMINATE
0998					11.2336	0 0006 1		EXTEND		
0999	REF	16	LAST	802	11.2337	05 013 0		WER	CHAM13	
1000	REF	56	LAST	816	11.2340	1 5261 0		TCP	TASKOVER	
1001	REF	32	LAST	813	11.2341	3 4737 0	COUNT'EM	CAF	-BIT3	ARE WE IN ATTITUDE-HOLD?
1002					11.2342	0 0006 1		EXTEND		
1003	REF	6	LAST	820	11.2343	02 031 1		RAND	CHAM31	
1004					11.2344	0 0006 1		EXTEND		
1005	REF	1			11.2345	1 2335 1		BZF	RESETRPT	YES: SKIP REDESIGNATION LOGIC.
1006	REF	117	LAST	820	11.2346	3 0001 0		CA	L	NO
1007	REF	1			11.2347	7 4746 1		MASK	-AZBIT	
1008	REF	234	LAST	810	11.2350	10 000 0		CCS	A	
1009	REF	1			11.2351	4 2374 1	-AZ	CS	AZ1ACH	
1010	REF	5	LAST	815	11.2352	27.266 0		ADS	AZ1NCRI	
1011	REF	118	LAST	821	11.2353	3 0001 0		CA	L	
1012	REF	1			11.2354	7 4747 0		MASK	+AZBIT	
1013	REF	235	LAST	821	11.2355	10 000 0		CCS	A	
1014	REF	2	LAST	821	11.2356	3 2374 0	+AZ	CA	AZEACH	
1015	REF	6	LAST	821	11.2357	27.266 0		ADS	AZ1NCRI	
1016	REF	119	LAST	821	11.2360	3 0001 0		CA	L	
1017	REF	1			11.2361	7 4753 0		MASK	-ELBIT	
1018	REF	236	LAST	821	11.2362	10 000 0		CCS	A	
1019	REF	1			11.2363	4 2375 0	-EL	CS	ELEACH	
1020	REF	4	LAST	815	11.2364	27.267 1		ADS	EL1NCRI	
1021	REF	120	LAST	821	11.2365	3 0001 0		CA	L	
1022	REF	1			11.2366	7 4752 1		MASK	+ELBIT	
1023	REF	237	LAST	821	11.2367	10 000 0		CCS	A	
1024	REF	2	LAST	821	11.2370	3 2375 1	+EL	CA	ELEACH	
1025	REF	5	LAST	821	11.2371	27.267 1		ADS	EL1NCRI	
1026	REF	2	LAST	821	11.2372	1 2335 1		TCP	RESETRPT	

R1027 THESE EQUIVALENCIES ARE BASED ON GSOP CHAPTER 4, REVISION 16 OF P64LM

1028	REF	38	LAST	715	4752	+ELBIT	=	BIT2	-PITCH
1029	REF	38	LAST	760	4753	-ELBIT	=	BIT1	+PITCH
1030	REF	35	LAST	800	4747	+AZBIT	=	BIT5	
1031	REF	41	LAST	795	4746	-AZBIT	=	BIT6	

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1032 11.2373 00063 1 ALL4BITS OUT 00063

1033 11.2374 01074 0 AZEACH DEC .03491 2 DEGREES

1034 11.2375 00217 0 ELEACH DEC .00873 1/2 DEGREE

R1035 *****

R1037 R.O.D. TRAP

R1038 *****

1039 20.2115 BANK 20

1040 REF 1 20.2000 SETLOC RODTRAP

1041 20.2115 BANK

1042 REF 1 COUNT* 11/F2DPS *****

1044 REF 26 LAST 561 20.2115 7 4745 1 DESCBITS MASK BIT7 COME HERE FROM MARKRUPT CODING WITH BIT

1045 REF 238 LAST 821 20.2116 10 000 0 CUS A 7 OR 6 OF CHANNEL 16 IN A: BIT 7 MEANS

1046 REF 49 LAST 820 20.2117 4 4752 1 CS TWO - RATE INCREMENT. BIT 6 - INCREMENT

1047 REF 90 LAST 817 20.2120 6 4753 1 AD ONE

1048 REF 5 LAST 816 20.2121 27 746 1 ADS RODCOUNT

1049 REF 20 LAST 820 20.2122 1 5270 0 TCF RESUME TRAP IS RESET WHEN SWITCH IS RELEASED

1050 31.3553 BANK 31

1051 REF 3 LAST 791 31.2000 SETLOC F2DPS+31

1052 31.3553 BANK

1053 REF 4 LAST 801 TO 816: 490 531* COUNT* 16/F2DPS

R1054 *****

R1056 DOUBLE PRECISION ROOT FINDER SUBROUTINE (BY ALLAN KLUMPF)

R1057 *****

R1059 N N-1

R1060 ROOTPSRS FINDS ONE ROOT OF THE POWER SERIES $A \cdot X^N + \dots + A \cdot X^{N-1} + 0$

R1062 N N-1 1 0

R1064 USING NEWTON'S METHOD STARTING WITH AN INITIAL GUESS FOR THE ROOT. THE ENTERING DATA MUST BE AS FOLLOWS:

A1066 A SP LOC-1 ADRES FOR REFERENCING PER CUF TAB

A1067 L SP N-1 N IS THE DEGREE OF THE POWER SERIES

A1068 MPAC DP X INITIAL GUESS FOR ROOT

A1069 LUC-2N DP A(0)

A1070 ...

A1071 LUC DP A(N)

A1072 LUC+2 SP PRECROOT PREC REQ OF ROOT (AS FRACT OF 1ST GUESS)

L LUNAR LANDING GUIDANCE EQUATIONS

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R1073 THE DP RESULT IS LEFT IN MPAC UPON EXIT, AND A SP COUNT OF THE ITERATIONS TO CONVERGENCE IS LEFT IN MPAC+2.
 R1075 RETURN IS NORMALLY TO LOC(TC ROOTPSRS)+3. IF ROOTPSRS FAILS TO CONVERGE IN 8 PASSES, RETURN IS TO LOC+1 AND
 R1077 OUTPUTS ARE NOT TO BE TRUSTED.

R1078 PRECAUTION: ROOTPSRS MAKES NO CHECKS FOR OVERFLOW OR FOR IMPROPER USAGE. IMPROPER USAGE COULD
 R1080 PRECLUDE CONVERGENCE OR REQUIRE EXCESSIVE ITERATIONS. AS A SPECIFIC EXAMPLE, ROOTPSRS FORMS A DERIVATIVE
 R1082 COEFFICIENT TABLE BY MULTIPLYING EACH A(I) BY I, WHERE I RANGES FROM 1 TO N. IF AN ELEMENT OF THE DERIVATIVE
 R1084 COEFFICIENT TABLE = 1 OR > 1 IN MAGNITUDE, ONLY THE EXCESS IS RETAINED. ROOTPSRS MAY CONVERGE ON THE CORRECT
 R1086 ROOT NONETHELESS, BUT IT MAY TAKE AN EXCESSIVE NUMBER OF ITERATIONS. THEREFORE THE USER SHOULD RECOGNIZE:

R1088 1. USER'S RESPONSIBILITY TO ASSURE THAT $I \times A(I) < 1$ IN MAGNITUDE FOR ALL I.

R1090 2. USER'S RESPONSIBILITY TO ASSURE OVERFLOW WILL NOT OCCUR IN EVALUATING EITHER THE RESIDUAL OR THE DERIVATIVE
 R1092 POWER SERIES. THIS OVERFLOW WOULD BE PRODUCED BY SUBROUTINE POWRSRS, CALLED BY ROOTPSRS, AND MIGHT NOT
 R1094 PRECLUDE EVENTUAL CONVERGENCE.

R1095 3. AT PRESENT, ERASABLE LOCATIONS ARE RESERVED ONLY FOR N UP TO 5. AN N IN EXCESS OF 5 WILL PRODUCE CHARS.
 R1097 ALL ERASABLES USED BY ROOTPSRS ARE UNSWITCHED LOCATED IN THE REGION FROM MPAC-33 OCT TO MPAC+7.

R1099 4. THE ITERATION COUNT RETURNED IN MPAC+2 MAY BE USED TO DETECT ABNORMAL PERFORMANCE.

A1101

STORE ENTERING DATA, INITIALIZE ERASABLES

1102				31,3553	0 0006 1	ROOTPSRS	EXTEND		
1103	REF	1		31,3554	22 132 1	DXCH	ENTER		RETURN ADRES
1104	REF	1		31,3555	54 117 1	TS	PWRPTR		PWR-TABL-POINTER
1105	REF	311	LAST	819	31,3556	52 160 1	DXCH	MPAC +3	PWR-TABL-ADRES, N-1
1106	REF	1		31,3557	3 3676 0	CA	DERTABL		
1107	REF	1		31,3560	54 141 1	TS	DERPTR		DER-TABL-POINTER
1108	REF	312	LAST	823	31,3561	54 161 0	TS	MPAC +5	DER-TABL-ADRES
1109	REF	313	LAST	823	31,3562	10 160 1	CCS	MPAC +4	NO-POWER-SERIES-OF-DEGREE-1-OR-LESS
1110	REF	314	LAST	823	31,3563	54 162 0	TS	MPAC +6	N-2
1111	REF	154	LAST	817	31,3564	3 4755 1	CA	ZER	MODE USED AS ITERATION COUNTER. 1-100
1112	REF	10	LAST	817	31,3565	54 163 1	TS	MODE	MUST BE POS 55 ABS WON'T CORR MPAC+2

A1113

COMPUTE CRITERION TO STOP ITERATING

1114				31,3566	0 0006 1	EXTEND			
1115	REF	315	LAST	823	31,3567	3 0155 0	DCA	MPAC	FETCH ROOT GUESS, KEEPING IT IN MPAC
1116	REF	1		31,3570	52 127 1	DXCH	ROOTPS		AND IN ROOTPS
1117	REF	316	LAST	823	31,3571	50 157 1	INDEX	MPAC +3	PWR-TABL-ADRES
1118				31,3572	3 0005 1	CA	5		PRECROOT-TO-A
1119	REF	7	LAST	462	31,3573	0 7307 1	TC	SHORTAP	YIELDS DP PRODUCT IN MPAC
1120	REF	2	LAST	601	31,3574	0 4713 0	TC	USRCADP	
1121	REF	1		31,3575	01226 0	CADR	APR		YIELDS ABVAL OF CRITERION ON DX IN MPAC
1122	REF	317	LAST	823	31,3576	52 155 1	DXCH	MPAC	
1123	REF	1		31,3577	52 125 0	DXCH	DXL-IT		CRITERION

A1124

SET-UP DER-CDF-TABL

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1125				31.3600	0 0006 1	EXTEND		
1126	REF	2	LAST	823	31.3601	5 0117 0	INDEX	PWRPTR
1127				31.3602	3 0004 0	DCA	3	
1128	REF	318	LAST	823	31.3603	52 155 1	DXCH	MPAC
								A(N) TO MPAC
1129	REF	319	LAST	824	31.3604	3 0160 0	CA	MPAC +4
								N-1 TO A
1130	REF	1			31.3605	54 140 0	DERCLOOP	TS
1131	REF	91	LAST	822	31.3606	6 4753 1	AD	ONE
1132	REF	1			31.3607	0 7316 1	TC	UNPAC
1133					31.3610	0 0006 1	EXTEND	
1134	REF	3	LAST	824	31.3611	5 0117 0	INDEX	PWRPTR
1135					31.3612	3 0002 0	DCA	1
1136	REF	320	LAST	824	31.3613	52 155 1	DXCH	MPAC
								A(I-1) TO MPAC. FETCHING DERCOF
1137	REF	2	LAST	823	31.3614	50 141 0	INDEX	DERPTR
1138					31.3615	52 004 1	DXCH	3
								DERCOF TO DER TABL
1139	REF	50	LAST	822	31.3616	4 4752 1	CS	TR
1140	REF	4	LAST	824	31.3617	26 117 1	ADS	PWRPTR
								DECREMENT PWR POINTER
1141	REF	51	LAST	824	31.3620	4 4752 1	CS	TR
1142	REF	3	LAST	824	31.3621	26 141 1	ADS	DERPTR
								DECREMENT DER POINTER
1143	REF	2	LAST	824	31.3622	10 140 0	CCS	PWRPTR
1144	REF	1			31.3623	1 3605 0	TCF	DERCLOOP
A1145								CONVERGE ON ROOT
1146					31.3624	0 0006 1	ROOTLOOP	EXTEND
1147	REF	2	LAST	823	31.3625	3 0127 0	DCA	ROOTPS
1148	REF	321	LAST	824	31.3626	52 155 1	DXCH	MPAC
								LEAVE IN MPAC
1149					31.3627	0 0006 1	EXTEND	
1150	REF	322	LAST	824	31.3630	3 0162 1	DCA	MPAC +5
1151	REF	1			31.3631	0 7215 0	TC	PWRSEERS
								LOAD A, L WITH DER TABL ADRES, N-1
								YIELDS DERIVATIVE IN MPAC
1152					31.3632	0 0006 1	EXTEND	
1153	REF	3	LAST	824	31.3633	3 0127 0	DCA	ROOTPS
1154	REF	323	LAST	824	31.3634	52 155 1	DXCH	MPAC
1155	REF	75	LAST	813	31.3635	52 131 0	DXCH	BUF
								CURRENT ROOT TO MPAC, FETCHING DERIVATIVE
1156					31.3636	0 0006 1	EXTEND	
1157	REF	324	LAST	824	31.3637	3 0160 0	DCA	MPAC +3
1158	REF	2	LAST	824	31.3640	0 7215 0	TC	PWRSEERS
								LEAVE DERIVATIVE IN BUF AS DIVIDER
								LOAD A, L WITH PWR TABL ADRES, N-1
								YIELDS RESIDUAL IN MPAC
1159	REF	5	LAST	823	31.3641	0 4713 0	TC	USPFCADP
1160	REF	1			31.3642	00353 1	CAOP	DDV/BDV
								YIELDS -DX IN MPAC
1161					31.3643	0 0006 1	EXTEND	
1162	REF	325	LAST	824	31.3644	4 0155 1	DCS	MPAC
1163	REF	4	LAST	824	31.3645	20 127 1	EAS	ROOTPS
								FETCH -DX. LEAVING -DX IN MPAC
								CORRECTED ROOT NOW IN ROOTPS
1164	REF	4	LAST	824	31.3646	0 4713 0	TC	USPFCADP
1165	REF	2	LAST	823	31.3647	01226 0	CAOP	ABS
1166					31.3650	0 0006 1	EXTEND	
								YIELDS ABS(DX) IN MPAC

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1167 REF 2 LAST 823 31.3651 4 0125 0 DCS DXC-IT
1168 REF 326 LAST 824 31.3652 20 155 1 DAX PAC ABS(DX)-ABS(DXC-IT) 15 PAC

1169 REF 11 LAST 823 31.3653 3 0163 0 CA MODE
1170 REF 32 LAST 795 31.3654 7 4750 0 MASK BIT KLUMPP-SAYS-GIVE-UP-AFTER-EIGHT-PASSES
1171 REF 239 LAST 822 31.3655 10 000 0 CCS
1172 REF 2 LAST 823 31.3656 6 0125 1 BADPORT TC RETIME T

1173 REF 12 LAST 825 31.3657 24 163 0 INCR MODE INCREMENT-ITERATION-COUNTER
1174 REF 327 LAST 825 31.3658 10 154 0 CCS PAC TEST HI ORDER DX
1175 REF 1 31.3661 1 3624 0 TCF FOUTLPP
1176 REF 1 31.3662 1 3664 1 TCF TESTLODX
1177 REF 1 31.3663 1 3670 1 TCF ROOTSTOP
1178 REF 328 LAST 825 31.3664 10 155 1 TESTLODX CCS MPAC +1 TEST-LO-ORDER-DX
1179 REF 2 LAST 825 31.3665 1 3624 0 TCF ROOTLOOP
1180 REF 2 LAST 825 31.3666 1 3670 1 TCF ROOT-ITP
1181 REF 3 LAST 825 31.3667 1 3670 1 TCF ROOTSTEP
1182 REF 5 LAST 824 31.3670 52 127 1 ROOTSTOP DXCH ROOT-ITP
1183 REF 329 LAST 825 31.3671 52 155 1 DXCH MPAC
1184 REF 13 LAST 825 31.3672 3 0163 0 CA MODE
1185 REF 330 LAST 825 31.3673 54 156 1 IS PAC +2 STORE SP ITERATION COUNTER IN MPAC
1186 REF 3 LAST 825 31.3674 50 157 1 INDEX RETIME T
1187 31.3675 1 0002 1 TCF

1188 REF 1 31.3676 00147 0 DERTABLL ADRES DERGUPN -3

1189 *****
1190 TRASHY-LITTLE SUBROUTINES-
1191 *****
1192 *****

1194 REF 14 LAST 811 31.3677 51 351 1 INTPKETX INDEX MCNPHASE SET-X1-ON-THE-WAY-TO-THE-INTERPRETER-
1195 REF 2 LAST 810 31.3700 4 2452 1 CS TARGETDEX
1196 REF 14 LAST 809 31.3701 50 120 1 INDEX FINEST
1197 REF 22 LAST 778 31.3702 54 046 1 TC XI
1198 REF 138 LAST 819 31.3703 1 6037 1 TCF INTERPRET

1199 REF 17 LAST 811 31.3704 3 1642 0 TDISPSET CA ITF/B
1200 31.3705 0 0006 1 EXTEND
1201 REF 1 31.3706 7 4750 0 MP TSCAL-INV
1202 REF 4 LAST 315 31.3707 53 476 1 DXCH ITF-DISF

1203 REF 8 LAST 813 31.3710 3 5014 1 CA MODE TREDER BECOMES ZERO TWO PASSES
1204 REF 29 LAST 813 31.3711 54 003 0 T FADDER BEFORE TCGFAPPR IS REACHED
1205 REF 2 LAST 121 E5.1470 EPRANK TCGFAPPR
1206 REF 3 LAST 825 31.3712 3 1470 0 CA TCGFAPPR
1207 REF 21 LAST 813 31.3713 24 006 1 INCR BBANK
1208 REF 22 LAST 825 31.3714 24 006 1 INCR BBANK
1209 REF 18 LAST 825 E7.1642 EBANK ITF/B
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1210	REF 19	LAST 825	31.3715	6 1642 0	AD	TTF/8
1211			31.3716	0 0006 1	EXTEND	
1212	REF 1		31.3717	7 3751 0	MP	TREDESCL
1213	REF 1		31.3720	6 3747 0	AD	-DEC103
1214	REF 3	LAST 597	31.3721	6 4735 1	AD	NEGMAX
1215	REF 121	LAST 821	31.3722	54 001 1	TS	L
1216	REF 122	LAST 826	31.3723	4 0001 1	CS	
1217	REF 123	LAST 826	31.3724	6 0001 0	AD	L
1218	REF 1		31.3725	6 3750 0	AD	+DEC99
1219	REF 19	LAST 812	31.3726	6 4733 1	AD	POS MAX
1220	REF 3	LAST 814	31.3727	55 666 1	TS	TREDES
1221	REF 4	LAST 826	31.3730	4 1666 1	CS	TREDES
1222	REF 5	LAST 826	31.3731	27 666 1	ADS	TREDES
1223	REF 201	LAST 813	31.3732	0 0002 0	TC	Q

1224	REF 4	LAST 455	31.3733	0 5652 0	1406PDD	TC	P00000
1225			31.3734	01406 1	UCT		01406
1226	REF 33	LAST 813	31.3735	0 5567 0	1406ALN	TC	ALARM
1227			31.3736	01406 1	OCT		01406
1228	REF 2	LAST 813	31.3737	1 3443 0	TCF		LATESTOP

R1229 *****
R1231 SPECIALIZED "PHASCHNG" SUBROUTINE
R1232 *****

1234	REF 1		E3,1440		EBANK	PHSHAME3		
1235	REF 2	LAST 223	31.3740	3 5007 0	FASTCHNG	CA	EBANK3	SPECIALIZED "PHASCHNG" ROUTINE
1236	REF 30	LAST 825	31.3741	56 003 1	XCH		EBANK	
1237	REF 124	LAST 826	31.3742	52 002 1	DXCH		L	
1238	REF 1		31.3743	55 442 0	TS		PHSHAME3	
1239	REF 31	LAST 826	31.3744	22 003 1	LXCH		EBANK	
1240	REF 3	LAST 798	E7,1621		EBANK		E2DPS	
1241	REF 240	LAST 825	31.3745	0 0000 1	TC		A	

R1242 *****
R1244 PARAMETER TABLE INDIRECT ADDRESSES
R1245 *****

1247	REF 2	LAST 121	E5,1402	ADG	=	ABRFG
1248	REF 2	LAST 121	E5,1410	VDG	=	VBRFG
1249	REF 2	LAST 121	E5,1416	ADG	=	ABRFG
1250	REF 2	LAST 121	E5,1424	VDG2TTF	=	VBRFG*
1251	REF 2	LAST 121	E5,1426	ADG2TTF	=	ABRFG*
1252	REF 2	LAST 121	E5,1430	JDG2TTF	=	JBRFG*

R1253 *****
R1255 LUNAR LANDING CONSTANTS
R1256 *****

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LINE	REF	LAST	ADDR	DATA	DESCRIPTION	UNIT	VALUE	DESCRIPTION
1258	REF 7	LAST 807	31,3746	01565 0	TABLTITL	ADRES	TABLTTF +3	ADDRESS FOR REFERENCING TTF TABLE
1259	REF 30	LAST 821	4740		TTFSCALE	=	51712	
1260	REF 33	LAST 825	4750		TSCALINV	=	8174	
1261			31,3747	77630 1	-DEC103	DEC	-103	
1262			31,3750	00143 1	+DEC99	DEC	+99	
1263			31,3751	75340 1	TREDESCI	DEC	-.08	
1264			31,3752	00264 1	180DEGS	DEC	+180	
1265			31,3753	00056 1	1/2DEC	DEC	+0.00278	
1266			31,3754	01542 0	PROJMAX	DEC	.42262 E-3	SIN(25°)/8 TO COMPARE WITH PROJ
1267			31,3755	01022 0	PROJMIN	DEC	.25832 E-3	SIN(15°)/8 TO COMPARE WITH PROJ
1268			31,3756	01477 1	VO6N63	VN	0663	P63
1269			31,3757	01500 0	VO6N64	VN	0664	P64
1270			31,3760	01474 1	VO6N60	VN	0660	P65, P66, P67
1271			22,3647		BANK	22		
1272	REF 1		22,2000		SETLOC	LANDCNST		
1273			22,3647		BANK			
1274	REF 1				COUNT	33/FLOPS		
1275			22,3647	00021 1	HIGHESTP	2DEC	4.34546769 E-12	
1275			22,3650	14161 1				
1276			22,3651	01440 0	GSCALE	2DEC	100 E-11	
1276			22,3652	00000 1				
1277			22,3653	14000 1	3/8DP	2DEC	.275	
1277			22,3654	00000 1				
1278			22,3655	30000 1	3/40P	2DEC	.750	
1278			22,3656	00000 1				
1279			22,3657	77534 0	DEPRCRIT	2DEC	-.02 E-1	
1279			22,3660	45074 0				

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R1280

R1282

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0001				21,2006			BANK	21		
0002	REF	1		21,2000			SETLUC	R11		
0003				21,2006			BANK			
0004	REF	33	LAST	816	E7,1515		EBANK	DVCNTR		
0005	REF	1					COUNT	33/R11		
0006	REF	17	LAST	762	21,2006	4 0103 1	R10,R11	CS	FLAGRD7	IS SERVICER STILL RUNNING?
0007	REF	4	LAST	704	21,2007	7 4747 0		MASK	AVEGFBIT	
0008	REF	241	LAST	826	21,2010	10 000 0		CCS	*	
0009	REF	57	LAST	821	21,2011	1 5261 0		TCF	TASKOVER	LET AVGEND TAKE CARE OF GROUP 2.
0010	REF	3	LAST	604	21,2012	11 056 1		CCS	PIPCTR	
0011					21,2013	1 2015 0		TCF	+2	
0012	REF	1			21,2014	1 2130 0		TCF	LRHTASK	LAST PASS. CALL LRHTASK.
0013	REF	1			21,2015	55 714 0	+2	TS	PIPCTR1	
0014	REF	2	LAST	151	E7,1714		PIPCTR1	=	LADGSAVE	
0015	REF	3	LAST	506	1056		PIPCTR	=	PHSPROT2	
0016	REF	3	LAST	436	21,2016	3 6010 0		CAF	OCT51	
0017	REF	23	LAST	820	21,2017	0 5173 1		TC	TWIDDLE	
0018	REF	2	LAST	240	21,2020	02006 0		ADRES	R10,R11	
0019	REF	28	LAST	612	21,2021	4 1303 1	R10,R11A	CS	LR0DES33	IF LAMP TEST, DO NOT CHANGE LR LITE.
0020	REF	39	LAST	821	21,2022	7 4753 0		MASK	BIT1	
0021					21,2023	0 0006 1		EXTEND		
0022	REF	1			21,2024	1 2042 1		BZF	10,11	
0023	REF	12	LAST	613	21,2025	7 0107 0	FLASHV?	MASK	FLGHRD11	C(A) = 1 = HFLASH BIT
0024					21,2026	0 0006 1		EXTEND		
0025	REF	1			21,2027	1 2033 1		BZF	FLASHV?	H-FLASH OFF, SO LEAVE ALONE
0026	REF	2	LAST	612	21,2030	3 4747 1		CA	HLITE	
0027	REF	125	LAST	826	21,2031	54 001 1		TS	L	
0028	REF	1			21,2032	0 4606 0		TC	FLIP	FLIP H LITE
0029	REF	1			21,2033	3 4752 0	FLASHV?	CA	VFLASHBIT	VFLASHBIT MUST BE BIT 2.
0030	REF	13	LAST	829	21,2034	7 0107 0		MASK	FLGHRD11	
0031					21,2035	0 0006 1		EXTEND		
0032	REF	2	LAST	829	21,2036	1 2042 1		BZF	10,11	V FLASH OFF
0033	REF	2	LAST	613	21,2037	3 4751 0		CA	VLITE	
0034	REF	126	LAST	829	21,2040	54 001 1		TS	L	
0035	REF	2	LAST	829	21,2041	0 4606 0		TC	FLIP	FLIP V LITE
0036	REF	3	LAST	739	21,2042	3 0105 0	10,11	CA	FLAGRD9	IS THE LEFTALERT FLAG SET?
0037	REF	2	LAST	739	21,2043	7 4743 1		MASK	LETABBIT	
0038					21,2044	0 0006 1		EXTEND		
0039	REF	1			21,2045	1 2154 1		BZF	LANDISP	NO. PROCEED TO P10.
0040	REF	14	LAST	801	21,2046	4 1011 1	P71NOW?	CS	MODPED	YES. ARE WE IN P71 NOW?

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0041	REF	1		21,2047	6 2107 0		AD	1DEC71	
0042				21,2050	0 0006 1		EXTEND		
0043	REF	2	LAST	829	21,2051	1 2154 1	BZF	LANDISP	YES. PROCEED TO R10.
0044				21,2052	0 0006 1		EXTEND		NO. IS AN ABORT STAGE COMMANDED?
0045	REF	6	LAST	800	21,2053	00 030 1	READ	CHAN30	
0046				21,2054	4 0000 0		COM		
0047	REF	127	LAST	829	21,2055	54 001 1	TS	L	
0048	REF	34	LAST	827	21,2056	7 4750 0	MASK	BIT4	
0049	REF	242	LAST	829	21,2057	10 000 0	CCS	A	
0050	REF	2	LAST	242	21,2060	1 2076 0	TCF	P71A	YES.
0051	REF	15	LAST	829	21,2061	4 1011 1	P70NOW?	CS	WOREG
0052	REF	1			21,2062	6 2106 1	AD	1DEC70	NO. ARE WE IN P70 NOW?
0053					21,2063	0 0006 1	EXTEND		
0054	REF	3	LAST	830	21,2064	1 2154 1	BZF	LANDISP	YES. PROCEED TO R10.
0055	REF	128	LAST	830	21,2065	3 0001 0	CA	L	NO. IS AN ABORT COMMANDED?
0056	REF	40	LAST	829	21,2066	7 4753 0	MASK	BIT,	
0057	REF	243	LAST	830	21,2067	10 000 0	CCS	A	
0058	REF	2	LAST	241	21,2070	1 2073 0	TCF	P70A	YES.
0059	REF	4	LAST	830	21,2071	1 2154 1	TCF	LANDISP	NO. PROCEED TO R10.
0060	REF	1					COUNT*	33/P70	
0061	REF	1			21,2072	0 2110 0	P70	TC	LEGAL?
0062	REF	155	LAST	823	21,2073	4 4755 0	P70A	CS	ZERD
0063					21,2074	1 2077 1		TCF	+3
0064	REF	2	LAST	830	21,2075	0 2110 0	P71	TC	LEGAL?
0065	REF	52	LAST	824	21,2076	3 4752 0	P71A	CAF	THO
0066	REF	202	LAST	826	21,2077	54 002 1	+3	TS	0
0067					21,2100	0 0004 0		INHINT	
0068					21,2101	0 0006 1		EXTEND	
0069	REF	1			21,2102	3 2105 1		DCA	CNTABTAD
0070					21,2103	52 000 0		OTC	
0071	REF	34	LAST	829	E7,1515			EBANK	DVCNTR
0072	REF	1			21,2104	03402 1	CNTABTAD	ZCADR	CONTABRT
0072	REF	1			21,2105	12067 0			
0073					21,2106	00106 0	1DEC70	DEC	70
0074					21,2107	00107 1	1DEC71	DEC	71
0075					05,3402			BANK	05
0076	REF	1			05,2000			SETLOC	ABORTS1
0077					05,3402			BANK	
0078	REF	1						COUNT*	33/P70
0079	REF	1			05,3402	3 3405 0	CONTABRT	CAF	ABRTJADP
0080	REF	1			05,3403	54 017 0		TS	BRUPT
0081					05,3404	5 0017 1		RESUME	

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0082	REF	1		05,3405	1 3406 1	ABRTJADR TCF	ABRTJASK	
0083	REF	1		05,3406	3 3477 0	ABRTJASK CAF	OCTAL27	
0084	REF	203	LAST	830	05,3407	6 0002 0	AD	Q
0085	REF	129	LAST	830	05,3410	54 001 1	TS	L
0086					05,3411	4 0000 0	COM	
0087	REF	6	LAST	747	05,3412	52 761 0	DXCH	-PHASE4
0088	REF	204	LAST	831	05,3413	50 002 0	INDEX	Q
0089	REF	1			05,3414	3 3476 1	CAF	MODE70
0090	REF	16	LAST	830	05,3415	55 011 1	TS	MODREG
0091	REF	24	LAST	757	05,3416	55 163 0	TS	DISPDEX INSURE DISPDEX IS POSITIVE.
0092	REF	205	LAST	831	05,3417	10 002 1	CLS	Q SET APSFLAG IF P71.
0093	REF	16	LAST	757	05,3420	4 0105 1	CS	FLGWRD10 SET APSFLAG PRIOR TO THE ENEMA.
0094	REF	11	LAST	757	05,3421	7 4737 1	MASK	APSFLBIT
0095	REF	17	LAST	831	05,3422	26 106 1	ADS	FLGWRD10
0096	REF	1			05,3423	4 2501 1	CS	DAPBITS DAPBITS = OCT 640 = BITS 6, 8, 9
0097	REF	27	LAST	760	05,3424	7 0111 1	MASK	DAPR0LS (TURN OFF: ULLAGE, DRIFT, AND ZENITHS)
0098	REF	28	LAST	831	05,3425	54 111 1	TS	DAPB0LS
0099	REF	24	LAST	760	05,3426	4 0101 0	CS	FLAGWRD5 SET ENEMFLO.
0100	REF	5	LAST	760	05,3427	7 4745 1	MASK	ENGWRBIT
0101	REF	25	LAST	831	05,3430	26 101 0	ADS	FLAGWRD5
0102	REF	8	LAST	760	05,3431	4 4355 1	CS	PR130 INSURE THAT THE ENGINE IS ON, IF ARMED.
0103					05,3432	0 0006 1	EXTEND	
0104	REF	26	LAST	760	05,3433	02 011 0	RAND	DSALMOUT
0105	REF	33	LAST	821	05,3434	6 4737 0	AD	BIT17
0106					05,3435	0 0006 1	EXTEND	
0107	REF	27	LAST	831	05,3436	01 011 0	WRITE	DSALMOUT
0108	REF	4	LAST	555	05,3437	3 4735 1	CAF	LRBYBIT TERMINATE R12.
0109	REF	14	LAST	829	05,3440	54 107 0	TS	FLGWRD11
0110	REF	25	LAST	592	05,3441	4 0074 0	CS	FLAGWRD0 SET R10FLAG TO SUPPRESS OUTPUTS TO THE
0111	REF	1			05,3442	7 4752 1	MASK	R10FLBIT CROSS-POINTER DISPLAY.
0112	REF	26	LAST	831	05,3443	26 074 0	ADS	FLAGWRD0 THE FOLLOWING ENEMA WILL REMOVE THE
A0113								DISPLAY-INERTIAL-DATA-OUTBIT.
0114	REF	10	LAST	543	05,3444	0 2011 1	TC	CLRARMED INSURE PADMODES PROPERLY SET FOR R24.
0115					05,3445	0 0006 1	EXTEND	
0116	REF	25	LAST	816	05,3446	3 0025 0	OCA	TIME1 LOAD TEVENT FOR THE DOWNLINK.
0117	REF	6	LAST	760	05,3447	53 345 0	DXCH	TEVENT
0118					05,3450	0 0006 1	EXTEND	
0119	REF	1			05,3451	3 3475 1	OCA	SVEXITAD
0120	REF	3	LAST	740	05,3452	53 253 0	DXCH	AVGEXIT

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0121				05,3453	0 0006 1	EXTEND	
0122	REF	15	LAST	814	05,3454	3 4755 1	DCA NEG
0123	REF	4	LAST	736	05,3455	52 753 1	DXCH -PHASE3
0124				05,3456	0 0006 1	EXTEND	
0125	REF	16	LAST	832	05,3457	3 4755 1	DCA NEG
0126	REF	4	LAST	814	05,3460	52 757 0	DXCH -PHASE3
0127				05,3461	0 0006 1	EXTEND	
0128	REF	17	LAST	832	05,3462	3 4755 1	DCA NEG
0129	REF	3	LAST	744	05,3463	52 765 1	DXCH -PHASE3
0130	REF	25	LAST	736	05,3464	3 6245 1	CAF THREE
0131	REF	130	LAST	831	05,3465	54 001 1	TS 1
0132				05,3466	4 0000 0	COM	SET UP 4.3SPDT FOR GUABORT
0133	REF	7	LAST	831	05,3467	52 761 0	DXCH -PHASE4
0134	REF	1		05,3470	3 7730 1	CAF OCT37774	SET TRUPT TO CALL DAPIDLER IN
0135	REF	2	LAST	219	05,3471	54 030 0	TS TIME5
0136	REF	48	LAST	816	05,3472	0 4635 0	TC POSTJUMP
0137	REF	1		05,3473	12765 0	CADP ENEMA	
0138	REF	35	LAST	830	E7,1515		EBANK DVCNTR
0139	REF	6	LAST	762	05,3474	03770 1	2CADP SE-VEXIT
0139				05,3475	64067 1		
0140				05,3476	00106 0	MODE70	DEC 70
0141				05,3477	00027 1	OCTAL27	OCT 27
0142				05,3500	00107 1	MODE71	DEC 71
0143				05,3501	00640 0	DAPBITS	OCT 00640
0144				32,3540		BANK	32
0145	REF	1		32,2000		SETLOC	ABORTS
0146				32,3540		BANK	
0147	REF	1				COUNT*	33/P70
0148	REF	139	LAST	825	32,3540	0 6037 0	GUABORT TC INTERPRET
0149				32,3541	77624 1		CALL
0150	REF	2	LAST	734	32,3542	61104 0	INITCDUW
0151				32,3543	77774 1		EXIT
0152	REF	15	LAST	813	32,3544	3 4751 0	CAF FOUR
0153	REF	36	LAST	832	32,3545	55 515 0	TS DVCNTR
0154	REF	1		32,3546	3 3764 1	CAF WHICHAB	
0155	REF	27	LAST	785	32,3547	55 455 0	TS WHICH
0156	REF	75	LAST	815	32,3550	0 5516 0	TC DONEFLAG
0157	REF	1		32,3551	00214 0	ADRES	PLACS

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0158	REF	76	LAST	832	32.3552	0 5516 0	TC	DOWNFLAG	
0159	REF	4	LAST	747	32.3553	00175 1	ADRES	FLUNDISP	
0160	REF	77	LAST	833	32.3554	0 5516 0	TC	DOWNFLAG	
0161	REF	5	LAST	762	32.3555	00161 1	ADRES	IDLEFLAG	
0162	REF	49	LAST	815	32.3556	0 5504 0	TC	UPFLAG	INSURE 4-JET TRANSLATION CAPABILITY.
0163	REF	1			32.3557	00307 0	ADRES	ACC4-2FL	
0164	REF	5	LAST	820	32.3560	0 5321 1	TC	CHECKMM	
0165					32.3561	00106 0	DEC	70	70DEC
0166	REF	1			32.3562	1 3707 0	TCF	P71RET	
0167	REF	140	LAST	832	32.3563	0 6037 0	P70INIT	TC	INTERET
0168					32.3564	77624 1	CALL		
0169	REF	1			32.3565	65737 1		IGDCOP	
0170					32.3566	54345 1	DLOAD	SL	
0171	REF	1			32.3567	34003 0		MUOTDPS	
0172					32.3570	20205 1		40	
0173					32.3571	77665 1	BDDV		
0174	REF	10	LAST	819	32.3572	01245 0		MASS	
0175	REF	2	LAST	119	32.3573	16271 1	STOOL	TGUP	
0176	REF	11	LAST	833	32.3574	01245 0		MASS	
0177					32.3575	70471 1	DDV	SR1	
0178	REF	1			32.3576	16015 1		K(1/DV)	
0179	REF	2	LAST	152	32.3577	03635 1	STORE	1/DV1	
0180	REF	2	LAST	152	32.3600	03637 0	STORE	1/DV2	
0181	REF	2	LAST	152	32.3601	03641 1	STORE	1/DV3	
0182					32.3602	77665 1	BDDV		
0183	REF	1			32.3603	25763 1		K(AT)	
0184	REF	3	LAST	200	32.3604	16263 1	STOOL	AT	
0185	REF	1			32.3605	34005 0		BTDECAY	
0186					32.3606	54276 0	DCOMP	SL	
0187					32.3607	20214 1		110	
0188	REF	2	LAST	119	32.3610	02267 0	STORE	TTD	
0189					32.3611	57535 0	SLUAD	DCORP	
0190	REF	2	LAST	754	32.3612	26002 1		DPSVEX	
0191					32.3613	77702 1	SR2		
0192	REF	2	LAST	119	32.3614	02265 1	STORE	VF	INITIALIZE DPS EXHAUST VELOCITY
0193					32.3615	45014 0	SET	CALL	
0194	REF	1			32.3616	04407 0		FLAP	
0195	REF	1			32.3617	60300 1		COMINIT	
0196					32.3620	52160 1	AXC,1	COTD	RETURN HERE IN P70, SE XI FOR DPS COEFF.
0197					32.3621	00000 1		00	
0198	REF	1			32.3622	65625 0		BOTHPOLY	
0199					32.3623	77760 0	INJTARG	AXC,1	RETURN HERE IN P71, SET XI FOR DPS COEFF
0200					32.3624	00010 0			
0201					32.3625	41343 0	BOTHPOLY	DLOAD	TG D
0202	REF	2	LAST	122	32.3626	02551 1		ABTCOF,1	
0203	REF	15	LAST	775	32.3627	03517 1		TG0	

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0204				32,3630	41213 1	DAD*	DMP	
0205	REF	3	LAST	833	32,3631		ABTCSF +2,1	TGD(C+TGD D)
0206	REF	16	LAST	833	32,3632		TGD	
0207				32,3633	41213 1	DAD*	DMP	
0208	REF	4	LAST	834	32,3634		ABTCSF +4,1	TGD(B+TGD(C+TGD D))
0209	REF	17	LAST	834	32,3635		TGD	
0210				32,3636	77613 0	DAD*		
0211	REF	5	LAST	834	32,3637		ABTCSF +6,1	A+TGD(B+TGD(C+TGD D))
0212	REF	3	LAST	316	32,3640		STORE ZDDTD	STORE TENTATIVELY IN ZDDTD
0213				32,3641	51025 1	DSU	RPL	CHECK AGAINST MINIMUM
0214	REF	2	LAST	122	32,3642		VMT	
0215	REF	1		32,3643	65647 1		UPRATE	IF BIG ENOUGH, LEAVE ZDDTD AS IS.
0216				32,3644	77745 1	DLOAD		
0217	REF	3	LAST	834	32,3645		VMT	
0218	REF	4	LAST	834	32,3646		STORE ZDDTD	IF TOO SMALL, REPLACE WITH MINIMUM.
0219				32,3647	77745 1	UPRATE	DLOAD	
0220	REF	2	LAST	122	32,3650		ABTDDT	
0221	REF	3	LAST	316	32,3651		STCALL RDDTD	INITIALIZE RDDTD.
0222	REF	1		32,3652	57312 0		YCOMP	COMPUTE Y
0223				32,3653	45246 0	ABS	DSU	
0224	REF	2	LAST	122	32,3654		YLM	/Y/-DYHAX
0225				32,3655	75240 0	BEN	YGR	IF <0, XRC, SDEG, LEAVE YCD AT 0
0226	REF	1		32,3656	65661 0		Y	IF >0, FIX SIGN OF DEFICIT, THIS IS YCD.
0227	REF	2	LAST	120	32,3657		STORE YCD	
0228	REF	2	LAST	152	32,3660		DLOAD	
0229				32,3661	45345 1	YOK	DSU	
0230	REF	3	LAST	834	32,3662		YCD	
0231	REF	3	LAST	834	32,3663		Y	COMPUTE XCHANGE IN CASE ASTEROID WENT.
02312				32,3664	77661 0	SP		
02314				32,3665	20606 0		SD	
0232	REF	3	LAST	316	32,3666		STORE XCHANGE	TO LOCK.
0233				32,3667	77414 0	UPTHROT	SET	
0234	REF	1		32,3670	04461 0		FLVR	
0235	REF	50	LAST	833	32,3671		TC	UPFLAG
0236	REF	1		32,3672	00220 1		ADRES	ROTFLAG
0237	REF	1		32,3673	0 3746 1		TC	THRUTUP
0238	REF	61	LAST	816	32,3674		TC	PHASCHNG
0239				32,3675	04024 0		CLT	04024
0240	REF	230	LAST	819	32,3676		TC	BANKCALL
0241	REF	2	LAST	733	32,3677		CADR	PGDADT
0242	REF	2	LAST	834	32,3700		TC	THRUTUP
0243				32,3701	0 0006 1	UPTHROT1	EXTEND	SET SERVICES TO CALL ASCENT GUIDANCE.
0244	REF	1		32,3702	3 3766 0		DCA	ATMAGAD
0245	REF	4	LAST	831	32,3703		DXCH	AVGEXIT

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0246	REF	62	LAST	814	32,3704	0 5353 1	GRP4OFF	TC	PHASCHNO	TERMINATE USE OF GROUP 4.
0247					32,3705	00004 0		OCT	00004	
0248	REF	130	LAST	815	32,3706	1 5155 1		TCF	END-EJIE	
0249	REF	78	LAST	833	32,3707	0 5516 0	P71RET	TC	DOWNFLAG	
0250	REF	2	LAST	791	32,3710	00215 1		ADRES	LETA00T	
0251	REF	2	LAST	758	32,3711	3 6000 1		CAP	THRESH2	SET DOWN THRESHOLD TO THE ASCENT VALUE.
0252	REF	5	LAST	785	32,3712	55*251 1		TS	DVTHRUSH	
0253	REF	141	LAST	833	32,3713	0 6037 0		TC	INTERET	
0254					32,3714	45014 0		BDN	CALL	
0255	REF	2	LAST	833	32,3715	04707 0			FLAP	
0256	REF	1			32,3716	65724 0			OLDTIME	
0257	REF	2	LAST	833	32,3717	65757 1			TCOLMP	IF FLAP=0, TCG=T-TIG
0258					32,3720	52131 0		SSP	GOTO	
0259	REF	7	LAST	771	32,3721	00053 1			QPRET	
0260	REF	1			32,3722	65623 0		CADK	INJTARG	
0261	REF	1			32,3723	60254 1			P12INIT	WILL EXIT P12INIT TO INJTARG
0262					32,3724	72545 0	OLDTIME	DLOAD	SLI	IF FLAP=1, TCG=2 TCG
0263	REF	18	LAST	834	32,3725	03517 1			TCG	
0264	REF	1			32,3726	37502 1		STCALL	TCG1	
0265	REF	2	LAST	835	32,3727	60254 1			P12INIT	
0266					32,3730	77776 1		EXIT		
0267	REF	63	LAST	835	32,3731	0 5353 1		TC	PHASCHNO	
0268					32,3732	04024 0		OCT	04024	
0269					32,3733	0 0006 1		EXTEND		
0270	REF	2	LAST	835	32,3734	3 1502 1		DCA	TCG1	
0271	REF	19	LAST	835	32,3735	53*517 1		DXCH	TCG	
0272	REF	1			32,3736	1 3676 1		TCF	UPTRKCT1 -5	
0273	REF	9	LAST	757	E7,1501		TCG1	=	VGBODY	
0274					*****					
0275					21,2110			BANK	21	
0276	REF	2	LAST	829	21,2000			SETLOC	P11	
0277					21,2110			BANK		
0278	REF	2	LAST	830 TO	830:	14	14*	COUNT*	33/P70	
0279	REF	10	LAST	231	21,2110	4 0775 0	LEGAL?	CS	NUMBER	IS THE DESIRED PGM ALREADY IN PROCESS?
0280	REF	17	LAST	831	21,2111	6 1011 0		AD	ADRES	
0281					21,2112	0 0006 1		EXTEND		
0282	REF	1			21,2113	1 2124 0		BZF	FBRTALF	
0283	REF	4	LAST	829	21,2114	4 0105 1		CS	FLAGED9	ARE THE ABORTS ENABLED?
0284	REF	3	LAST	829	21,2115	7 4745 1		MASK	LETA00T	
0285	REF	244	LAST	830	21,2116	10 000 0		CCS	A	

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0286 REF 2 LAST 835 21,2117 1 2124 0

TCF ABORTALM

0287 REF 18 LAST 829 21,2120 3 0103 0

CA FLACR07

IS SERVICER ON THE AIR?

0288 REF 5 LAST 829 21,2121 7 4747 0

HASK AVEG01F

0289 REF 245 LAST 835 21,2122 10 000 0

CLS "

0290 REF 206 LAST 831 21,2123 0 0002 0

TC 0

YES. ALL IS WELL.

0291 REF 8 LAST 497 21,2124 0 4364 1

ABORTALM TC FALTON

0292 REF 10 LAST 458 21,2125 0 4457 0

TC RELOSP

0293 REF 49 LAST 832 21,2126 0 4635 0

TC POSTJUMP

0294 REF 5 LAST 450 21,2127 21050 1

CADR PINBENCH

0295 32,3737

BANK 37

0296 REF 2 LAST 832 32,2000

SETLOC ABORTS

0297 32,3737

BANK

0298 REF 2 LAST 832 TO 835: 127 127*

COUNT# 14/P70

R0299 *****

0300 32,3737 45234 0

TGOCOMP RTB DSU

0301 REF 22 LAST 729 32,3740 21573 0

LOADTIME

0302 REF 40 LAST 788 32,3741 03442 0

TIG

0303 32,3742 77661 0

SL

0304 32,3743 20214 1

IID

0305 REF 20 LAST 835 32,3744 03517 1

STORE TGD

0306 32,3745 77616 0

RVQ

R0307 *****

0308 REF 34 LAST 831 32,3746 3 4737 0

THROTOP CAF -IT15

0309 REF 5 LAST 795 32,3747 54 055 0

TS THRUST

0310 REF 35 LAST 830 32,3750 3 4750 1

CAF -IT4

0311 32,3751 0 0006 1

EXTEND

0312 REF 11 LAST 795 32,3752 05 014 1

WGR CHRG14

0313 REF 207 LAST 836 32,3753 0 0002 0

TC

R0314 *****

0315 32,3754 00000 1

10SECS 2DEC 1000

0315 32,3755 01750 1

0316 32,3756 00021 1

HINJECT 2DEC 18288 B-24

60,000 FEET EXPRESSED IN METERS.

0316 32,3757 33400 0

0317 32,3760 11021 1

(TGO)A 2DEC 37000 B-17

0317 32,3761 00000 1

0318 32,3762 00507 0

K(AT) 2DEC .02

SCALING CONSTANT

0318 32,3763 25605 0

0319 REF 1 32,3764 02112 1

WHICHADR REMADR ABRTABLE

R0320 *****

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0321	REF	37	LAST	832	E7,1515				EBANK= DVCNIR
0322	REF	2	LAST	749	32,3765	03642 1	ATMAGAD	2CADR	ATHAG
0322					32,3766	70067 1			
0323	REF	5	LAST	235	32,3767	00003 1	ORBNHAD	ADRES	ORBNHUV

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0001 24.3670
0002 REF 1 30,2000
0003 30,2061

BANK 24
SETLUC P12
BANK

0004 REF 38 LAST 837 E7.1515
0005 REF 1

EBANK= DVCTR
COURT# 14/P12

0006 REF 64 LAST 835 30,2061 0 5353 1 P12LM
00062 30,2062 04024 0

TC PHASCHNG
OCT 04024

00064 REF 231 LAST 834 30,2063 0 4616 1
0007 REF 10 LAST 785 30,2064 11254 1

TC BANKCALL
CADR 10201TH

CHECK THE STATUS OF THE LAG.

0008 REF 51 LAST 834 30,2065 0 5504 0
0009 REF 5 LAST 785 30,2066 00141 0

TC OFFLAG
ADRES MUNFLAG

0010 REF 52 LAST 838 30,2067 0 5504 0
0011 REF 2 LAST 833 30,2070 00307 0

TC OFFLAG
ADRES ACC4-2FL

INSURE 4-JET TRANSLATION CAPABILITY.

00112 REF 53 LAST 838 30,2071 0 5504 0
00114 REF 1 30,2072 00015 0

TC OFFLAG
ADRES R10FLAG

PREVENT R10 FROM ISSUING CROSS-POINTED
OUTPUTS.

00115 REF 11 LAST 831 30,2073 0 6011 1

TC CLEARDROP

INITIALIZE RADMODES FOR R29.

0012 REF 79 LAST 835 30,2074 0 5516 0
0013 REF 5 LAST 785 30,2075 00010 0

TC DOWNFLAG
ADRES RADVZFLC

CLEAR RENDEZVOUS FLAG FOR R2.

001301 REF 3 LAST 835 30,2076 3 6000 1
001302 REF 6 LAST 835 30,2077 55'251 1
001303 REF 16 LAST 832 30,2100 3 4751 0
001304 REF 39 LAST 838 30,2101 55'515 0

CAF TRESH2
TS DVTRUSH
CAF FOUR
TS DVCTR

INITIALIZE DVCTR

00131 REF 156 LAST 830 30,2102 3 4755 1
00132 REF 10 LAST 760 30,2103 55'462 1
0014 REF 1 30,2104 3 3035 1
0015 REF 232 LAST 838 30,2105 0 4616 1
0016 REF 23 LAST 791 30,2106 20476 0
0017 REF 34 LAST 814 30,2107 1 6001 1
0018 30,2110 1 2112 0
0019 30,2111 1 2104 1

CA ZERO
TS FRANKONT
CAF VOGN33A
TC BANKCALL
CADR GOFASH
TCF GOTOPOOH
TCF +2
TCF -5

SHOW THAT R29 DOWNLINK DATA ISN'T READY.

FLASH TIG

PROCEED

ENTER

00192 REF 65 LAST 838 30,2112 0 5353 1
00194 30,2113 04024 0

TC PHASCHNG
OCT 04024

0020 REF 142 LAST 835 30,2114 0 6037 0
0021 30,2115 77624 1
0022 REF 2 LAST 786 30,2116 46432 0
0023 30,2117 45014 0
00235 REF 1 30,2120 04464 0
0024 REF 3 LAST 835 30,2121 60254 1

TC INTERET
CALL
SET CALL
FLPI
P12INIT

INITIALIZE R2 AND /LANDZ

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0025				30,2122	77745 1	P12LMB	DLOAD		
0026	REF	1		30,2123	25761 0		STOVL	(TIG)A	SET TIG TO AN INITIAL NOMINAL VALUE.
0027	REF	21	LAST	836	30,2124		STOVL	TIG	
0028	REF	41	LAST	836	30,2125		STOVL	TIG	
0029	REF	51	LAST	788	30,2126		STCALL	TDECI	
0030	REF	11	LAST	786	30,2127		LEMPREC		ROTATE THE STATE VECTORS TO THE
0031				30,2130	64375 1		VLOAD	MXV	IGNITION TIME.
0032	REF	23	LAST	766	30,2131		VATT		
0033	REF	28	LAST	806	30,2132		REFSMAT		
0034				30,2133	77772 0		VSLI		
0035	REF	2	LAST	147	30,2134		STOVL	VIS	COMPUTE VIS = VEL(TIG)*2(-7)F/CS.
0036	REF	28	LAST	766	30,2135		RATT		
0037				30,2136	52521 0		MXV	VSL6	
0038	REF	29	LAST	839	30,2137		REFSMAT		
0039	REF	16	LAST	819	30,2140		STCALL	R	COMPUTE R = POS(TIG)*2(-24)M.
0040	REF	3	LAST	786	30,2141		MONOPAV		COMPUTE GDT1/2(TIG)*2(-7)M/CS.
0041				30,2142	53575 0		VLOAD	UNIT	
0042	REF	17	LAST	839	30,2143		R		
0043	REF	9	LAST	812	30,2144		STCALL	UNIT/R/	COMPUTE UNIT/R/ FOR YCOMP.
0044	REF	2	LAST	834	30,2145		YCOMP		
0045				30,2146	57461 0		SR	DCOMP	
0046				30,2147	20606 0		SD		
0047	REF	4	LAST	834	30,2150		STOVL	XFANGE	INITIALIZE XFANGE FOR NGUN 76.
0048	REF	1		30,2151	06456 0		VINJONH		
0049	REF	5	LAST	834	30,2152		STOVL	ZDDTD	
00492	REF	1		30,2153	06460 0		REDTONEH		
00494	REF	4	LAST	834	30,2154		STORE	KDDTD	
0050				30,2155	77776 1		EXIT		
0051	REF	66	LAST	836	30,2156	0 5353 1	TC	PHASCHNG	
0052				30,2157	04024 0		DCT	04024	
0053	REF	1		30,2160	3 3034 0	NEWLOAD	CAF	YCON76	FLASH CROSS-RANGE AND APOLUNE VALUES.
0054	REF	233	LAST	838	30,2161	0 4616 1	TC	BANKCALL	
0055	REF	24	LAST	838	30,2162	20476 0	CADR	GOFLASH	
0056	REF	35	LAST	838	30,2163	1 6001 1	TCF	GOTOPDGH	
0057				30,2164	1 2166 0		TCF	+2	PROCEED
0058	REF	1		30,2165	1 2160 0		TCF	NEWLOAD	ENTER NEW DATA.
0059	REF	1		30,2166	3 2320 1		CAF	P12ADRES	
0060	REF	28	LAST	832	30,2167	55 455 0	TS	WHICH	
00602	REF	67	LAST	839	30,2170	0 5353 1	TC	PHASCHNG	
00604				30,2171	04024 0		DCT	04024	
0061	REF	143	LAST	838	30,2172	0 6037 0	TC	INTPRET	
0062				30,2173	54345 1		DLOAD	SI	
0063	REF	5	LAST	839	30,2174	03643 0		XRANGE	
0064				30,2175	20206 1		SD		
0065				30,2176	77615 0		DAD		

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0066	REF	4	LAST	834	30,2177	02335 0		Y	
0067	REF	4	LAST	834	30,2209	27633 1	STOVL	YCB	
0081	REF	10	LAST	839	30,2201	03537 0		UNIT/R/	
0082					30,2202	53361 0	VXSC	VAD	
0083	REF	1			30,2203	06454 1		49FPS	
0084	REF	3	LAST	839	30,2204	03601 0		VIS	
0085	REF	8	LAST	817	30,2205	03527 1	STORE	V	$V(TIPOVER) = V(IGN) + 57FPS (UNIT/R/)$
00852					30,2206	72441 0	DOT	SL1	
00853	REF	11	LAST	840	30,2207	03537 0		UNIT/R/	
00854	REF	1			30,2210	27474 0	STOVL	UNIT	$FOOT * 2(-7)$
00855	REF	12	LAST	840	30,2211	03537 0		UNIT/R/	
00856					30,2212	53435 0	VXV	UNIT	
00857	REF	1			30,2213	03720 1		QAXIS	
00858	REF	1			30,2214	03726 1	STORE	ZAXIS1	
0087					30,2215	77614 1	SETGO		
0088	REF	2	LAST	834	30,2216	04421 1		FLVR	
0089	REF	1			30,2217	60321 1		ASCENT	
0090					30,2220	77745 1	P12RET	CLORD	
0091	REF	2	LAST	120	30,2221	02361 1		ATP	$ATP(2)*2(18)$
0092					30,2222	65316 0	DSO	POOL	
0093	REF	2	LAST	120	30,2223	02355 0		ATY	$ATY(2)*2(18)$
0094					30,2224	43316 1	DSO	DAG	
0095					30,2225	75454 0	BZE	SHORT	
0096	REF	1			30,2226	60232 1		YAWDUN	
0097					30,2227	55352 0	SL1	DDV	
0098	REF	3	LAST	840	30,2230	02355 0		ATY	
0099					30,2231	77736 0	APCSIP		
0100	REF	3	LAST	316	30,2232	26363 0	YAWDUN	STOVL	YAW
0101	REF	15	LAST	812	30,2233	03254 1		UNIT/R/2	
0102					30,2234	50256 0	UNIT	DDF	
0103	REF	13	LAST	840	30,2235	03537 0		UNIT/R/	
0104					30,2236	65552 0	SL1	ARCCOS	
0105					30,2237	77676 0	DCOMP		
0106	REF	2	LAST	316	30,2240	02365 0	STORE	FITCH	
0107					30,2241	77776 1	EXIT		
0108	REF	68	LAST	839	30,2242	0 5353 1	TC	PHASCHNG	
0109					30,2243	04024 0	OCI	04024	
0110	REF	80	LAST	838	30,2244	0 5516 0	TC	DOWNFLAG	
0111	REF	2	LAST	838	30,2245	00213 1	ADRES	FLPI	
0112					30,2246	0 0004 0	INHINT		
0113	REF	37	LAST	788	30,2247	0 4674 0	TC	THRCALL	
0114	REF	3	LAST	788	30,2250	40142 1	CADR	PFLITEDB	
0115					30,2251	0 0003 1	RELINT		
0116	REF	50	LAST	836	30,2252	0 4635 0	TC	POSTJUMP	
0117	REF	3	LAST	789	30,2253	74126 1	CADR	BURNBABY	
0118					30,2254	77745 1	P12INIT	DLOAD	INITIALIZE ENGINE DATA. USED FOR P12 AND

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0119	REF	1		30,2255	16013-1		(1/DV1A	P71.
0120	REF	3	LAST 833	30,2256	03641-1	STORE	1/DV3	
0121	REF	3	LAST 833	30,2257	03637-0	STORE	1/DV2	
0122	REF	3	LAST 833	30,2260	17635-1	STOOL	1/DV1	
0123	REF	1		30,2261	16017-0		(AT)A	
0124	REF	4	LAST 833	30,2262	16263-1	STOOL	AT	
0125	REF	1		30,2263	16021-0		(TBUP)A	
0126	REF	3	LAST 833	30,2264	16271-1	STOOL	TBUP	
0127	REF	1		30,2265	34013-1		ATDECAY	
0128				30,2266	54276-0	DCOMP	SL	
0129				30,2267	20214-1		11D	
0130	REF	3	LAST 833	30,2270	02267-0	STORE	TTD	
0131				30,2271	57535-0	SLOAD	DCOMP	
0132	REF	2	LAST 758	30,2272	26001-1		APSVEX	
0133				30,2273	77702-1	SR2		
0134	REF	3	LAST 833	30,2274	02265-1	STORE	VE	
0135				30,2275	43414-1	BUFF	RVQ	
0136	REF	3	LAST 835	30,2276	04747-1		FLAP	
0137	REF	2	LAST 833	30,2277	60300-1		COMMIT	
0138				30,2300	43345-1	COMMIT DLOAD	DAD	INITIALIZE TARGET DATA. USED BY P12, P70
0139	REF	1		30,2301	25757-0		HINJECT	AND P71 IF IT DOES NOT FOLLOW P70.
0140	REF	6	LAST 818	30,2302	02333-0		/LAND/	
0141	REF	2	LAST 152	30,2303	17631-0	STOOL	RCD	
0142	REF	8	LAST 786	30,2304	06522-1		H16ZERUS	
0143	REF	2	LAST 152	30,2305	03654-0	STORE	TXO	
0144	REF	5	LAST 840	30,2306	03633-1	STORE	YCO	
0145	REF	5	LAST 839	30,2307	02273-0	STORE	KDOTD	
0146	REF	2	LAST 119	30,2310	26275-0	STOVL	YDOTD	
0147	REF	1		30,2311	01563-0		VKECTCSM	
0148				30,2312	64235-1	VXV	MXV	
0149	REF	5	LAST 240	30,2313	01555-0		KKECTCSM	
0150	REF	30	LAST 839	30,2314	01734-0		REFSMAT	
0151				30,2315	77656-1	UNIT		
0152	REF	2	LAST 840	30,2316	03720-1	STORE	QAXIS	
0153				30,2317	77616-0	RVQ		
01652	REF	1		30,2320	02022-0	P12ADRES REMADR	P12TABLE	
01654	REF	1		23,2000		SETLOC	P12A	
01656				23,2432		BANK		
01658	REF	1				COUNT	44/P12	
0166				23,2432	40220-0	GUIDINIT STO	SETPD	
0167	REF	6	LAST 748	23,2433	01164-0		TEMPR60	
0168				23,2434	00001-0		UD	
0169				23,2435	41575-0	VLOAD	PUSH	
0170	REF	8	LAST 786	23,2436	06514-1		UNIT7	
0171				23,2437	41434-1	RTB	PUSH	
0172	REF	23	LAST 836	23,2440	21573-0		LOADTIME	
0173				23,2441	77624-1	CALL		
0175	REF	2	LAST 786	23,2442	55716-1		RP-TD-K	

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0176				23.2443	74321 1
0177	REF	31	LAST	841	23.2444 01734 0
0178	REF	1			23.2445 16027 0
0179	REF	4	LAST	806	23.2446 26325 1
0180	REF	8	LAST	791	23.2447 02023 1
0181					23.2450 52446 0
0182	REF	7	LAST	841	23.2451 36333 1
0183	REF	7	LAST	841	23.2452 01164 0

MAXV	VXSC
	REFSHHAT
	HCONRATE
STOVL	WH
	RLS
ABVAL	SL3
STCALL	/LAND/
	TEMPR60

0185		23.2453	00046 0	49FPS	2DEC	.149352 E-6	EXPECTED ROOT AT TIPOVER
0185		23.2454	07374 0				
0186		23.2455	04145 0	VINJNM	2DEC	16.7924 E-7	5509.5 FPS (APU=30NM WITH WIND=10.5MPS)
0186		23.2456	15527 0				
0187		23.2457	00007 0	ROOTONNM	2DEC	.059436 E-7	19.5 FPS
0187		23.2460	23346 1				

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0001				34,3642				BANK 34
0002	REF	1		34,2000				SETLOC ASCFILT
0003				34,3642				BANK
0004	REF	40	LAST	838	E7,1515			EBANK = DVCONTR
0005	REF	1						COUNT* 33/ASENT
0006	REF	69	LAST	840	34,3642	0 5353	1	ATMAC TC PHASCHNC
0007					34,3643	00035	1	OC1 00035
0008	REF	144	LAST	839	34,3644	0 6037	0	TC INTPRET
0009					34,3645	77614	1	BUN
0010	REF	2	LAST	832	34,3646	04705	1	FLRCS
0011	REF	2	LAST	840	34,3647	60321	1	ASCENT
0012					34,3650	45345	1	DLUAD DSU
0013	REF	2	LAST	147	34,3651	03514	1	ABDVCONV
0014	REF	1			34,3652	26205	1	MINABDV
0015					34,3653	43040	1	BMN CLEAR
0016	REF	1			34,3654	60750	0	ASC TERM4
0017	REF	15	LAST	791	34,3655	04267	0	SURFFLAC
0018					34,3656	67214	1	CLEAR SLOAD
0019	REF	10	LAST	609	34,3657	02676	1	RENDWFLB
0020	REF	1			34,3660	31716	0	BIT3H
0021					34,3661	77471	0	DDV EXIT
0022	REF	3	LAST	843	34,3662	03514	1	ABDVCONV
0023	REF	331	LAST	825	34,3663	52 155	1	DXCH MPAC
0024	REF	4	LAST	841	34,3664	53,641	1	DXCH 1/DV3
0025	REF	4	LAST	841	34,3665	53,637	0	DXCH 1/DV2
0026	REF	4	LAST	841	34,3666	53,635	1	DXCH 1/DV1
0027	REF	1			34,3667	53,571	1	DXCH 1/DV0
0028	REF	145	LAST	843	34,3670	0 6037	0	TC INTPRET
0029					34,3671	43345	1	DLOAD DAD
0030	REF	2	LAST	843	34,3672	03571	1	1/DV0
0031	REF	5	LAST	843	34,3673	03635	1	1/DV1
0032					34,3674	43215	0	DAD DAD
0033	REF	5	LAST	843	34,3675	03637	0	1/DV2
0034	REF	5	LAST	843	34,3676	03641	1	1/DV3
0035					34,3677	41205	0	DMP DMP
0036	REF	4	LAST	841	34,3700	02265	1	VE
0037	REF	1			34,3701	21032	0	2SEC(9)
0038					34,3702	65252	1	SL3 PDS1
0039	REF	4	LAST	841	34,3703	02271	1	TBUP
0040					34,3704	43342	0	SR1 DAD
0041					34,3705	77625	0	DSU
0042	REF	1			34,3706	21027	1	6SEC(18)
0043	REF	5	LAST	843	34,3707	16271	1	STUOL TBUP
0044	REF	5	LAST	843	34,3710	02265	1	VE
0045					34,3711	56342	1	SR1 DDV
0046	REF	6	LAST	843	34,3712	02271	1	TBUP
0047	REF	5	LAST	841	34,3713	36263	0	STCALL AT

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0048 REF 3 LAST 843 34.3714 60321 1 ASCENT

0049 34.3715 00004 0 BIT3H OCT 4

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P0050

0051					30,2321					BANK	3C
0052	REF	2	LAST	39	30,2000					SETLOC	ASENT
0053					30,2321					BANK	
0054	REF	2	LAST	39 TO	39:	2	2*			COUNT*	15/ASENT

0055					30,2321	31575	1	ASCENT	VLOAD	ABVAL	
0056	REF	18	LAST	839	30,2322	03521	1				
0057	REF	2	LAST	119	30,2323	26301	1		STOVL	/R/HAG	
0058	REF	2	LAST	840	30,2324	03726	1			ZAXIS1	
0059					30,2325	72441	0		DOT	SL1	
0060	REF	9	LAST	840	30,2326	03527	1			V	$Z.V = ZDOT*2(-3).$
0061	REF	2	LAST	120	30,2327	26313	1		STOVL	ZDOT	$ZDOT*2(-7)$
0062	REF	3	LAST	845	30,2330	03726	1			ZAXIS1	
0063					30,2331	76435	1		VXV	VSL1	
0064	REF	14	LAST	840	30,2332	03537	0			UNIT/R/	$Z \times UP = LAXIS*2(-2)$
0065	REF	2	LAST	120	30,2333	02303	0		STORE	LAXIS	$LAXIS*2(-1)$
0066					30,2334	72441	0		DOT	SL1	
0067	REF	10	LAST	845	30,2335	03527	1			V	$L.V = YDOT*2(-8).$
0068	REF	3	LAST	316	30,2336	36311	1		STCALL	YDOT	$YDOT*2(-7)$
0069	REF	3	LAST	839	30,2337	57312	0			YCOMP	
0070					30,2340	77775	1		VLOAD		
0071	REF	2	LAST	147	30,2341	03563	1			UNIT/2	$LOAD \ CDT1/2*2(-7)M/CS.$
0072					30,2342	50341	1		V/SC	DOT	
0073	REF	1			30,2343	27147	0			2SEC(18)	
0074	REF	15	LAST	845	30,2344	03537	0			UNIT/R/	$G.UR*2(9) = GR*2(9).$
0075					30,2345	47315	0		PDVL	VXV	$STORE \ IN \ PDL(0) \quad (2)$
0076	REF	16	LAST	845	30,2346	03537	0			UNIT/R/	$LOAD \ UNIT/R/*2(-1).$
0077	REF	11	LAST	845	30,2347	03527	1			V	$UR*2(-1) - X - V*2(-7) = H/R*2(-8).$
0078					30,2350	56236	0		VSD	DLV	$H(2)/P(2)*2(-16).$
0079	REF	3	LAST	845	30,2351	02301	1			/R/HAG	$H(2)/P(5)*2(9).$
0080					30,2352	43352	1		SEL	DAD	
0081					30,2353	77626	0		STADR		
0082	REF	2	LAST	120	30,2354	61467	0		STOVL	GEFF	$GEFF*2(10)M/CS/CS.$
0083	REF	6	LAST	839	30,2355	02277	1			ZDOTD	
0084					30,2356	77625	0		DSU		
0085	REF	3	LAST	845	30,2357	02313	1			ZDOT	
0086	REF	2	LAST	120	30,2360	02343	1		STORE	DZDOT	$DZDOT = (ZDOTD - ZDOT)*2(7)M/CS.$
0087					30,2361	65361	0		VXSC	PDDL	
0088	REF	4	LAST	845	30,2362	03726	1			ZAXIS1	
0089	REF	3	LAST	841	30,2363	02275	0			YDOTD	
0090					30,2364	77625	0		DSU		
0091	REF	4	LAST	845	30,2365	02313	0			YDOT	
0092	REF	2	LAST	120	30,2366	02341	0		STORE	DYDOT	$DYDOT = (YDOTD - YDOT)*2(7)M/CS.$
0093					30,2367	65361	0		VXSC	PDDL	
0094	REF	3	LAST	845	30,2370	02303	0			LAXIS	
0095	REF	6	LAST	841	30,2371	02273	0			RDDTD	

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0096				30,2372	77625-0	DSU		
0097	REF	2	LAST	840	30,2373	03474-0	ROOT	
0098	REF	2	LAST	120	30,2374	02337-1	STORE DRDOT	$DRDOT = (RDOTO - RDOT) * 2(17)H/CS.$
0099				30,2375	53561-0	VXSC	VAD	
0100	REF	17	LAST	845	30,2376	03537-0	UNIT/R/	
0101				30,2377	76455-1	VAD	VSL1	
0102				30,2400	77626-0	STADR		
0103	REF	3	LAST	200	30,2401	74131-1	STORE VGVECT	$VG = (DRDOT)R + (DYD)1L + (DZD)1Z.$
0104				30,2402	41345-0	DLOAD	DMP	LOAD TGO
0105	REF	22	LAST	839	30,2403	03517-1	TGO	TGO GEFF
0106	REF	3	LAST	845	30,2404	02315-1	GEFF	
0107				30,2405	76561-1	VXSC	VSL1	
0108	REF	18	LAST	846	30,2406	03537-0	UNIT/R/	TGO GEFF UR
0109				30,2407	77645-0	BVSU		
0110	REF	4	LAST	846	30,2410	03646-0	VGVECT	COMPENSATED FOR GEFF
0111	REF	5	LAST	846	30,2411	03646-0	STORE VGVECT	STORE FOR DOWNLINK
0112				30,2412	76521-0	MXV	VSL1	GET VGBODY FOR N85-DISPLAY
0113	REF	4	LAST	812	30,2413	02146-0	XNBPIP	
0114	REF	10	LAST	835	30,2414	27502-0	STOVL	VGBODY
0115	REF	6	LAST	846	30,2415	03646-0	VGVECT	
0116				30,2416	43046-1	ABVAL	BOFF	MAGNITUDE OF VGVECT
0117	REF	5	LAST	843	30,2417	04745-0	FLRCS	IF FLRCS=0, NO NORMAL GUIDANCE
0118	REF	1			30,2420	60425-1	MAINENG	
0119				30,2421	77671-1	DDV		USE TGO=VG/AT WITH RCS
0120	REF	1			30,2422	20001-1	AT/RCS	
0121	REF	23	LAST	846	30,2423	37517-0	STCALL	TGO
0122	REF	1			30,2424	60746-1	ASCTERM2	THIS WILL BE USED ON NEXT CYCLE
0123				30,2425	41471-0	MAINENG	DDV	VG/VE IN PD(10)
0124	REF	6	LAST	843	30,2426	02265-1	VE	
0125				30,2427	44205-0	DMP	BDSU	1-KT VG/VE
0126	REF	1			30,2430	26201-0	KTI	
0127	REF	1			30,2431	17771-0	NEARONE	
0128				30,2432	41205-0	DMP	DMP	TBUP VG(1-KT VG/VE)/VE
0129	REF	7	LAST	843	30,2433	02271-1	TBUP	= TGO
0130				30,2434	77625-0	DSU		COMPENSATE FOR TAILOFF
0131	REF	4	LAST	841	30,2435	02267-0	TTO	
0132	REF	24	LAST	846	30,2436	03517-1	STORE TGO	
0133				30,2437	57461-0	SR	DCOMP	
0134				30,2440	20614-0		110	
0135	REF	23	LAST	746	30,2441	17454-1	STOVL	TGO
0136	REF	25	LAST	846	30,2442	03517-1	TGO	TGO(1-24)CS
0137				30,2443	45214-1	BON	DSU	
0138	REF	6	LAST	833	30,2444	03710-1	IDLEFLAG	
0139	REF	1			30,2445	60451-1	T2TEST	
0140	REF	2	LAST	773	30,2446	21021-1	45 C(17)	$(-TGO - 4) * 2(-17)CS.$
0141				30,2447	77640-0	BON		
0142	REF	1			30,2450	30355-1	ENG EFF	
0143				30,2451	77745-1	T2TEST	DLOAD	
0144	REF	26	LAST	846	30,2452	03517-1	TGO	
0145				30,2453	50025-0	DSU	BON	IF TGO - T2 NEG., GO TO CHRONOM

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0146	REF	1		30,2454	21023 0		T2A	
0147	REF	1		30,2455	60612 1		COMPONENT	
0148				30,2456	45345 1	DLOAD	DSU	
0149	REF	8	LAST	846	30,2457	02271 1	TRUP	
0150	REF	27	LAST	846	30,2460	03517 1	TGO	
0151				30,2461	45071 0	DDV	CALL	1-TGO/TRUP
0152	REF	9	LAST	847	30,2462	02271 1	TRUP	
0153	REF	1		30,2463	61036 0		LOGSUB	
0154				30,2464	41461 1	SL	PUSH	-L IN PDL(0) (2)
0155				30,2465	20206 1			
0156				30,2466	44265 0	BDDV	BDSU	-TGO/L*2(-17)
0157	REF	28	LAST	847	30,2467	03517 1	TGO	
0158	REF	10	LAST	847	30,2470	02271 1	TRUP	TRUP + TGO/L = D12*2(-17)
0159				30,2471	43006 0	PUSH	BON	STORE IN PDL(2) (4)
0160	REF	1		30,2472	04703 1		FLPC	IF FLPC = 1, GO TO CONST
0161	REF	1		30,2473	60502 0		NORATES	
0162				30,2474	45345 1	DLOAD	DSU	
0163	REF	29	LAST	847	30,2475	03517 1	TGO	
0164	REF	1		30,2476	21025 0		T3	
0165				30,2477	43044 0	BPL	SET	FLPC=1
0166	REF	1		30,2500	60510 0		RATES	
0167	REF	2	LAST	847	30,2501	04463 1	FLPC	
0168				30,2502	77745 1	NORATES	DLOAD	
0169	REF	9	LAST	841	30,2503	06522 1	HISZEROS	
0170	REF	2	LAST	120	30,2504	02351 1	STORE	PRATE E = 0
0171	REF	2	LAST	120	30,2505	02353 0	STORE	YRATE U = 0
0172				30,2506	77650 1	GOTO		
0173	REF	1		30,2507	60572 1		CONST	GO TO CONST
0174				30,2510	45345 1	RATES	DLOAD	
0175	REF	30	LAST	847	30,2511	03517 1	DSU	
0176				30,2512	00003 1		TGO	TGO - D12 = D21*2(-17)
0177				30,2513	72406 0	PUSH	SL1	IN PDL(4) (6)
0178				30,2514	52421 1	BDSU	SL3	(1/2TGO -- D21)*2(-13) = E * 2(-13) (7)
0179	REF	31	LAST	847	30,2515	03517 1	TGO	
0180				30,2516	41325 0	FDL	IMP	IN PDL(6)
0181	REF	32	LAST	847	30,2517	03517 1	TGO	
0182	REF	3	LAST	846	30,2520	03474 0	RDOT	ROOT TGO * 2(-24)
0183				30,2521	45215 0	DAD	DSU	* + RDOT TGO
0184	REF	4	LAST	845	30,2522	02301 1	/R/MAG	R + RDOT TGO = RCU
0185	REF	3	LAST	841	30,2523	03631 0	RCU	MPAC = - DR*2(-24);
0186				30,2524	41325 0	FDL	DEF	-DR IN PDL(8) (10)
0187	REF	3	LAST	846	30,2525	02337 1	DRDOT	
0188				30,2526	00005 1		U4D	D21 - DRDOT*2(-24)
0189				30,2527	62415 0	DAD	SL2	(D21 DRDOT-DR)*2(-22) (8)
0190				30,2530	56271 0	DDV	DDV	
0191				30,2531	00007 0		GO	(D21 DRDOT-DR)/E*2(-9)
0192	REF	33	LAST	847	30,2532	03517 1	TGO	
0193	REF	3	LAST	847	30,2533	02351 1	STORE	PRATE B * 2(8)
0194				30,2534	71240 1	BMN	DLOAD	B>0 NOT PERMITTED
0195	REF	1		30,2535	60541 1		CHKBMAG	

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0196	REF	10	LAST	847	30,2536	06522 1		H16ZEROS	
0197	REF	4	LAST	847	30,2537	36351 0	STCALL	PRATE	
0198	REF	1			30,2540	60553 1		PROK	
0199					30,2541	56202 1	CHKBMAG	SR4	B*2(4)
0200	REF	11	LAST	847	30,2542	02271 1		TAUP	(B / TAU) * 2(21)
0201					30,2543	51025 1	DSU	BPL	
0202	REF	1			30,2544	26203 1		PELLIMIT	(B / TAU) * 2(21) MAX.
0203	REF	2	LAST	848	30,2545	60553 1		PRPK	
0204					30,2546	41345 0	DLOAD	DMP	
0205	REF	2	LAST	848	30,2547	26203 1		PELLIMIT	
0206	REF	12	LAST	848	30,2550	02271 1		TAUP	B MAX. * 2(4)
0207					30,2551	77612 1	SL4		BMAX*2(8)
0208	REF	5	LAST	848	30,2552	02351 1	STORE	PKATE	
0209					30,2553	77745 1	PROK	DLOAD	
0210	REF	34	LAST	847	30,2554	03517 1		TGO	
0211					30,2555	43205 1	DMP	DAD	YDOT TGO
0212	REF	5	LAST	845	30,2556	02311 0		YDOT	
0213	REF	5	LAST	840	30,2557	02335 0		Y	Y + YDOT TGO
0214					30,2560	65225 1	DSU	PDDI	Y + YDOT TGO - YCD
0215	REF	6	LAST	841	30,2561	03633 1		YCD	MPAC * - DY*2(-24.) IN PDL(8) (10)
0216	REF	3	LAST	845	30,2562	02341 0		DYDOT	
0217					30,2563	43205 1	DMP	DAD	D21 DYDOT - DY (8)
0218					30,2564	00005 1		D4D	
0219					30,2565	56312 1	SL2	DDV	(D21-DYDOT - -DY)/E*2(-9)
0220					30,2566	40271 1	DDV	SETPD	(D21-DYDOT - -DY)/E TGO*2(8)
0221	REF	35	LAST	848	30,2567	03517 1		TGO	= D*2(6)
0222					30,2570	00005 1		D4	
0223	REF	3	LAST	847	30,2571	02353 0	STORE	YATE	
0224					30,2572	41345 0	CONST	DLOAD	LOAD E*2(8)
0225	REF	6	LAST	848	30,2573	02351 1		PRATE	B D12*2(-9)
0226					30,2574	00003 1		D2D	
0227					30,2575	56325 0	PDDI	DDV	D12 B IN PDL(4) (6)
0228	REF	4	LAST	847	30,2576	02337 1		DRDOT	LOAD-DRDOT*2(-7)
0229					30,2577	00001 0		GGG	-DRDOT/L*2(-7)
0230					30,2600	45302 1	SR4	DSU	(-DRDOT/L-D12 B)=A*2(-9) (4)
0231					30,2601	77626 0	STADP		
0232	REF	2	LAST	120	30,2602	61432 0	STODL	PCONS	
0233	REF	4	LAST	848	30,2603	02353 0		YATE	D*2(8)
0234					30,2604	65205 0	DMP	PDDI	D12 D EXCH WITH -L IN PDL(6) (2,2)
0235					30,2605	60465 0	DDV	SR4	-DYDOT/L*2(-9)
0236	REF	4	LAST	848	30,2606	02341 0		DYDOT	
0237					30,2607	77625 0	DSU		(-DYDOT/L-D12-D)=C*2(-9)
0238					30,2610	00001 0		GGG	
0239	REF	2	LAST	120	30,2611	02347 0	STORE	YCONS	
0240					30,2612	71201 1	CMPOINT	SETPD	
0241					30,2613	00001 0		GGG	
0242	REF	1			30,2614	27147 0		ICOLS	
0243					30,2615	77605 1	DMP		
0244	REF	7	LAST	848	30,2616	02351 1		PRATE	B(T-T0)*2(-9)
0245					30,2617	56215 1	DAD	DDV	(A+B(T-T0))*2(-9)

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0246	REF	3	LAST	848	30.2620	02345 1	PCONS	(A+B(T-T ₀))/TBUP*2(8)	
0247	REF	13	LAST	848	30.2621	02271 1	TEMP		
0248					30.2622	45352 1	SL1	DSU	
0249	REF	4	LAST	846	30.2623	02315 1	GEFF	ATP*2(9)	
0250	REF	2	LAST	120	30.2624	16357 1	STOOL	ATR	
0251	REF	2	LAST	848	30.2625	27147 0		100CS	
0252					30.2626	43205 1	DMP	DAD	
0253	REF	5	LAST	848	30.2627	02353 0		VFATE	
0254	REF	3	LAST	848	30.2630	02347 0		YCONS	(C+D(T-T ₀))*2(1-9)
0255					30.2631	72471 0	DDV	SL1	
0256	REF	14	LAST	849	30.2632	02271 1		TBUP	
0257	REF	4	LAST	840	30.2633	02355 0	STORE	ATY	ATY*2(9)
0258					30.2634	65361 0	VXSC	PDDL	ATY-UY*2(8) (6)
0259	REF	4	LAST	845	30.2635	02303 0		LAXIS	
0260	REF	3	LAST	849	30.2636	02357 1		ATR	
0261					30.2637	53361 0	VXSC	VAD	(10)
0262	REF	19	LAST	846	30.2640	03537 0		UNIT/R/	
0263					30.2641	41572 1	VSL1	PUSH	AH*2(9) IN PDL(0) (6)
0264					30.2642	65246 1	ABVAL	PDDL	AH(2) IN PDL(34)
0265	REF	6	LAST	843	30.2643	02263 1		AT	AHHAG IN PDL(6) (8)
0266					30.2644	45316 1	DSQ	DSU	(AT(2)-AH(2))*2(18)
0267					30.2645	00043 0		BAD	=ATP2*2(18)
0268					30.2646	41525 0	PDDL	PUSH	(12)
0269	REF	7	LAST	849	30.2647	02263 1		AT	
0270					30.2650	45316 1	DSQ	DSU	(AT(2)KR(2)-AH(2))*2(18) (10)
0271					30.2651	00043 0		BAD	=ATP3*2(18)
0272					30.2652	71240 1	BMN	DLUAD	IF ATP3 NEG, GO TO NO-ATP
0273	REF	1			30.2653	60657 0		NO-ATP	LOAD ATP3, IF ATP3 POS
0274					30.2654	00011 1		BD	
0275					30.2655	52166 1	SORT	GOLD	ATP*2(9)
0276	REF	1			30.2656	60665 1		AIMER	
0277					30.2657	55345 0	NO-ATP	DLUAD	KR AT/AH = KH (8)
0278					30.2660	00007 0		BD	
0279					30.2661	77761 1	VXSC		KH AH*2(9)
0280					30.2662	00001 0		OOD	
0281					30.2663	14001 0	STOOL	OOD	STORE NEW AH IN PDL(0)
0282	REF	11	LAST	848	30.2664	06522 1		H16ZEROS	
0283					30.2665	77765 0	AIMER	SIGN	
0284	REF	3	LAST	845	30.2666	02343 1		DZDOT	
0285	REF	3	LAST	840	30.2667	02361 1	STORE	ATP	
0286					30.2670	77761 1	VXSC		
0287	REF	5	LAST	845	30.2671	03726 1		ZAXIS1	ATP-ZAXIS *2(8).
0288					30.2672	53372 1	VSL1	VAD	AT*2(9)
0289					30.2673	00001 0		OOD	
0290	REF	16	LAST	840	30.2674	03254 1	STORE	UNFC/2	WILL BE OVERWRITTEN IF IN VERT. PISE.
0291					30.2675	43001 1	SETPD	BON	
0292					30.2676	00001 0		OOD	
0293	REF	3	LAST	840	30.2677	04704 0		FLPI	
0294	REF	1			30.2700	60220 1		P12RET	
0295					30.2701	77614 1	BOH		

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0296	REF	3	LAST	840	30,2702	04701 0		FLVR	
0297	REF	1			30,2703	60755 0		CHECKALT	
0298					30,2704	57575 1	MAINLINE VLOAD	VCDMP	
0299	REF	20	LAST	849	30,2705	03537 0		UNIT/R/	
0300	REF	7	LAST	813	30,2706	17262 1	STODL	UNWC/2	
0301	REF	3	LAST	841	30,2707	03654 0		TXD	
0302					30,2710	51025 1	DSU	BPL	
0303	REF	16	LAST	817	30,2711	01235 1		PIPTIME	
0304	REF	1			30,2712	60721 0		ASCTERM	
0305					30,2713	77614 1	BUR		
0306	REF	2	LAST	834	30,2714	04711 1		ROTFLAG	
0307	REF	1			30,2715	57273 0		ANGICHEK	
0308					30,2716	43014 0	CLRFLAG CLEAR	CLEAR	
0309	REF	1			30,2717	01664 1		NOR/9FLG	START R29 IN ASCENT PHASE.
0310	REF	5	LAST	802	30,2720	06666 1		XOVINFLG	ALLOW X-AXIS OVERRIDE
0311					30,2721	77776 1	ASCTERM EXIT		
0312	REF	5	LAST	835	30,2722	3 0105 0	CA	FLAGWRD9	
0313	REF	1			30,2723	7 4742 0	MASK	FLRCSBIT	
0314	REF	246	LAST	836	30,2724	10 000 0	CCS	A	
0315	REF	1			30,2725	1 2747 0	TCF	ASCTERM3	
0316	REF	146	LAST	843	30,2726	0 6037 0	TC	INTPRET	
0317					30,2727	77624 1	CALL		
0318	REF	4	LAST	814	30,2730	61111 1		FINDCDUH -2	
0319					30,2731	77776 1	ASCTERM1 EXIT		
0320	REF	6	LAST	850	30,2732	3 0105 0	+1 CA	FLAGWRD9	INSURE THAT THE NOON 63 DISPLAY IS
0321	REF	2	LAST	850	30,2733	7 4742 0	MASK	FLRCSBIT	BYPASSED IF WE ARE IN THE PCS TRIMMING
0322	REF	247	LAST	850	30,2734	10 000 0	CCS	A	MODE OF OPERATION
0323	REF	2	LAST	850	30,2735	1 2747 0	TCF	ASCTERM3	
0324	REF	12	LAST	814	30,2736	3 0104 1	CA	FLAGWRD6	BYPASS DISPLAYS IF ENGINE FAILURE IS
0325	REF	3	LAST	814	30,2737	7 4742 0	MASK	FLUNDBIT	INDICATED.
0326	REF	248	LAST	850	30,2740	10 000 0	CCS	A	
0327	REF	3	LAST	850	30,2741	1 2747 0	TCF	ASCTERM3	
0328	REF	1			30,2742	3 3033 1	CAF	V06H63+	
0329	REF	234	LAST	839	30,2743	0 4616 1	TC	BANKCALL	
0330	REF	2	LAST	474	30,2744	20451 0	CADR	GUDSPR	
0331	REF	4	LAST	850	30,2745	1 2747 0	TCF	ASCTERM3	
0332					30,2746	77776 1	ASCTERM2 EXIT		
0333	REF	131	LAST	835	30,2747	1 5155 1	ASCTERM3 TCF	ENDOFJOB	
0334					30,2750	77776 1	ASCTERM4 EXIT		
0335					30,2751	0 0004 0	INHIBIT		
0336	REF	38	LAST	840	30,2752	0 4674 0	TC	BANKCALL	NO GUIDANCE THIS CYCLE -- HENCE ZERO
0337	REF	7	LAST	791	30,2753	40153 1	CADR	ZATTEROR	THE DAP ATTITUDE ERRORS.
0338	REF	1			30,2754	1 2732 1	TCF	ASCTERM1 +1	
0339					30,2755	45345 1	CHECKALT DLOAD	DSU	
0340	REF	5	LAST	847	30,2756	02301 1		/F/PAL	
0341	REF	8	LAST	842	30,2757	02333 0		/LAND/	
0342					30,2760	50025 0	DSU	BMN	IF H LT-25K CHECK Z-AXIS ORIENTATION.
0343	REF	1			30,2761	26700 1		25KFT	
0344	REF	1			30,2762	16667 1		CHECKYAW	

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0345					30,2763	43014 0	EXITVR	CLEAR	BOW
0346	REF	4	LAST	850	30,2764	04661 1			FLVR
0347	REF	3	LAST	850	30,2765	04711 1			ROTFLAG
0348	REF	1			30,2766	60704 1			MAINLINE
0349					30,2767	43345 1		DLOAD	DAD
0350	REF	17	LAST	850	30,2770	01235 1			PIPTIME
0351	REF	1			30,2771	25755 1			10SECS
0352	REF	4	LAST	850	30,2772	37654 1		STCALL	TXD
0353	REF	2	LAST	851	30,2773	60704 1			MAINLINE
0354					30,2774	77614 1	EXITVR1	CLROD	
0355	REF	4	LAST	851	30,2775	04631 1			ROTFLAG
0356	REF	1			30,2776	60763 0			EXITVR

0357	REF	3	LAST	44	27,2000			SETLOC	ASENT1
0358					27,3273			BANK	
0359	REF	1						COUNT*	33/ASENT

0360					27,3273	50375 0	ANGICMEK	VLOAD	DOT
0361	REF	17	LAST	849	27,3274	03254 1			UNFC/2
0362	REF	5	LAST	848	27,3275	02146 0			XNBPIP
0363					27,3276	51025 1		DSU	BPL
0364	REF	2	LAST	122	27,3277	02577 0			COSTHET1
0365	REF	1			27,3300	57307 1			OFFROT
0366					27,3301	50375 0		VLOAD	DOT
0367	REF	6	LAST	851	27,3302	02146 0			XNBPIP
0368	REF	21	LAST	850	27,3303	03537 0			UNIT/K/
0369					27,3304	50025 0		DSU	BMN
0370	REF	2	LAST	122	27,3305	02601 1			COSTHET2
0371	REF	1			27,3306	30351 0			FEFFVR1
0372					27,3307	77614 1	OFFROT	CLROD	
0373	REF	5	LAST	851	27,3310	04631 1			ROTFLAG
0374	REF	1			27,3311	60716 1			CLRFLAG

0375					07,2667			BANK	7
0376	REF	1			07,2000			SETLOC	ASENT2
0377					07,2667			BANK	
0378	REF	1						COUNT*	34/ASENT

0379	REF	2	LAST	850	07,2667		SETXFLAG	=	CHECKYAN
------	-----	---	------	-----	---------	--	----------	---	----------

0380					07,2667	77614 1	CHECKYAN	SET	
0381	REF	6	LAST	850	07,2670	06466 0			XDVINFLC
0382					07,2671	74345 0		DLOAD	VXSC
0383	REF	5	LAST	849	07,2672	02355 0			ATY
0384	REF	5	LAST	849	07,2673	02303 0			LAXIS
0385					07,2674	74325 0		PDDL	VXSC
0386	REF	4	LAST	849	07,2675	02361 1			ATP
0387	REF	6	LAST	849	07,2676	03726 1			ZAXIS1
0388					07,2677	53455 0		VAD	UNIT
0389					07,2700	50206 0		PUSH	DOT

PROHIBIT X-AXIS OVERRIDE

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0390	REF	4	LAST	804	07,2701	02154 0		YNBPIP	
0391					07,2702	45246 0	ABS	DSU	
0392	REF	1			07,2703	13503 0		SINSDEG	
0393					07,2704	71244 0	BPL	DLAD	
0394	REF	1			07,2705	30347 1		KEEPVR	
0395	REF	4	LAST	847	07,2706	03474 0		RDUT	
0396					07,2707	51025 1	DSU	BPL	
0397	REF	1			07,2710	13505 0		40FPS	
0398	REF	1			07,2711	60774 0		EXITVR1	
0399					07,2712	77650 1	GOTO		
0400	REF	2	LAST	852	07,2713	30347 1		KEEPVR	
0401					05,3502		BANK	5	
0402	REF	1			05,2000		SETLOC	ASENT3	
0403					05,3502		BANK		
0404	REF	1					COUNT*	11/ASENT	
0405					05,3502	00545 0	SINSDEG	2DEC	0.06716 8-2
0405					05,3503	00171 0			
0406					05,3504	00017 1	40FPS	2DEC	0.12192 6-7
0406					05,3505	23305 0			
0407					14,2347		BANK	14	
0408	REF	1			14,2000		SETLOC	ASENT4	
0409					14,2347		BANK		
0410	REF	1					COUNT*	16/ASENT	
0411					14,2347	45575 1	KEEPVR	VLOAD	STADR
0412	REF	8	LAST	850	14,2350	74515 0		STORE	UNWC/2
0413					14,2351	77775 1	KEEPVR1	VLOAD	
0414	REF	22	LAST	851	14,2352	03537 0			UNIT/R/
0415	REF	18	LAST	851	14,2353	37254 0		STCALL	UNFC/2
0416	REF	2	LAST	850	14,2354	60721 0			ASCTERM
0417					14,2355	77634 0	ENGOFF	RTB	
0418	REF	24	LAST	841	14,2356	21573 0			LGADTIME
0419					14,2357	43225 0	DSU	DAD	
0420	REF	18	LAST	851	14,2360	01235 1			PIPTIME
0421	REF	24	LAST	846	14,2361	03454 1			TTOGO
0422					14,2362	77476 1	DCOMP	LXIT	
0423	REF	11	LAST	796	14,2363	0 7257 0	TL	TPAGREL	FORCE SIGN AGREEMENT ON MPAC. MPAC +1.
0424	REF	8	LAST	794	14,2364	3 5016 0	CAF	EBANK7	
0425	REF	32	LAST	826	14,2365	54 003 0	TS	EBANK	
0426	REF	36	LAST	848	E7,1516		EBANK	TGU	
0427					14,2366	0 0004 0	INHINT		
0428	REF	332	LAST	843	14,2367	10 155 1	CGS	MPAC +1	
0429					14,2370	1 2373 0	TCF	+3	C(A) = DT = 1 BIT
0430					14,2371	1 2373 0	TCF	+2	C(A) = 0
0431	REF	157	LAST	838	14,2372	3 4755 1	CAF	ZERU	C(A) = 0
0432	REF	41	LAST	830	14,2373	6 4753 1	AD	BIT1	C(A) = 1 BIT OR DT.

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0433	REF	2	LAST	152	14,2374	55'644 1		TS	ENG OFFDT	
0434	REF	24	LAST	829	14,2375	0 5173 1		TC	TWIDDLE	
0435	REF	1			14,2376	02410 0		ADRES	ENG OFF1	
0436	REF	70	LAST	843	14,2377	0 5353 1		TC	PHASCHNG	
0437					14,2400	47014 1		OCT	47014	
0438	REF	3	LAST	853	14,2401	76133 1		-GENADR	ENG OFFDT	
0439	REF	37	LAST	852	E7,1516			EBANK	TGD	
0440	REF	2	LAST	853	14,2402	02410 0		2CADR	ENG OFF1	
0440					14,2403	30067 0				
0441	REF	147	LAST	850	14,2404	0 6037 0		TC	INTPRET	
0442					14,2405	52014 0		SET	GOTD	
0443	REF	7	LAST	846	14,2406	03470 1			IDLEFLAG	DISABLE DELTA-V MONITOR
0444	REF	2	LAST	846	14,2407	60451 1			TZTEST	
0445	REF	39	LAST	850	14,2410	0 4674 0	ENG OFF1	TC	IBNRCALL	SHUT OFF THE ENGINE.
0446	REF	1			14,2411	75551 1		CADR	ENG OFF2	
0447	REF	4	LAST	747	14,2412	3 5027 1		CAF	PRIOR 7	SET UP A JOB FOR THE ASCENT GUIDANCE
0448	REF	36	LAST	816	14,2413	0 5105 0		TC	FINDVAC	POSTBURN LOGIC.
0449	REF	29	LAST	839	E7,1455			EBANK	WHICH	
0450	REF	3	LAST	747	14,2414	02424 1		2CADR	CUTOFF	
0450					14,2415	30067 0				
0451	REF	71	LAST	853	14,2416	0 5353 1		TC	PHASCHNG	
0452					14,2417	07024 0		OCT	07024	
0453					14,2420	17000 1		OCT	17000	
0454	REF	38	LAST	853	E7,1516			EBANK	TGD	
0455	REF	4	LAST	853	14,2421	02424 1		2CADR	CUTOFF	
0455					14,2422	30067 0				
0456	REF	58	LAST	829	14,2423	1 5261 0		TCF	TASKOVER	
0457	REF	54	LAST	838	14,2424	0 5504 0	CUTOFF	TC	UPFLAG	SET FLRCS FLAG.
0458	REF	4	LAST	846	14,2425	00214 0		ADRES	FLRCS	
0459	REF	1			14,2426	3 2445 0	-5	CAF	VIGN63	
0460	REF	235	LAST	850	14,2427	0 4616 1		TC	BANKCALL	
0461	REF	25	LAST	839	14,2430	20476 0		CADR	GOFLASH	
0462					14,2431	1 2434 1		TCF	+3	
0463	REF	1			14,2432	1 2436 0		TCF	CUTOFF1	
0464					14,2433	1 2426 1		TCF	-5	
0465	REF	51	LAST	840	14,2434	0 4635 0	+3	TC	POSTJUMP	
0466	REF	1			14,2435	61007 1		CADR	TERMASC	
0467					14,2436	0 0004 0	CUTOFF1	INHINT		
0468	REF	40	LAST	853	14,2437	0 4674 0		TC	IBNRCALL	ZERO ATTITUDE ERRORS SET RE RECORDING IS.
0469	REF	8	LAST	850	14,2440	40153 1		CADR	ZATTERM	
0470	REF	41	LAST	853	14,2441	0 4674 0		TC	IBNRCALL	
0471	REF	5	LAST	756	14,2442	40140 0		CADR	SETMINDB	
0472	REF	52	LAST	853	14,2443	0 4635 0		TC	POSTJUMP	
0473	REF	1			14,2444	60777 0		CADR	CUTOFF2	

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0474 14,2445 04077 0 VI6N63 VN 1663
 0475 30,2777 BANK 30
 0476 REF 1 30,2000 SETLOC ASENT5
 0477 30,2777 BANK
 0478 REF 3 LAST 845 TO 851: 302 304* COUNT* 33/ASENT

0479 REF 72 LAST 853 30,2777 0 5353 1 CUTOFF2 TC PHYSCHNG
 0480 30,3000 04024 0 OCT 04024

0481 REF 1 30,3001 3 3017 1 CAF VI6N63C
 0482 REF 236 LAST 853 30,3002 0 4616 1 TC BANKCALL
 0483 REF 26 LAST 853 30,3003 20476 0 CADR GUFASH
 0484 REF 2 LAST 853 30,3004 1 3007 1 TCF TERMASC
 0485 30,3005 1 3007 1 TCF +2 PROCEED
 0486 REF 2 LAST 853 30,3006 1 2777 0 TCF CUTOFF2

0487 REF 73 LAST 854 30,3007 0 5353 1 TERMASC TC PHYSCHNG
 0488 30,3010 04024 0 OCT 04024

0489 30,3011 0 0004 0 IGNINT --- RESTORE DEADBAND DESIRED BY ASTRONAUT.
 0490 REF 42 LAST 853 30,3012 0 4674 0 TC BANKCALL
 0491 REF 7 LAST 755 30,3013 40123 0 CADR RESTORDB
 0492 REF 81 LAST 840 30,3014 0 5516 0 TC DOWNFLAG DISALLOW ABORTS AT THIS TIME.
 0493 REF 3 LAST 835 30,3015 00215 1 ADRES LETABDRT
 0494 REF 36 LAST 839 30,3016 1 6001 1 TCF GOTOPOOH

049405 30,3017 04125 0 VI6N65C VN 1685

04941 27,3312 BANK 27
 049415 REF 4 LAST 851 27,2000 SETLOC ASENT1
 04942 27,3312 BANK
 049425 REF 2 LAST 851 TO 851: 15 15* COUNT* 33/ASENT

0495 27,3312 50375 0 YCOMP VLOAD INT
 0496 REF 23 LAST 852 27,3313 03537 0 UNIT/R/
 0497 REF 3 LAST 841 27,3314 03720 1 GAXIS
 0498 27,3315 41312 1 SLR REP
 0499 REF 4 LAST 847 27,3316 03631 0 FLO
 0503 REF 6 LAST 848 27,3317 02335 0 STORE Y
 0504 27,3320 77616 0 RVG

R0506
 0507 30,3020 BANK 30
 0508 REF 3 LAST 845 30,2000 SETLOC ASENT
 0509 30,3020 BANK

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PC510 ASCENT GUIDANCE CONSTANTS

0511	REF	2	LAST	845	33.3146		100CS	EQUALS	2SEC(18)	
0512	REF	1			30.3022		T2A	EQUALS	2SEC(17)	
0513					30.3020	00062 0	4SEC(17)	2DEC	400	B-17
0513					30.3021	00000 1				
0514					30.3022	00031 0	2SEC(17)	2DEC	200	B-17
0514					30.3023	00000 1				
0515					30.3024	00175 1	T3	2DEC	1000	B-17
0515					30.3025	00000 1				
0516					30.3026	00045 0	6SEC(18)	2DEC	600	B-18
0516					30.3027	20000 0				
0517					30.3030	00010 0	BIT4H	001	10	
0518					30.3031	14400 0	2SEC(19)	2DEC	200	B-9
0518					30.3032	00000 1				
0519					30.3033	01477 1	V06N63*	VN	0663	
0520					30.3034	01514 0	V06N76	VN	0676	
0521					30.3035	01441 1	V06N33A	VN	0633	
0522					33.2200			BANK	33	
0523	REF	1			33.2000			SETLOC	ASENT6	
0524					33.2200			BANK		
0525	REF	1						COUNT*	44/ASENT	
0526					33.2200	20000 0	RTI	2DEC	0.5000	
0526					33.2201	00000 1				
0527					33.2202	75751 0	PI-LIMIT	2DEC	-0.0639	(0/TROU)MIN=-0.1-F.SEC(-)
0527					33.2203	41775 1				
0528					33.2204	00022 1	MINABOV	2DEC	.0356	B-5 10 PERCENT HIGHER THAN GRAVITY
0528					33.2205	07212 1				
0529	REF	2	LAST	147	27.1570		1/DVO	=	MASS1	

L ASCENT GUIDANCE

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P0530 THE LOGARITHM SUBROUTINE

0531		24.3670	BANK	24
0532	REF 1	30.2000	SETLOC	FLOGSUB
0533		30.3036	BANK	

R0534 INPUT X IN MPAC
R0535 OUTPUT -LOG(X) IN MPAC

0536		30.3036	44301 0	LOGSUB	NORM	BDSU
0537	REF 333	LAST 852	30.3037	60163 0		MPAC +6
0538	REF 2	LAST 846	30.3040	17771 0		NEARONE
0539			30.3041	77776 1	EXIT	
0540	REF 1		30.3042	0 7222 1	TC	POLY
0541			30.3043	00006 1	DEC	6
0542			30.3044	00000 1	2DEC	.0000000000
0542			30.3045	00002 0		
0543			30.3046	76777 1	2DEC	-.0312514377
0543			30.3047	77175 1		
0544			30.3050	77400 0	2DEC	-.0155686771
0544			30.3051	75416 0		
0545			30.3052	77507 0	2DEC	-.0112502068
0545			30.3053	65515 0		
0546			30.3054	77741 0	2DEC	-.0018545108
0546			30.3055	63547 1		
0547			30.3056	77052 0	2DEC	-.0286607906
0547			30.3057	55373 0		
0548			30.3060	01167 0	2DEC	.0385598563
0548			30.3061	30361 0		
0549			30.3062	76520 1	2DEC	-.0419261902
0549			30.3063	75267 0		
0550	REF 158	LAST 852	30.3064	3 4755 1	CAF	ZERO
0551	REF 334	LAST 856	30.3065	54 156 1	TS	MPAC +2
0552			30.3066	0 0006 1	EXTEND	
0553	REF 1		30.3067	3 3103 0	DCA	CLOG2/32
0554	REF 335	LAST 856	30.3070	52 155 1	DXCH	MPAC
0555	REF 76	LAST 824	30.3071	52 132 0	DXCH	BUF +1
0556	REF 336	LAST 856	30.3072	3 0162 1	CA	MPAC +0
0557	REF 8	LAST 823	30.3073	0 7307 1	TC	SHORTMP
0558	REF 337	LAST 856	30.3074	52 156 1	DXCH	MPAC +1
0559	REF 338	LAST 856	30.3075	52 155 1	DXCH	MPAC
0560	REF 77	LAST 856	30.3076	52 132 0	DXCH	BUF +1
0561	REF 339	LAST 856	30.3077	20 155 1	OAS	MPAC
0562	REF 148	LAST 853	30.3100	0 6037 0	TC	INTERPRET
0563			30.3101	43476 0	DCOMP	RVQ
0564			30.3102	00542 1	CLOG2/32	2DEC .0216608494
0564			30.3103	34414 1		

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0001 37.3410
0002 REF 1 37.2000
0003 37.3410

BANK 57
SETLOC SERV1
BANK

0004 REF 41 LAST 843 E7.1515

EBANK= DVCHTP

P0005 ***** PPEREAD
R0007

0008 REF 1

COUNT=33/SERV

0009 REF 10 LAST 820 37.3410 3 4757 0 PREEAD
0010 REF 1 37.3411 0 3531 0
0011 REF 4 LAST 599 37.3412 3 5031 0
0012 REF 21 LAST 781 37.3413 0 5072 1
0013 REF 5 LAST 334 E3.1460
0014 REF 1 37.3414 0 5663 1
0014 REF 1 37.3415 14063 1

CAF SEVEN
TC GNOFAZES
CAF PRI021
TC F0VAT
EBANK= NBDX
ECAOR LASTBIAS

5.7 SPOT TO SKIP LASTBIAS AFTER
RESTART.

DO LAST GYRO COMPENSATION IN FREE FALL

0015 REF 2 LAST 334 37.3416 0 3544 1 RIBIBIAS TC
A0016

PIPAGE +3

CLEAR + READ PIPS LAST TIME IN FREE+PIPS
DO NOT DESTROY VALUE OF PIPTIME1

0017 REF 19 LAST 836 37.3417 4 0103 1
0018 REF 1 37.3420 7 4773 1
0019 REF 20 LAST 857 37.3421 26 103 1

CS FLAGWRD7
MASK SUPERD7
ADS FLAGWRD7

SET VERTFLAG AND AVEGFLAG (BITS 6 AND 7
OF FLAGWRD7)

0020 REF 2 LAST 165 37.3422 4 4735 0
0021 REF 21 LAST 813 37.3423 7 0076 1
0022 REF 22 LAST 857 37.3424 54 076 1

CS REFBIT
MASK FLAGWRD2
TS FLAGWRD2

RESET DRIFTFLAG

0023 REF 17 LAST 838 37.3425 3 4751 0
0025 REF 3 LAST 107 37.3426 55 257 1

CAF FOUR
TS PIPAGE

INITIALIZE DV MONITOR

0026 REF 1 37.3427 3 3537 0
0027 REF 2 LAST 228 37.3430 55 260 0

CAF ENDJOBAD
TS OUTROUTE

POINT OUTROUTE TO END-OF-JOB.

0028 REF 5 LAST 816 37.3431 3 7710 0
0029 REF 37 LAST 853 37.3432 0 5105 0
0030 REF 42 LAST 857 E7.1515
0031 REF 2 LAST 242 37.3433 02461 0
0031 37.3434 46067 1

CAF PRI022
TC FINDVAC
EBANK= DVCHTP
ZCAOR NORMLIZE

TO FIRST ENTRY TO AVERAGE G.

0032 REF 53 LAST 830 37.3435 3 4752 0
0033 REF 1 37.3436 0 3525 0 GOREADAX
0034 REF 6 LAST 795 37.3437 3 5000 1
0035 REF 8 LAST 820 37.3440 0 5224 0

CA TWO
TC GNOFAZ5
CA 3 SECS
TC VARDELAY

5.2 SPOT FOR REEADAC AND NORMLIZE

WAIT TWO SECONDS FOR REEADACS

L - - - - - SERVICER

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P	0036	REF	1	LAST	832	37,3441	4 3540 1	READACCS	CS	DCTA7771		THIS PIECE OF CODING ATTEMPTS TO
0039	REF	3	LAST	832	37,3442	6 0030 1		READACCS	AD	TIMES		SYNCHRONIZE READACCS WITH THE DIGITAL
0040	REF	249	LAST	850	37,3443	10 000 0			CCS	A		AUTOPILOT SO THAT A PAXIS RUPT WILL
0041	REF	92	LAST	824	37,3444	4 4753 0			CS	ONE		OCCUR APPROXIMATELY 70 MILLISECOND
0042					37,3445	1-3447 1			TCF	+2		FOLLOWING THE READACCS RUPT. THE 70 MS
0043	REF	93	LAST	858	37,3446	3 4753 1			CA	ONE		OFFSET WAS CHOSEN SO THAT THE PAXIS
0044	REF	4	LAST	858	37,3447	26 030 0	+2		ADS	TIMER		RUPT WOULD NOT OCCUR SIMULTANEOUSLY
A0045												WITH ANY OF THE 8 SUBSEQUENT R10,R11
A0046												INTERUPTS -- THUS MINIMIZING THE POSS-
A0047												IBILITY OF LOSING DOWNUPTS.
0048	REF	3	LAST	857	37,3450	0 3541 1			TC	PIPASK		READ THE PIPAS.
0049	REF	17	LAST	820	37,3451	3 4756 1	PIPSDONE		CA	FIVE		
0050	REF	2	LAST	857	37,3452	0 3531 0			TC	GNUMAZES		
0051	REF	94	LAST	858	37,3453	3 4753 1	REDD05.5		CAF	ONE		
0052	REF	4	LAST	857	37,3454	55'257 1			TS	PIPEGE		
0053	REF	7	LAST	760	37,3455	3 4736 1			CA	PRID20		
0054	REF	38	LAST	857	37,3456	0 5105 0			TC	FINDVAC		
0055	REF	43	LAST	857	E7,1515				EBANK=	DVCNTR		
0056	REF	2	LAST	242	37,3457	02206 1			ZCADR	SERVICER		SET UP SERVICER JOB
0056					37,3460	66067 0						
0057	REF	21	LAST	745	37,3461	3 4743 0			CA	BIT9		
0058					37,3462	0 0006 1			EXTEND			
0059	REF	28	LAST	831	37,3463	05 011 1			WDR	DSALMOUT		TURN ON TEST CONNECTOR OUTPUT
0060	REF	21	LAST	857	37,3464	3 0103 0			CA	FLAGWD7		
0061	REF	6	LAST	836	37,3465	7 4747 0			MASK	AVEGFRIT		
0062					37,3466	0 0006 1			EXTEND			
0063	REF	1			37,3467	1 3517 0			BZF	AVEGDUT		AVEGFLAG DOWN - SET UP FINAL EXIT
0064	REF	6	LAST	814	37,3470	3 0102 1			CA	FLACHRD4		
0065	REF	3	LAST	707	37,3471	7 4744 0			MASK	MUNFLBIT		
0066					37,3472	0 0006 1			EXTEND			
0067	REF	1			37,3473	1 3515 1			BZF	HAKENCOS		MUNFLAG CLEAR - BYPASS LR AND DISP.
0068	REF	2	LAST	761	37,3474	10 755 1			CCS	PHASE2		
0069	REF	2	LAST	858	37,3475	1 3515 1			TCF	HAKFACCS		PHASE 2 ACTIVATED - AVOID MULTIPLE R10.
0070	REF	11	LAST	857	37,3476	3 4757 0			CAF	SEVEN		SET PIPCTR FOR 4X/SEC RATE.
0071	REF	4	LAST	829	37,3477	55'056 1			TS	PIPCTR		
0072	REF	11	LAST	795	37,3500	4 0025 1			CS	TBASE1		SET TBASE2 .05 SECONDS IN THE PAST.
0073	REF	18	LAST	858	37,3501	6 4756 1			AD	FIVE		
0074	REF	2	LAST	220	37,3502	6 4734 0			AD	NEG1/2		
0075	REF	3	LAST	858	37,3503	6 4734 0			AD	NEG1/2		
0076	REF	3	LAST	475	37,3504	57'055 0			XCH	TBASE2		

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0077	REF	3	LAST	375	37.3505	3 4361 1		CAP	DEC17	2.21SPOT FOR P10.R11
0078	REF	131	LAST	832	37.3506	54 001 1		TS	L	
0079					37.3507	4 0000 0		CON		
0080	REF	5	LAST	737	37.3510	52 755 1		DXCH	-PHASE2	
0081	REF	6	LAST	497	37.3511	3 6007 0		CAP	OCT24	FIRST R10.R11 IN .200 SECONDS.
0082	REF	35	LAST	760	37.3512	0 5203 0		TC	WAITLIST	
0083	REF	24	LAST	854	E7.1536			EBANK	UNIT/R/	
0084	REF	3	LAST	829	37.3513	02006 0		2CADR	R10.R11	
0084					37.3514	42067 0				
0085	REF	18	LAST	857	37.3515	3 4751 0	MAKEACCS	CA	FOUR	
0086	REF	1			37.3516	1 3436 1		TCF	GUREADAX	DO PHASE CHANGE AND RECALL READACCS
0087					37.3517	0 0006 1	AVEGOUT	EXTEND		
0088	REF	1			37.3520	3 3538 1		DCA	AVDUTCAD	SET UP FINAL SERVICER EXIT
0089	REF	5	LAST	834	37.3521	53 253 0		DXCH	AVGEXIT	
0090	REF	19	LAST	859	37.3522	3 4751 0		CA	FOUR	SET 5.4 SPOT FOR REPEADAC AND SERVICER
0091	REF	2	LAST	857	37.3523	0 3525 0		TC	GNUTFAZ5	IF REPEADAC IS CALLED, IT WILL EXIT
0092	REF	59	LAST	853	37.3524	0 5261 1		TC	TASKOVER	END TASK WITHOUT CALLING READACCS
0093	REF	132	LAST	859	37.3525	54 001 1	GNUTFAZ5	TS	L	SAVE INPUT IN L
0094	REF	12	LAST	858	37.3526	4 0025 1		CS	TIME1	
0095	REF	1			37.3527	55 063 1		TS	TRASE5	SET TRASE5
0096					37.3530	1 3532 1		TCF	+2	
0097	REF	133	LAST	859	37.3531	54 001 1	GNUTFAZ5	TS	L	SAVE INPUT IN L
0098	REF	134	LAST	859	37.3532	4 0001 1		CS	L	-PHASE IN A, PHASE IN L
0099	REF	2	LAST	214	37.3533	52 763 1		DXCH	-PHASE5	SET -PHASE5, PHASE5
0100	REF	208	LAST	836	37.3534	0 0002 0		TC	0	
0101	REF	44	LAST	858	E7.1515			EBANK	DVCNTR	
0102	REF	1			37.3535	03661 0	AVDUTCAD	2CADR	AVGEND	
0102	REF	1			37.3536	44067 0				
0103	REF	7	LAST	832	37.3537	65772 0	ENDJBCAD	CADR	SERVEXIT +2	
0104					37.3540	37771 1	OCT37771	OCT	37771	
0105					33.2206			BANK	33	
0106	REF	4	LAST	44	33.2000			SETLOC	SERVICES	
0107					33.2206			BANK		
0108	REF	4	LAST	44 TO 45:	12	37*		COUNT*	33/SERV	

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P0109 ***** SERVICER *****

R0111

Line	REF	LAST	Address	Value	Label	Operation	Comment
0112	REF 74	LAST 854	33,2206	0 5353 1	SERVICER TC	PHASCHND	PESTART REPEADAC + SERVICER
0113			33,2207	16035 0	DCT	16035	
0114			33,2210	20000 0	DCT	20000	
0115	REF 45	LAST 859	E7.1515		EBANK	UVCHTR	
0116	REF 1		33,2211	02217 1	2CADR	GETABVAL	
0116	REF 1		33,2212	66067 0			
0117	REF 2	LAST 336	33,2213	3 7716 0	CAF	PIPA33	INITIALIZE 1/PIPAUT IN CASE RESTART HAS CAUSED LASTBIAS TO BE SKIPPED.
0118	REF 7	LAST 336	33,2214	55'075 0	TS	1/PIPAUT	
0119	REF 237	LAST 854	33,2215	0 4616 1	TC	BANKCALL	PIPA COMPENSATION CALL
0120	REF 2	LAST 385	33,2216	15263 1	CADR	1/PIPA	
0121	REF 149	LAST 856	33,2217	0 6037 0	GETABVAL TC	INTPRET	
0122			33,2220	51575 1	VLOAD	ABVAL	
0123	REF 5	LAST 195	33,2221	00325 0		DELV	
0124			33,2222	77776 1	EXIT		
0125	REF 340	LAST 856	33,2223	3 0154 1	CA	MPAC	
0126	REF 4	LAST 793	33,2224	55'246 1	TS	ABDELV	ABDELV = CA/SEC*2(-14).
0127			33,2225	0 0006 1	EXTEND		
0128	REF 1		33,2226	7 2020 0	MP	KPIF	
0129	REF 4	LAST 843	33,2227	53'514 1	DXCH	ABDVCONV	ABDVCONV = M/CS *2(-5).
01292			33,2230	0 0006 1	EXTEND		
01294	REF 12	LAST 833	33,2231	3 1245 0	DCA	MASS	
01296	REF 3	LAST 855	33,2232	53'571 1	DXCH	MASS	INITIALIZE MASS1 IN CASE WE SKIP MASSMOM
0130	REF 13	LAST 850	33,2233	4 0104 0	CS	FLAGFLB	ARE WE ON THE SURFACE?
0131	REF 8	LAST 704	33,2234	7 4744 0	MASK	SURFEBIT	
0132			33,2235	0 0006 1	EXTEND		
0133	REF 1		33,2236	1 2254 1	BZF	MOONSPOT	YES: BYPASS MASS MESS
0134	REF 18	LAST 831	33,2237	3 0106 0	CA	FLAGFLB	NO: WHICH VEX SHOULD BE USED?
0135	REF 12	LAST 831	33,2240	7 4737 1	MASK	APSELBIT	
0136	REF 250	LAST 858	33,2241	10 000 0	CLS	A	
0137			33,2242	0 0006 1	EXTEND		IF EXTEND IS EXECUTED, APSVEX --> A.
0138	REF 3	LAST 841	33,2243	3 2001 1	DCA	APSVEX	OTHERWISE APSVEX --> A
0139	REF 209	LAST 859	33,2244	54 002 1	TS	0	
0140			33,2245	0 0006 1	EXTEND		
0141	REF 5	LAST 860	33,2246	3 1514 0	DCA	ABDVCONV	
0142			33,2247	0 0006 1	EXTEND		
0143	REF 210	LAST 860	33,2250	10 002 1	OV	0	WHERE APPROPRIATE VEX RESIDES
0144			33,2251	0 0006 1	EXTEND		
0145	REF 13	LAST 860	33,2252	7 1244 0	MP	MASS	
0149	REF 4	LAST 860	33,2253	21'571 1	DAS	MASS1	
0150	REF 3	LAST 818	33,2254	3 2021 0	MOONSPOT CA	KPIF1	IF MPAC = ABDELV AT 2(14) CP/SEC
0151	REF 9	LAST 856	33,2255	0 7307 1	TC	SHORTMP	MULTIPLY BY KPIF1 TO GET

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0152	REF 341	LAST 860	33,2256	52 155 1	DXCH	MPAC	ABDELV AT 2(7) M/CS
0153	REF 6	LAST 733	33,2257	21 510 0	DAS	DVTOTAL	UPDATE DVTOTAL FOR DISPLAY
0156	REF 1		33,2260	0 2440 0	TC	TMPTOSPT	
0157	REF 238	LAST 860	33,2261	0 4616 1	TC	BANKCALL	
0158	REF 2	LAST 601	33,2262	47615 0	CAOR	QUICKRIG	
0159	REF 1		33,2263	3 2414 1	CAF	XNBPIPAD	
0160	REF 239	LAST 861	33,2264	0 4616 1	TC	BANKCALL	
0161	REF 1		33,2265	20037 1	CAOR	FLPSHPUT	
0166	REF 150	LAST 860	33,2266	0 6037 0	TC	INTPRET	
0167			33,2267	45014 0	AVERAGEG	BOH	CALL
0168	REF 6	LAST 838	33,2270	03307 0		HONFLAG	
0169	REF 1		33,2271	67032 1		RYBETH	
0170	REF 1		33,2272	66776 1		CALCRVS	
0171			33,2273	77776 1	EXIT		
0172	REF 1		33,2274	0 3552 0	GOSERV	TC	QUICKFAZ5
0173	REF 1		33,2275	0 2423 0	COPYCYCL	TC	COPYCYC
0174					CA	ZERO	A IS ZERO ON RETURN FROM COPYCYC
0175	REF 2	LAST 817	33,2276	55 160 0	TS	PIPATHPX	STILL UNDER INHIBIT
0176	REF 2	LAST 817	33,2277	55 161 1	TS	PIPATHPY	
0177	REF 2	LAST 817	33,2300	55 162 1	TS	PIPATHPZ	
0178	REF 2	LAST 813	33,2301	4 4741 0	CS	STEERBIT	CLEAR STEERSW PRIOR TO DVMON.
0179	REF 23	LAST 857	33,2302	7 0076 1	MASK	FLAGWRD2	
0180	REF 24	LAST 861	33,2303	54 076 1	TS	FLAGTDF	
0181	REF 3	LAST 762	33,2304	3 4745 0	CAF	IDLEBIT	IS THE IDLE FLAG SET?
0182	REF 22	LAST 858	33,2305	7 0103 1	MASK	FLAGWRD7	
0183	REF 251	LAST 860	33,2306	10 000 0	CCS	A	
0184	REF 1		33,2307	1 2342 1	TCF	NO DVMON1	IDLEFLAG = 1. HENCE SET AUXFLAG TO 1.
0185	REF 7	LAST 858	33,2310	4 0102 0	CS	FLAGWRD6	
0186	REF 1		33,2311	7 4752 1	MASK	AUXFLBIT	
0187	REF 252	LAST 861	33,2312	10 000 0	CCS	7	
0188	REF 1		33,2313	1 2346 0	TCF	NO DVMON2	AUXFLAG = 0. HENCE SET AUXFLAG TO 0.
0189	REF 7	LAST 838	33,2314	4 1251 1	DVMON	CS	DVTIMUSH
0190	REF 5	LAST 860	33,2315	6 1246 0	AD	ABDELV	
0191			33,2316	0 0006 1	EXTEND		
0192	REF 1		33,2317	6 2352 1	HZMF	LETHRUST	
0193	REF 25	LAST 861	33,2320	4 0076 1	CS	FLAGWRD2	SET STEERSW.
0194	REF 3	LAST 861	33,2321	7 4741 0	MASK	STEERBIT	
0195	REF 26	LAST 861	33,2322	26 076 1	ADS	FLAGWRD2	
0196	REF 95	LAST 858	33,2323	3 4753 1	DVCNTSET	CAF	ONE
							ALLOW TWO PASSES MAXIMUM NEW THAT

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0197	REF	46	LAST	860	33,2324	55'515 0		TS	DVCNTR	THRUST HAS BEEN DETECTED.
0198	REF	19	LAST	860	33,2325	3 0106 0		CA	FLGWRD10	BRANCH IF APSFLAG IS SET.
0199	REF	13	LAST	860	33,2326	7 4737 1		MASK	APSFLBIT	
0200	REF	253	LAST	861	33,2327	10 000 0		CCS	A	
0201	REF	1			33,2330	1 2375 0		TCF	USEJETS	
0202	REF	22	LAST	858	33,2331	3 4743 0		CA	BIT9	CHECK GIMBAL FAIL BIT
0203					33,2332	0 0006 1		EXTEND		
0204	REF	3	LAST	191	33,2333	02 032 1		RAND	CHAN32	
0205					33,2334	0 0006 1		EXTEND		
0206	REF	2	LAST	862	33,2335	1 2375 0		BZF	USEJETS	
0207	REF	2	LAST	760	33,2336	4 4736 0	USEGTS	CS	USEJETS	
0208	REF	29	LAST	831	33,2337	7 0111 1		MASK	DAPBOOLS	
0209	REF	30	LAST	862	33,2340	54 111 1		TS	DAPBOOLS	
0210	REF	1			33,2341	1 2400 0		TCF	SERVOUT	
0211	REF	2	LAST	861	33,2342	4 4752 1	NODVHON1	CS	AUXFLBIT	SET AUXFLAG TO 0.
0212	REF	8	LAST	861	33,2343	7 0102 0		MASK	FLAGWRD6	
0213	REF	9	LAST	862	33,2344	54 102 0		TS	FLAGWRD6	
0214	REF	3	LAST	862	33,2345	1 2375 0		TCF	USEJETS	
0215	REF	10	LAST	862	33,2346	4 0102 0	NODVHON2	CS	FLAGWRD6	SET AUXFLAG TO 1.
0216	REF	3	LAST	862	33,2347	7 4752 1		MASK	AUXFLBIT	
0217	REF	11	LAST	862	33,2350	26 102 0		ADS	FLAGWRD6	
0218	REF	4	LAST	862	33,2351	1 2375 0		TCF	USEJETS	
0219	REF	2	LAST	861	33,2352	0 3552 0	LOTHRUST	TC	QUICKFAZ5	
0220	REF	47	LAST	862	33,2353	11'515 0		CCS	DVCNTR	
0221	REF	1			33,2354	1 2366 1		TCF	DECCNTR	
0222	REF	1			33,2355	10 761 0		CCS	PHASE4	COMFAIL JOB ACTIVE?
02222	REF	2	LAST	862	33,2356	1 2400 0		TCF	SERVOUT	YES - WON'T NEED ANOTHER.
02224	REF	75	LAST	860	33,2357	0 5353 1		TC	PHASCHNG	4.57SPOT FOR COMFAIL.
02226					33,2360	00374 1		OCT	00374	
02228	REF	4	LAST	716	33,2361	3 7713 0		CAF	PR1025	
0223	REF	22	LAST	857	33,2362	0 5072 1		TC	NOVAC	
02232	REF	30	LAST	853	E7.1455			EBANK	HIGH	
02234	REF	2	LAST	242	33,2363	02571 0		2CADR	COMFAIL	
02234					33,2364	74067 0				
02236	REF	3	LAST	862	33,2365	1 2400 0		TCF	SERVOUT	
0224	REF	1			33,2366	55'570 0	DECCNTR	TS	DVCNTR1	
0225	REF	3	LAST	862	33,2367	0 3552 0		TC	QUICKFAZ5	
0226	REF	2	LAST	862	33,2370	3 1570 1		CA	DVCNTR1	
0227	REF	48	LAST	862	33,2371	55'515 0		TS	DVCNTR	
0228					33,2372	0 0004 0		INHINT		
0229	REF	43	LAST	854	33,2373	0 4674 0		TC	IBNKCALL	IF THRUST IS LOW, NO STEERING IS DONE

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0230	REF	6	LAST	813	33,2374	40165 1		CADR	STOPRATE	AND THE DESIRED RATES ARE SET TO ZERO.
0231	REF	31	LAST	862	33,2375	4 0111 1	USEJETS	CS	GAPBOULS	
0232	REF	3	LAST	862	33,2376	7 4736 0		MASK	USEJETS	
0233	REF	32	LAST	863	33,2377	26 111 1		ADS	EAPBOULS	
0234					33,2400	0 0003 1	SERVOUT	RELINT		
0235	REF	240	LAST	861	33,2401	0 4616 1		TC	BANKCALL	
0236	REF	1			33,2402	40457 0		CADR	1/ACCS	
0239	REF	11	LAST	269	33,2403	3 0167 1		CA	PRIORITY	
0240	REF	8	LAST	430	33,2404	7 5004 1		MASK	LOW9	
0241	REF	8	LAST	806	33,2405	54 166 1		TS	PUSHLOC	
0242					33,2406	22 007 0		ZL		
0243	REF	25	LAST	825	33,2407	52 121 1		DXCH	FIXLOC	FIXLOC AND OVERIND
0244	REF	4	LAST	862	33,2410	0 3552 0		TC	QUICKFAZ5	
0245					33,2411	0 0006 1		EXTEND		EXIT TO SELECTED ROUTINE WHETHER THERE
0246	REF	6	LAST	859	33,2412	3 1253 1		DCA	AVGEXIT	IS THRUST OR NOT. THE STATE OF STEPSW
0247	REF	21	LAST	755	33,2413	52 006 0		DXCH	Z	WILL CONVEY THIS INFORMATION.
02475	REF	7	LAST	851	33,2414	02145 0	XNBPIPAD	ELADR	XNBPIP	
0248					32,3770			BANK	32	
0249	REF	1			22,2000			SETLOC	SERV2	
0250					22,3661			BANK		
0251	REF	1						COUNT*	11/SERV	
0252	REF	19	LAST	852	22,3661	3 1235 1	AVGENO	CA	PIPELINE +1	FINAL AVERAGE G EXIT
0253	REF	8	LAST	860	22,3662	55 075 0		TS	1/PIPADT	SET UP FREE FALL GYRO COMPENSATION.
0254	REF	55	LAST	853	22,3663	0 5504 0		TC	DRIFTFLAG	SET DRIFT FLAG.
0255	REF	1			22,3664	00036 1		ADRES	DRIFTFLG	
0256	REF	241	LAST	863	22,3665	0 4616 1		TC	BANKCALL	
0257	REF	1			22,3666	17310 0		CADR	PIPFREE	
0258	REF	23	LAST	862	22,3667	4 4743 1		CS	BIT9	
0259					22,3670	0 0006 1		EXTEND		
0260	REF	29	LAST	858	22,3671	03 011 1		WAND	DSALMOUT	
0261	REF	10	LAST	762	22,3672	0 5327 1		TC	2PHSCHNG	
0262					22,3673	00005 1		DCT	5	GROUP 5 OFF
0263					22,3674	05022 1		DCT	05022	GROUP 2 ON
0264					22,3675	20000 0		DCT	20000	
0265	REF	151	LAST	861	22,3676	0 6037 0		TC	INTERPT	
0266					22,3677	43014 0		SET	CLEAR	
0267	REF	2	LAST	850	22,3700	01464 0			ROR29FLG	SHUT OFF R29 WHEN SERVICER ENDS.
0268	REF	1			22,3701	03664 0			SPANDISP	SHUT OFF R10 WHEN SERVICER ENDS.
0269					22,3702	45014 0		CLEAR	CALL	RESET MUNFLAG.
0270	REF	7	LAST	861	22,3703	03267 1			MUNFLAG	

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0271	REF	1		22.3704	27467 1			AVERTMID	
0272				22.3705	77414 0		CLEAR	EXIT	
0273	REF	1		22.3706	03671 1			V37FLAG	
0274	REF	3	LAST 857	22.3707	3 1260 1	AVERTAN	CA	OUTROUTE	RETURN TO DESIRED POINT.
0275	REF	14	LAST 748	22.3710	0 4640 1		TC	BANK JUMP	
0276	REF	1		22.3707		OUTGOAVE	=	AVERTRN	
0277	REF	5	LAST 860	27.1570		DVCNTRL	=	PASSI	

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P0278

02782	REF	1		27,2000		SETLOC SERV3		
02784				27,3321		BANK		
02786	REF	1				COUNT* 33/SERV		
0279				27,3321	0 0006 1	SERVIDLE	EXTEND	
0280	REF	1		27,3322	3 3357 0	DCA	SVEATAD	
0281	REF	7	LAST	863	27,3323	53 253 0	DXCH	AVGEXIT
0282	REF	23	LAST	861	27,3324	4 0103 1	CS	FLAGWRD7
0283	REF	4	LAST	861	27,3325	7 4745 1	MASK	IDLEFBIT
0284	REF	24	LAST	865	27,3326	26 103 1	ADS	FLAGWRD7
0285	REF	5	LAST	831	27,3327	3 4735 1	CAP	LBRYBIT
0286	REF	15	LAST	831	27,3330	54 107 0	TS	FLAGWRD11
0287				27,3331	0 0006 1	EXTEND		
0288	REF	18	LAST	832	27,3332	3 4755 1	DCA	NEGO
0289	REF	5	LAST	832	27,3333	52 753 1	DXCH	-PHASE1
0290	REF	12	LAST	862	27,3334	3 0102 1	CA	FLAGWRD
0291	REF	4	LAST	858	27,3335	7 4744 0	MASK	MUNFLBIT
0292	REF	254	LAST	862	27,3336	10 000 0	CCS	A
0293				27,3337	1 3343 1	TCF	+4	
0294				27,3340	0 0006 1	EXTEND		
0295	REF	19	LAST	865	27,3341	3 4755 1	DCA	NEGO
0296	REF	6	LAST	859	27,3342	52 755 1	DXCH	-PHASE2
0297				27,3343	0 0006 1	+4	EXTEND	
0298	REF	20	LAST	865	27,3344	3 4755 1	DCA	NEGO
0299	REF	5	LAST	832	27,3345	52 757 0	DXCH	-PHASE3
0300				27,3346	0 0006 1	EXTEND		
0301	REF	21	LAST	865	27,3347	3 4755 1	DCA	NEGO
0302	REF	4	LAST	832	27,3350	52 765 1	DXCH	-PHASE4
0303	REF	2	LAST	224	27,3351	3 4764 0	CAP	ECT33
0304	REF	135	LAST	859	27,3352	54 001 1	TS	L
0305				27,3353	4 0000 0	LUM		
0306	REF	8	LAST	832	27,3354	52 761 0	DXCH	-PHASE4
0307	REF	1		27,3355	1 5644 0	TCF	WHIMPER	
A0308								
A0309								
A0310								
A0311								
0312	REF	49	LAST	862	27,1515		EBANK= DVCHTR	

DISCONNECT SERVICER FROM ALL GUIDANCE

DISCONNECT THE DELTA-V MONITOR

PREPARE P.2 IF RUNNING.

DO NOT TURN OFF PHASE 2 IF MUNFLAG SET.

PERFORM A SOFTWARE RESTART AND PROCEED TO GOTOPDWH WHILE SERVICER CONTINUES TO RUN, ALTHOUGH IN A GROUND STATE WHERE ONLY STATE-VECTOR DEPENDENT FUNCTIONS ARE MAINTAINED.

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0313	REF	8	LAST	859	27.3356	03770 1	SVEXTAOR	2CAGR	SERVEXIT
0313					27.3357	64067 1			
0314					32.3770		BANK	32	
0315	REF	1			32.2000		SETLOC	SEAV	
0316					32.3770		BANK		
0317	REF	1					COUNT*	45/SEAV	
0318	REF	76	LAST	862	32.3770	0 5353 1	SERVEXIT	TC	PHASCHNG
0319					32.3771	00035 1		LCT	00035
0320	REF	132	LAST	850	32.3772	1 5155 1	+2	TCF	ENDOFJOB
0321					23.2461			BANK	23
0322	REF	1			23.2000			SETLOC	NORMLIZ
0323					23.2461			BANK	
0324	REF	1						COUNT*	45/SEAV

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P0325 NORMLIZE AND COPYCYCL

0326	REF 152	LAST 863	23,2461	0 6037 0	NORMLIZE TC	INTERPRET	
0327			23,2462	43175 0	VLOAD	BUFF	
0328	REF 3	LAST 149	23,2463	03545 0		RNI	
0329	REF 8	LAST 863	23,2464	03347 1		MUNFLAG	
0330	REF 1		23,2465	66415 1		NORMLIZ1	
0331			23,2466	64252 0	VSL6	MXV	
0332	REF 32	LAST 842	23,2467	01734 0		REFSMAT	
0333	REF 19	LAST 845	23,2470	37521 0	STCALL	F	
0334	REF 4	LAST 839	23,2471	67130 1		MUNGRAV	
0335			23,2472	76575 1	VLOAD	VSL1	
0336	REF 4	LAST 779	23,2473	03553 1		VNI	
0337			23,2474	77721 0	MXV		
0338	REF 33	LAST 867	23,2475	01734 0		REFSMAT	
0339	REF 12	LAST 845	23,2476	27527 1	STOVL	V	
0340	REF 4	LAST 734	23,2477	01726 0		V(CSM)	
0341			23,2500	53435 0	VXV	UNIT	
0342	REF 4	LAST 734	23,2501	01720 0		R(CSM)	
0343	REF 3	LAST 151	23,2502	03720 1	STORE	UHYP	
0344			23,2503	77776 1	ASCSPOT EXIT		
0345			23,2504	0 0006 1	EXTEND		MAKE SURE GROUP 2 IS OFF.
0346	REF 22	LAST 865	23,2505	3 4755 1	DCA	REGG	
0347	REF 7	LAST 865	23,2506	52 755 1	DXCH	-PHASE2	
0348	REF 53	LAST 853	23,2507	0 4635 0	TC	POSTJUMP	
03482	REF 1		23,2510	66420 1	CADR	NORMLIZ2	
03483			33,2415		BANK 33		
03484	REF 5	LAST 859	33,2000		SETLOC	SERVICES	
03485			33,2415		BANK		
03486	REF 5	LAST 859 TO 863:	135	172*	COUNT*	33/SERV	
0349			33,2415	77624 1	NORMLIZ1 CALL		
0350	REF 1		33,2416	66730 0		CALCGRV	
0351			33,2417	77776 1	EXIT		
0352	REF 1		33,2420	3 2437 0	NORMLIZ2 CA	EIGHTERN	
0353	REF 2	LAST 861	33,2421	0 2424 1	TC	COPYCYC +1	DO NOT COPY MASS IN NORMLIZ2
0354	REF 133	LAST 866	33,2422	0 5155 0	TC	ENDOFJOB	
0355	REF 7	LAST 859	33,2423	3 6007 0	COPYCYC CA	OCT24	DEC 20
0356			33,2424	0 0004 0	+1	INHINT	
0357	REF 4	LAST 333	33,2425	7 7747 0	+2	MASK	REGG
0358	REF 31	LAST 751	33,2426	54 061 1	TS	ITEMP1	REDUCE BY 1 IF ODD
0359			33,2427	0 0006 1	EXTEND		
0360	REF 32	LAST 867	33,2430	5 0061 0	INDEX	ITEMP1	
0361	REF 4	LAST 867	33,2431	3 1545 1	DCA	RNI	
0362	REF 33	LAST 867	33,2432	50 061 0	INDEX	ITEMP1	

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0363	REF	13	LAST	791	33,2433	53'221 0
0364	REF	34	LAST	867	33,2434	10 061 1
0365	REF	3	LAST	867	33,2435	1 2425 1
0366	REF	211	LAST	800	33,2436	0 0002 0

DACH
CCS
TLF
TC

FW
111 MPI
COPYCVC +2
5

RETURN UNDER INHINT

0367 33,2437 00022-1 EIGHTEEN DEC 18

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P0368 ***** PIPA READER *****

R0369 MOD NO. 00 BY D. LICKLY DEC.9 1966

R0370 FUNCTIONAL DESCRIPTION

R0371 SUBROUTINE TO READ PIPA COUNTERS, TRYING TO BE VERY CAREFUL SO THAT IT WILL BE RESTARTABLE.
 R0373 PIPA READINGS ARE STORED IN THE VECTOR DELV. THE HIGH ORDER PART OF EACH COMPONENT CONTAINS THE PIPA READING.
 R0375 RESTARTS BEGIN AT REHEADAC.

R0376 AT THE END OF THE PIPA READER THE CDUS ARE READ AND STORED AS A
 R0377 VECTOR IN CDUTEMP. THE HIGH ORDER PART OF EACH COMPONENT CONTAINS
 R0378 THE CDU READING IN 2S COMP IN THE ORDER CDUX.Y.Z. THE THRUST
 R0379 VECTOR ESTIMATOR IN FINDCDUD REQUIRES THE CDUS BE READ AT PIPTIME.

R0380 CALLING SEQUENCE AND EXIT

R0381 CALL VIA TC, ISWCALL, ETC.

R0382 EXIT IS VIA Q.

R0383

R0384 INPUT

R0385 INPUT IS THROUGH THE COUNTERS PIPAX, PIPAY, PIPAZ, AND TIMEZ.

R0386 OUTPUT

R0387 HIGH ORDER COMPONENTS OF THE VECTOR DELV CONTAIN THE PIPA READINGS.
 R0388 PIPTIME CONTAINS TIME OF PIPA READING.

R0389 DEBRIS (ERASABLE LOCATIONS DESTROYED BY PROGRAM)

R0390 TEMX TEMY TEMZ PIPAGE

0391		37.3541	BANK 37
0392	REF 2 LAST 857	37.2000	SETLOC SERVI
0393		37.3541	BANK

0394	REF 2 LAST 857 TO 859:	89	89*	COUNT* 11/SERV
------	------------------------	----	-----	----------------

0395		37.3541	0 0000 1	PIPASK	EXTEND
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0396	REF	26	LAST	831	37,3542	3-0025-0	DCA	TIME2	
0397	REF	8	LAST	802	37,3543	53'561-0	DXCH	PIPTIME1	CURRENT TIME POSITIVE VALUE
0398	REF	159	LAST	856	37,3544	4-4755-0	+3 CS	ZERO	INITIALIZE THESE AT NEG. ZERO.
0399	REF	5	LAST	817	37,3545	55'254-1	TS	TEMX	
0400	REF	4	LAST	817	37,3546	55'255-0	TS	TEMY	
0401	REF	4	LAST	817	37,3547	55'256-0	TS	TEMZ	
0402	REF	160	LAST	870	37,3550	3-4755-1	CA	ZERO	
0403	REF	4	LAST	384	37,3551	54-330-0	TS	DELVZ	
04031	REF	5	LAST	870	37,3552	54-331-1	TS	DELVZ +1	
0404	REF	5	LAST	384	37,3553	54-326-1	TS	DELVY	
04041	REF	6	LAST	870	37,3554	54-327-0	TS	DELVY +1	
04042	REF	9	LAST	385	37,3555	54-325-1	TS	DELVX +1	
0405	REF	5	LAST	858	37,3556	55'257-1	TS	PIPAGE	SHOW PIPA READING IN PROGRESS
0406					37,3557	0-0006-1	REPIPI	EXTEND	
0407	REF	9	LAST	816	37,3560	4-0040-1	DCS	PIPAZ	X-AND-Y-PIPS-READ
0408	REF	6	LAST	870	37,3561	53'255-0	DXCH	TEMX	
0409	REF	10	LAST	870	37,3562	52-040-1	DXCH	PIPAZ	PIPAS SET TO NEG ZERO AS READ.
0410	REF	10	LAST	870	37,3563	54-324-0	TS	DELVX	
0411	REF	7	LAST	870	37,3564	22-326-0	LXCH	DELVY	
0412	REF	4	LAST	816	37,3565	4-0041-0	REPIPI3	CS	PIPAZ
0413	REF	5	LAST	870	37,3566	57'256-1	XCH	TEMZ	REPEAT PROCESS FOR 2 PIP
0414	REF	5	LAST	870	37,3567	56-041-1	XCH	PIPAZ	
0415	REF	6	LAST	870	37,3570	54-330-0	DODELVZ	TS	DELVZ
0416					37,3571	0-0006-1	REPIPI4	EXTEND	COMPUTE GUIDANCE PERIOD
0417	REF	9	LAST	870	37,3572	3-1561-1	DCA	PIPTIME1	
0418	REF	2	LAST	105	37,3573	53'250-0	DXCH	PGUIDE	
0419					37,3574	0-0006-1	EXTEND		
0420	REF	20	LAST	863	37,3575	4-1235-0	DCS	PIPTIME	
0421	REF	3	LAST	870	37,3576	21'250-0	DAS	PGUIDE	
0422	REF	13	LAST	606	37,3577	3-0032-0	CA	CDUX	READ CDUX INTO HIGH ORDER CDUTEMP
0423	REF	1			37,3600	55'155-0	TS	CDUTEMPX	
0424	REF	5	LAST	606	37,3601	3-0033-1	CA	CDUY	
0425	REF	1			37,3602	55'156-0	TS	CDUTEMPY	
0426	REF	7	LAST	601	37,3603	3-0034-0	CA	CDUZ	
0427	REF	1			37,3604	55'157-1	TS	CDUTEMPZ	
0428	REF	11	LAST	870	37,3605	3-0324-1	CA	DELVX	
0429	REF	3	LAST	861	37,3606	55'160-0	TS	PIPATMPX	
0430	REF	8	LAST	870	37,3607	3-0326-0	CA	DELVY	
0431	REF	3	LAST	861	37,3610	55'161-1	TS	PIPATMPY	
0432	REF	7	LAST	870	37,3611	3-0330-1	CA	DELVZ	
0433	REF	3	LAST	861	37,3612	55'162-1	TS	PIPATMPZ	
0434	REF	212	LAST	868	37,3613	0-0002-0	TC	Q	

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0435	REF	6	LAST	870	37.3614	11.257 1	RELEADAC	CCS	PIPAGE	
0436	REF	1			37.3615	1 3441 1		TCF	READACCS	PIP READING NOT STARTED. GO TO BEGINNING
0437	REF	1			37.3616	3 3654 0		CAF	DOSEADP	SET UP RETURN FROM PIPASE
0438	REF	213	LAST	870	37.3617	54 002 1		TS	0	
0439	REF	8	LAST	870	37.3620	10 330 0		CCS	DELVZ	
0440	REF	1			37.3621	1 3571 0		TCF	REP1P4	Z DONE. GO DO CDUS
0441					37.3622	1 3625 1		TCF	+3	Z NOT DONE, CHECK Y.
0442	REF	2	LAST	871	37.3623	1 3571 0		TCF	REP1P4	
0443	REF	3	LAST	871	37.3624	1 3571 0		TCF	REP1P4	
0444					37.3625	22 007 0		ZL		
0445	REF	9	LAST	870	37.3626	10 326 1		CCS	DELVY	
0446					37.3627	1 3632 1		TCF	+3	
0447	REF	1			37.3630	1 3641 0		TCF	CHKTEMX	Y NOT DONE, CHECK X.
0448					37.3631	1 3632 1		TCF	+1	
0449	REF	6	LAST	870	37.3632	22 041 1		LXCH	PIPAZ	Y DONE, ZERO Z PIP.
0450	REF	6	LAST	870	37.3633	11.256 0		CCS	TEMZ	
0451	REF	7	LAST	871	37.3634	4 1256 0		CS	TEMZ	TEMZ NOT = -0. CONTAINS -PIPAZ VALUE.
0452	REF	1			37.3635	1 3570 1		TCF	DODELVZ	
0453					37.3636	1 3634 1		TCF	-2	
0454	REF	9	LAST	871	37.3637	22 330 1		LXCH	DELVZ	TEMZ = -0. L HAS ZPIP VALUE.
0455	REF	4	LAST	871	37.3640	1 3571 0		TCF	REP1P4	
0456	REF	7	LAST	870	37.3641	11.254 1	CHKTEMX	CCS	TEMX	HAS THIS CHANGED
0457	REF	8	LAST	871	37.3642	4 1254 1		CS	TEMX	YES
0458					37.3643	1 3646 1		TCF	+3	YES
0459					37.3644	1 3642 0		TCF	-2	YES
0460	REF	1			37.3645	1 3557 1		TCF	REP1P1	NO
0461	REF	12	LAST	870	37.3646	54 324 0		TS	DELVX	
0462	REF	5	LAST	870	37.3647	4 1255 0		CS	TEMY	
0463	REF	10	LAST	871	37.3650	54 326 1		TS	DELVY	
0464	REF	161	LAST	870	37.3651	4 4755 0		CS	ZERO	ZERO X AND Y PIPS
0465	REF	11	LAST	870	37.3652	52 040 1		DXCH	PIPAZ	L STILL ZERO FROM ABOVE
0466	REF	1			37.3653	1 3565 0		TCF	REP1P3	
0467	REF	1			37.3654	03451 1	DOSEADR	GENADR	PIPSDONE	

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0468 33,2440 BANK 33
 0469 REF 6 LAST 867 33,2000 SETLOC SERVICES
 0470 33,2440 BANK

0471 REF 6 LAST 867 TO 869: 19 191* COUNT* 33/SERV

0472 REF 2 LAST 870 33,2440 3 1156 1 TMPTUSPT CA CDUTEMPY
 0473 REF 1 33,2441 54 766 1 TS CDUSPTY
 0474 REF 2 LAST 870 33,2442 3 1157 0 CA CDUTEMPZ
 0475 REF 1 33,2443 54 770 0 TS CDUSPTZ
 0476 REF 2 LAST 870 33,2444 3 1155 1 CA CDUTEMPX
 0477 REF 1 33,2445 54 772 1 TS CDUSPTX
 0478 REF 214 LAST 871 33,2446 0 0002 0 TC 0

THIS SUBROUTINE, CALLED BY AN RTE FROM
 INTERPRETIVE, LOADS THE CDUS CORRESPON-
 DING TO PIPTIME INTO THE CDUSPT VECTOR.

R0479 LRHTASK IS A WAITLIST TASK SET BY READACCS DURING THE DESCENT BRAKING
 R0480 PHASE WHEN THE ALT TO THE LUNAR SURFACE IS LESS THAN 25,000 FT. THIS
 R0481 TASK CLEARS THE ALTITUDE MEASUREMENT MADE DISCRETE AND INITIATES THE
 R0482 LANDING RADAR MEASUREMENT JOB (LRHJOB) TO TAKE A ALTITUDE MEASUREMENT
 R0483 50 MS PRIOR TO THE NEXT READACCS TASK.

0484 21,2130 BANK 21
 0485 REF 2 LAST 42 21,2000 SETLOC R10
 0486 21,2130 BANK

0487 REF 1 COUNT* 33/SERV

0488 REF 16 LAST 865 21,2130 4 0107 0 LRHTASK CS FLGWRD11
 0489 REF 6 LAST 865 21,2131 7 4735 0 MASK LRBYPBIT
 0490 21,2132 0 0006 1 EXTEND
 0491 REF 1 21,2133 1 2150 0 BZF GRP2OFF

LR BYPASS SET - BYPASS ALL LR READING.

0492 REF 1 21,2134 3 4746 0 CA READLBIT
 0493 REF 17 LAST 872 21,2135 7 0107 0 MASK FLGWRD11
 0494 21,2136 0 0006 1 EXTEND
 0495 REF 2 LAST 872 21,2137 1 2150 0 BZF GRP2OFF

IS READLR FLAG SET?

NO. BYPASS LR READ.

0496 REF 18 LAST 872 21,2140 4 0107 0 CS FLGWRD11
 0497 REF 1 21,2141 7 4742 0 MASK NOLRRBIT
 0498 21,2142 0 0006 1 EXTEND
 0499 REF 3 LAST 872 21,2143 1 2150 0 BZF GRP2OFF

IS LR READ INHIBITED?

YES. BYPASS LR READ.

0500 REF 1 21,2144 3 7720 0 CA PF1032
 0501 REF 23 LAST 862 21,2145 0 5072 1 TC XCVAC
 0502 REF 3 LAST 201 E7,1654 EBANK HMEAS
 0503 REF 1 21,2146 03716 1 2CADR LRHJOB
 0503 REF 1 21,2147 70067 1
 0504 21,2150 0 0006 1 GRP2OFF EXTEND
 0505 REF 23 LAST 867 21,2151 3 4755 1 DCA NEG0
 0506 REF 8 LAST 867 21,2152 52 755 1 DXCH -PHASE2
 0507 REF 1 21,2153 1 2021 1 TCF R10,R11A

LR READ OK SET JOB TO DO IT
 ABOUT 50 MS PRIOR TO PIPA READ

L ~~SERVICER~~

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0508 33,2447 BANK 33
 0509 REF 7 LAST 872 33,2000 SETLOC SERVICES
 0510 33,2447 BANK

0511 REF 7 LAST 872 TO 872: 7 198* COUNT* 33/SERV

R0512 HIGATASK IS ENTERED APPROXIMATELY 6 SECS PRIOR TO HIGATE DURING THE
 R0513 DESCENT PHASE. HIGATASK SETS THE HIGATE FLAG (BIT11) AND THE LR INHIBIT
 R0514 FLAG (BIT10) IN LRSTAT. THE HIGATASK IS SET UP TO REPOSITION THE LR
 R0515 ANTENNA FROM POSITION 1 TO POSITION 2. IF THE REPOSITIONING IS
 R0516 SUCCESSFUL THE ALT BEAM AND VELOCITY BEAMS ARE TRANSFERRED TO THE NEW
 R0517 ORIENTATION IN NB COORDINATES AND STORED IN ERASABLE.

0518				33,2447	0 0004 0	HIGATASK INHINT		
0519	REF	11	LAST	706	33,2450	4 5015 1	CS	PR103 SET HIGATE AND LR INHIBIT FLAS
0520	REF	19	LAST	872	33,2451	7 0107 0	MASK	FL00011
0521	REF	12	LAST	873	33,2452	6 5015 0	AD	PR103
0522	REF	20	LAST	873	33,2453	54 107 0	TS	FL00011
0523	REF	2	LAST	872	33,2454	3 7720 0	CAF	PR1032
0524	REF	39	LAST	858	33,2455	0 5105 0	TC	FL00011 SET LR POSITIONING JOB (POS2)
0525	REF	4	LAST	872	E7,1654		EBANK	HMEAS
0526	REF	1			33,2456	03670 0	ZCADR	HIGATJOB
0526	REF	1			33,2457	66067 0		
0527	REF	1			33,2460	1 2540 0	TCF	CONT SERV CONTINUE SERVICER

L SERVICER

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P0528 MUNRETRN IS THE RETURN LOC FROM SPECIAL AVE G ROUTINE (MUNREVG)

0529 33.2461 77776 1 MUNRETRN EXIT

0530 REF 21 LAST 873 33.2462 4 0107 0
 0531 REF 7 LAST 872 33.2463 7 4735 0
 0532 33.2464 0 0006 1
 0533 REF 1 33.2465 1 2546 0

CS FLGRD11
 MASK LGRYBIT
 EXTEND
 BZF COPYCYC1

BYPASS LR LOGIC IF BIT15 IS SET.

0534 REF 2 LAST 872 33.2466 3 4746 0
 0535 REF 22 LAST 874 33.2467 7 0107 0
 0536 33.2470 0 0006 1
 0537 REF 1 33.2471 1 2721 0

CA HEADLBIT
 MASK FLGRD11
 EXTEND
 BZF BSKCHK

SEE IF ALT < 35000 FT LAST CYCLE

ALT WAS > 35000 FT LAST CYCLE CHK NOW

0538 REF 1 33.2472 3 4743 0
 0539 REF 23 LAST 874 33.2473 7 0107 0
 0540 33.2474 0 0006 1
 0541 REF 1 33.2475 1 2710 1

CAF XREFLBIT
 MASK FLGRD11
 EXTEND
 BZF XERCHK

WERE WE BELOW 30000 FT LAST PASS?

NO - TEST THIS PASS

0542 REF 1 33.2476 3 4741 1
 0543 REF 24 LAST 874 33.2477 7 0107 0
 0544 33.2500 0 0006 1
 0545 REF 1 33.2501 1 2515 0

CAF PSTHIBIT
 MASK FLGRD11
 EXTEND
 BZF HIGATCHK

CHECK FOR HIGATE

NOT AT HIGATE LAST CYCLE-CHK THIS CYCLE

0546 REF 27 LAST 822 33.2502 3 4745 0
 0547 33.2503 0 0006 1
 0548 REF 22 LAST 789 33.2504 02 033 0
 0549 33.2505 0 0006 1

CAF BIT7
 EXTEND
 RAND CHAN33
 EXTEND

VERIFY LR IN P052

0550 REF 1 33.2506 1 3155 1
 0551 REF 35 LAST 836 33.2507 3 4737 0
 0552 33.2510 0 0006 1
 0553 REF 50 LAST 785 33.2511 02 012 0

BZF UPDATCHK
 CAF BIT13
 EXTEND
 RAND CHAN12
 EXTEND

IT IS-CHECK FOR LR UPDATE
NOT IN P052-MAYBE REPOSITIONING

0554 33.2512 0 0006 1
 0555 REF 1 33.2513 1 2536 1
 0556 REF 2 LAST 873 33.2514 1 2540 0

BZF LRPOSALH
 TCF CONTSERV

LR NOT IN P052 OR REPOSITIONING-BAD
LR BEING REPOSITIONED-CONTINUE SERV

0557 REF 20 LAST 826 33.2515 3 1642 0
 0558 REF 1 33.2516 6 1427 1
 0559 33.2517 0 0006 1
 0560 REF 1 33.2520 6 2531 1

HIGATCHK CA TTF/4
 AD PFCRTIME
 EXTEND
 BZMF POSCHK

IS TTF > CRITERION? (TTF IS NEGATIVE)

NO

0561 REF 3 LAST 279 33.2521 3 4741 1
 0562 REF 33 LAST 852 33.2522 56 003 1
 0563 REF 136 LAST 865 33.2523 54 001 1

CA EBANK4
 XCH EBANK
 TS L

MUST SWITCH EBANKS

SAVE IN L

05635 REF 8 LAST 863 33.2524 4 1545 0
 0564 REF 9 LAST 874 33.2524 4 1545 0
 056405 REF 50 LAST 865 33.2525 22 003 1
 05641 REF 34 LAST 874 33.2525 22 003 1
 05642 REF 1 33.2526 6 1430 1

EBANK= XNBP1P
 CS XNBP1P
 EBANK= DVCONTR
 LXCH FBANK
 AD RPORTQSW

UXGXP IN GSUP CH5

RESTORE FBANK
QSW - UXGXP

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05643					33,2527	0-0006-1		EXTEND		
05644	REF	1			33,2530	6-2447-1		BZMF	HIGATASK	IF-UXBXP->-QSW, THEN-REPOSITION
0565	REF	42	LAST	821	33,2531	3-4746-0	POSICLK	LAF	BIT6	HIGATE NOT IN SIGHT-DO POSI CHK
0566					33,2532	0-0006-1		EXTEND		
0567					33,2533	02-033-0		RAND	35	
0568					33,2534	0-0006-1		EXTEND		
0569	REF	2	LAST	874	33,2535	1-3155-1		BZF	UPDATCHK	LR-IN-POSI-CHECK FOR LR UPDATE
0570	REF	34	LAST	826	33,2536	0-5567-0	LRPOSALM	TC	ALARM	LR NOT IN PROPER POS-ALARM-BYPASS UPDATE
0571					33,2537	0-0511-1		OCT	511	AND-CONTINUE-SERVICER
0572					33,2540	0-0004-0	CONTSERV	INHINT		
0573	REF	1			33,2541	4-3154-0		CS	BITS4-7	
0574	REF	25	LAST	874	33,2542	7-0107-0		MASK	FLGWRD11	CLEAR LR MEASUREMENT-MADE DISCRETES.
0575	REF	26	LAST	875	33,2543	54-107-0		TS	FLGWRD11	
0576	REF	44	LAST	862	33,2544	0-4674-0		TC	IBNKCALL	SET LR LITES PROPERLY
05761	REF	1			33,2545	53607-0		CADP	112LITES	

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0620 REF 5 LAST 876 33,2621 03601 0
 0621 33,2622 63552 0
 0622 33,2623 77671 1
 0623 33,2624 47075 0
 0624 REF 1 33,2625 26030 0
 0625 REF 4 LAST 876 33,2626 21612 1
 0626 33,2627 77776 1
 0627 33,2630 0 0004 0
 0628 REF 27 LAST 876 33,2631 3 1536 0
 0629 REF 3 LAST 151 33,2632 55 743 1
 0630 REF 28 LAST 877 33,2633 3 1540 1
 0631 REF 4 LAST 877 33,2634 55 744 0
 0632 REF 29 LAST 877 33,2635 3 1542 0
 0633 REF 5 LAST 877 33,2636 55 745 1
 0634 REF 342 LAST 861 33,2637 3 0154 1
 0635 REF 2 LAST 151 33,2640 55 716 1

COPYCYC2

EXIT

INHINT

CA UNIT/R/

TS RUNIT

CA UNIT/R/ +2

TS RUNIT +1

CA UNIT/R/ +4

TS RUNIT +2

CA MPAC

TS DALTRATE

LEAVE ALTITUDE RATE COMPENSATION IN MPAC

UPDATE RUNIT FOR R10.

LOAD NEW DALTRATE FOR R10.

0636 33,2641 0 0006 1
 0637 REF 4 LAST 876 33,2642 3 1573 1
 0638 REF 20 LAST 867 33,2643 53 521 1
 0639 33,2644 0 0006 1
 0640 REF 5 LAST 877 33,2645 3 1575 1
 0641 REF 21 LAST 877 33,2646 53 523 0
 0642 33,2647 0 0006 1
 0643 REF 6 LAST 877 33,2650 3 1577 0
 0644 REF 22 LAST 877 33,2651 53 525 0
 0645 33,2652 0 0006 1
 0646 REF 6 LAST 877 33,2653 3 1601 1
 0647 REF 13 LAST 867 33,2654 53 527 1
 0648 33,2655 0 0006 1
 0649 REF 7 LAST 877 33,2656 3 1603 0
 0650 REF 14 LAST 877 33,2657 53 531 0
 0651 33,2660 0 0006 1
 0652 REF 8 LAST 877 33,2661 3 1605 0
 0653 REF 15 LAST 877 33,2662 53 533 1

EXTEND

DCA R15

DXCH R

EXTEND

DCA R15 +2

DXCH R +2

EXTEND

DCA R15 +4

DXCH R +4

EXTEND

DCA VIS

DXCH V

EXTEND

DCA VIS +2

DXCH V +2

EXTEND

DCA VIS +4

DXCH V +4

0654 REF 1 33,2663 1 2275 1

TCF COPYCYCL

COMPLETE THE COPYCYCL.

L SERVICER

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R0655 ALTCHK COMPARES CURRENT ALTITUDE (IN HCALC) WITH A SPECIFIED ALTITUDE FROM A TABLE BEGINNING AT ALTCHIT.
 R0657 ITS CALLING SEQUENCE IS AS FOLLOWS:-

R0658 L CAF N
 R0659 L+1 TC BANKCALL
 R0660 L+2 CADR ALTCHK
 R0661 L+3 RETURN HERE IF HCALC STILL > SPECIFIED CRITERION. C(L) = +0.
 R0663 L+4 RETURN HERE IF HCALC < OR = SPECIFIED CRITERION. C(A) = C(L) = +0

R0665 ALTCHK MUST BE BANKCALLED EVEN FROM ITS OWN BANK. - 4 IS THE LOCATION, RELATIVE TO THE TAG ALTCHIT,
 R0667 OF THE BEGINNING OF THE OP CONSTANT TO BE USED AS A CRITERION.

0668 33,2664 0-0006-1 ALTCHK EXTEND
 0669 REF 258 LAST 876 33,2665 5-0000-1 INDEX A
 0670 REF 1 33,2666 3-2700-1 DCA ALTCHIT
 0671 REF 343 LAST 877 33,2667 52-156-1 DXCH MPAC +1
 0672 33,2670 0-0006-1 EXTEND
 0673 REF 5 LAST 876 33,2671 4-1535-1 DCS HCALC
 0674 REF 344 LAST 878 33,2672 20-156-1 DAS MPAC +1
 0675 REF 1 33,2673 0-6727-0 TC BRANCH +4
 0676 REF 162 LAST 871 33,2674 3-4755-1 CAF ZERO BETTER THAN A NOOP, PERHAPS
 0677 REF 6 LAST 491 33,2675 24-133-0 INCR BUF2
 0678 REF 4 LAST 537 33,2676 1-4631-0 TCF SWRETURN

0679 REF 2 LAST 850 33,2677 ALTCHIT = 5KFT
 0680 33,2677 00007-0 25KFT 2DEC 7620 B-24 (0)
 0680 33,2700 16100-1
 0681 33,2701 00016-0 50KFT 2DEC 15240 B-24 (2)
 0681 33,2702 34200-1
 0682 33,2703 00000-1 50FT 2DEC 15.24 B-24 (4)
 0682 33,2704 00364-0
 0683 33,2705 00010-0 30KFT 2DEC 9144 B-24 (6)
 0683 33,2706 35600-1
 0684 33,2707 01414-1 2KFT/SEC DEC 6.096 B-7 2000-FT/SEC AT 2171 M/GS

R0685

0686 REF 17 LAST 813 33,2710 3-6242-0 XORCHK CAF SIX ARE WE BELOW 30000 FT?
 0687 REF 242 LAST 863 33,2711 0-4616-1 TC BANKCALL
 0688 REF 1 33,2712 66664-0 CADR ALTCHK
 0689 REF 1 33,2713 1-2476-1 TCF HITEST CONTINUE LR UPDATE
 0690 REF 56 LAST 863 33,2714 0-5504-0 TC UPFLAG YES: INHIBIT X-AXIS OVERRIDE
 0691 REF 7 LAST 851 33,2715 00311-1 ADRES XOVINFLG
 0692 REF 57 LAST 878 33,2716 0-5504-0 TC UPFLAG
 0693 REF 1 33,2717 00253-0 ADRES XORFLG
 0694 REF 2 LAST 878 33,2720 1-2476-1 TCF HITEST CONTINUE LR UPDATE

0695 REF 54 LAST 857 33,2721 3-4752-0 35KCHK CAF TWO ARE WE BELOW 35000 FT?

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0696	REF	243	LAST	878	33,2722	0 4616 1
0697	REF	2	LAST	878	33,2723	66664 0
0698	REF	3	LAST	874	33,2724	1 2540 0
0699	REF	58	LAST	878	33,2725	0 5504 0
0700	REF	1			33,2726	00256 0
0701	REF	4	LAST	879	33,2727	1 2540 0

TC	BANKCALL
CADR	ALCHK
TCF	CONTSEV
TC	UPFLAG
ADRES	READLE
TCF	CONTSEV

SET READLE FLAG TO ENABLE IF READ I...

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PG702
R0705

LINE	REF	LAST	VALUE	UNIT	OPERATION	DESCRIPTION
0706			33.2730	41456 0	CALCGRV	UNIT PUSH SAVE UNIT/R/ IN PUSHLIST (18)
0707	REF 30	LAST 877	33.2731	03537-0	STORE	UNIT/R/
0708			33.2732	67346 1	LXC,1	SLDAD RTX2 = 0 IF EARTH ORBIT, =2 IF LUNAR.
0709	REF 16	LAST 779	33.2733	02777-1		RTX2
0710	REF 17	LAST 830	33.2734	03000 1		RTX2
0711			33.2735	50076-0	DCOMP	BMN
0712	REF 1		33.2736	66765 0		CALCGRV
0713			33.2737	50375-0	VLOAD	OUT (12)
0714	REF 9	LAST 841	33.2740	06514-1		UNITZ
0715	REF 31	LAST 880	33.2741	03537 0		UNIT/R/
0716			33.2742	41552 0	SL1	PUSH (14)
0717			33.2743	44316-0	DSQ	BDSU
0718	REF 1		33.2744	27027-1		DP1/20
0719			33.2745	56325 0	PDDL	OPV
0720	REF 1		33.2746	26040-1		RESQ
0721			33.2747	00043 0		340 (RM)SQ
0722			33.2750	00041 1	STORE	320 TEMP FOR (REF)DSQ
0723			33.2751	41205-0	DMP	DMP
0724	REF 1		33.2752	26042-0		20J
0725			33.2753	65361-0	VXSC	PDDL
0726	REF 32	LAST 880	33.2754	03537-0		UNIT/R/
0727			33.2755	41205-0	DMP	DMP
0728	REF 1		33.2756	26044-0		2J
0729			33.2757	00041-1		320
0730			33.2760	76561-1	VXSC	VSL1
0731	REF 10	LAST 880	33.2761	06514-1		UNITZ
0732			33.2762	45455-1	VAD	STADR
0733	REF 2	LAST 780	33.2763	74256-0	STORE	UNITGOBL
0734			33.2764	41455-0	VAD	PUSH MPAC = UNIT-GRAVITY-VECTOR. (18)
0735			33.2765	60345-0	CALCGRV	DLOAD NORM PERFORM A NORMALIZATION ON RMAG50 IN
0736			33.2766	00043 0		340 ORDER TO BE ABLE TO SCALE THE M-FR
0737	REF 14	LAST 777	33.2767	00050-1		X2 MAXIMUM PRECISION.
0738			33.2770	53663-1	BDDV*	SLR*
0739	REF 1		33.2771	26032-1		-MUOT.1
0740			33.2772	56623-0		0 -210.2
0741			33.2773	45561-1	VXSC	STADR
0742	REF 3	LAST 845	33.2774	74214 0	STORE	OUT1/2 SCALED AT 2(+7) M/CS
0743			33.2775	77616 0	RVG	
0744			33.2776	61375 1	CALCGRV	VLOAD VAF
0745	REF 6	LAST 860	33.2777	00325-0		DELV
0746	REF 26	LAST 876	33.3000	01734 0		REF-SHAT
0747			33.3001	76561-1	VXSC	VSL1
0748	REF 4	LAST 860	33.3002	26022-0		KPIPI
0749	REF 5	LAST 771	33.3003	03527 1	STORE	DELVREF
0750			33.3004	41562 0	VSL1	PUSH
0751			33.3005	41455-0	VAD	PUSH (DV-OLDGOT)/2 TO PD-SCALED AT 2(+7)M/CS

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0752	REF	8	LAST	818	33,3006	01237 0
0753					33,3007	65255 0
0754	REF	8	LAST	761	33,3010	01227 1
0755	REF	4	LAST	870	33,3011	01250 1
0756					33,3012	74261 1
0757					33,3013	20207 0
0758					33,3014	44055 1
0759	REF	14	LAST	868	33,3015	01221 1
0760					33,3016	00037 0
0761	REF	6	LAST	876	33,3017	37545 1
0762	REF	2	LAST	867	33,3020	66730 0

VAD	GET/2
	PODL
	VH
	PGUISE
SL	VXSL
	6D
VAD	STD
	RE
	310
STCALL	RNI
	CALCGRV

(18)

TEMP STORAGE OF RN SCALED 2(+29)H

0763					33,3021	53255 0
0764					33,3022	77655 1
0765	REF	9	LAST	881	33,3023	01227 1
0766	REF	6	LAST	876	33,3024	37553 0
0767					33,3025	00037 0

VAD	VAD
VAD	
	VH
STCALL	VNI
	310

TEMP STORAGE OF VN SCALED 2(+7)H/CS

0768					33,3026	01463 1	DP1/20	2DEC	C.05
0768					33,3027	06315 0			
0769					33,3030	00010 0	SHIFT11	2DEC	1-B-11
0769					33,3031	00006 1			

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P0770 *****

R0772 MUNRVG IS A SPECIAL AVERAGE G INTEGRATION ROUTINE USED BY THRUSTING
 R0773 PROGRAMS WHICH FUNCTION IN THE VICINITY OF AN ASSUMED SPHERICAL MOON.
 R0774 THE INPUT AND OUTPUT QUANTITIES ARE REFERENCED TO THE STABLE MEMBER
 R0775 COORDINATE SYSTEM.

0776				33.3032	41575 0	RVBOTH	VLOAD	PUSH	
0777	REF	3	LAST	734	33.3033			G(CSM)	
0778				33.3034	65255 0		VAD	PDOL	
0779	REF	5	LAST	867	33.3035			V(CSM)	
0780	REF	5	LAST	881	33.3036			PGUIDE	
0781				33.3037	74271 0		DDV	VXSC	
0782	REF	1			33.3040			SHIFT11	
0783				33.3041	77655 1		VAD		
0784	REF	5	LAST	867	33.3042			G(CSM)	
0785	REF	7	LAST	877	33.3043		STCALL	RIS	
0786	REF	5	LAST	867	33.3044			MUNGRAV	
0787				33.3045	53255 0		VAD	VAD	
0788	REF	6	LAST	882	33.3046			V(CSM)	
0789				33.3047	77626 0		STADR		
0790	REF	9	LAST	877	33.3050		STORE	VIS	
0791				33.3051	77776 1		EXIT		
0792	REF	6	LAST	876	33.3052	0 3552 0	TC	QUICKFAZ5	
0793	REF	154	LAST	876	33.3053	0 6037 0	TC	INTERP	
0794				33.3054	77775 1		VLOAD		
0795	REF	4	LAST	880	33.3055	03563 1		GET1/2	
0796	REF	4	LAST	882	33.3056	26317 0	STOVL	G(CSM)	
0797	REF	8	LAST	882	33.3057	03573 0		RIS	
0798	REF	6	LAST	882	33.3060	25720 0	STOVL	R(CSM)	
0799	REF	10	LAST	882	33.3061	03601 0		VIS	
0800	REF	7	LAST	882	33.3062	01726 0	STORE	V(CSM)	
0801				33.3063	77776 1		EXIT		
0802	REF	7	LAST	882	33.3064	0 3552 0	TC	QUICKFAZ5	
0803	REF	155	LAST	882	33.3065	0 6037 0	TC	INTERP	
0804				33.3066	74375 0	MUNRVG	VLOAD	VXSC	
0805	REF	7	LAST	880	33.3067	00325 0		DELV	
0806	REF	1			33.3070	26024 0		KPIR	
0807				33.3071	53206 0		PUSH	VAD	1ST PUSH: DELV IN UNITS OF 2(8) M/CS
0808	REF	9	LAST	881	33.3072	01237 0		GET1/2	
0809				33.3073	53206 0		PUSH	VAD	2ND PUSH: (DELV + GET)/2, UNITS OF (7)
0810	REF	16	LAST	877	33.3074	03527 1		V	(12)
0811				33.3075	56325 0		PDDI	DDV	
0812	REF	6	LAST	882	33.3076	01250 1		PGUIDE	
0813	REF	2	LAST	882	33.3077	27031 0		SHIFT11	
0814				33.3100	77761 1		VXSC		
0815				33.3101	77655 1		VAD		
0816	REF	23	LAST	877	33.3102	03521 1		R	
0817	REF	9	LAST	882	33.3103	37573 1	STCALL	RIS	STORE R SCALED AT 2(+24)M.
0818	REF	6	LAST	882	33.3104	67130 1		MUNGRAV	

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0819				33,3105	53255 0	VAD	VAD	
0820				33,3106	77655 1	VAD		(-)
0821	REF	17	LAST	882	33,3107	03527 1	V	
0822	REF	11	LAST	882	33,3110	03601 0	STORE	V15 STORE V SCALED AT 2(+7)M/CS.
0823				33,3111	77646 0	ABVAL		
0824	REF	5	LAST	735	33,3112	27472 0	STOVL	ABVEL STORE SPEED FOR LR AND DISPLAYS.
0825	REF	33	LAST	880	33,3113	03537 0		UNIT/R/
0826				33,3114	72441 0	DOT	SL1	
0827	REF	12	LAST	883	33,3115	03601 0		V15
0828	REF	11	LAST	819	33,3116	27474 0	STOVL	H00T015F H00T = V. UNIT(P)*2(7)M/CS.
0829	REF	10	LAST	882	33,3117	03573 0		R15
0830				33,3120	72435 0	VXV	VSL2	
0831	REF	5	LAST	842	33,3121	02325 1		WM
0832	REF	3	LAST	819	33,3122	17734 1	STOVL	DELVE LUNAR ROTATION CORRECTION TERM 2(5)-/CS.
0833				33,3123	00045 0		360	
0834				33,3124	77625 0	DSU		
0835	REF	10	LAST	876	33,3125	02333 0		/LAND/
0836	REF	6	LAST	878	33,3126	37535 0	STCALL	H0ALC FOR NOW, DISPLAY WHETHER POS OR NEG
0837	REF	1			33,3127	66461 1		MUNRETRN
0838				33,3130	77656 1	MUNGRAV	UNIT	AT 360 HAVE ABVAL(P). AT 340 R.H
0839	REF	34	LAST	883	33,3131	17537 0	STOVL	UNIT/R/
0840				33,3132	00043 0		340	
0841				33,3133	55261 1	SL	BDDV	
0842				33,3134	20207 0		60	
0843	REF	1			33,3135	26036 0		-MUOTMUN
0844				33,3136	74205 0	DMP	VXSC	
0845	REF	3	LAST	882	33,3137	27031 0		SHIFT11
0846	REF	35	LAST	883	33,3140	03537 0		UNIT/R/
0847	REF	5	LAST	882	33,3141	03563 1	STORE	G0T1/2 1/26DT SCALED AT 2(7)M/CS.
0848				33,3142	77616 0	RVO		
0849				33,3143	00303 1	1.95SECS	DEC	195
0850				33,3144	00005 1	7.5	2DEC	.02286 B-6 7.5 FT/SEC AT 2(6) M/CS
0850				33,3145	33212 0			
0851				33,3146	00014 1	2SEC(18)	2DEC	200 B-18
0851				33,3147	20000 0			
0852				33,3150	00000 1	2SEC(28)	2DCT	00000 00310 2SEC AT 2(28)
0852				33,3151	00310 0			
08525				33,3152	00000 1	4SEC(28)	2DEC	400 B-28
08525				33,3153	00620 0			
0853				33,3154	00110 1	8ITS4-7	DCT	110

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POB54	REF	2	LAST	872	33,3155	3 4742 1	UPDATCHK	CAF	NOLRFBIT	SEE IF LR UPDATE INHIBITED.
0855	REF	27	LAST	875	33,3156	7 0107 0		MASK	FLGWRD11	
0856	REF	259	LAST	878	33,3157	10 000 0		CCS	A	
0857	REF	5	LAST	879	33,3160	1 2540 0		TCF	CONTSERV	IT IS-NO LR UPDATE
0858	REF	1			33,3161	3 4750 1		CAF	RNGEDBIT	NO-INHIBIT -- SEE ALT-MEAS. THIS CYCLE.
0859	REF	28	LAST	884	33,3162	7 0107 0		MASK	FLGWRD11	
0860					33,3163	0 0006 1		EXTEND		
0861	REF	1			33,3164	1 3310 1		BZF	VMEASCHK	NO-ALT-MEAS THIS CYCLE-CHECK FOR VEL
0862	*REF	26	LAST	863	33,3165	3 0120 1	POSUPDAT	CA	FIXLOC	SET PUSHLIST TO ZERO
0863	*REF	9	LAST	863	33,3166	54 166 1		TS	PUSHLOC	
0864	*REF	156	LAST	882	33,3167	0 6037 0		TC	INTERET	
0865	*				33,3170	61375 1		VLOAD	VXH	
0866	*REF	1			33,3171	02273 0			HBEAMNG	
0867	*REF	10	LAST	874	33,3172	02146 0			XNDPIP	HBEAM SM AT 2(2)
0868	*				33,3173	72515 0	PDVL	VSL2		STORE HBEAM IN PD-0-5
0869	*REF	13	LAST	883	33,3174	03601 0		VLS		SCALE V AT 2(5) M/CS
0870	*				33,3175	50255 0	VAD	DOT		
0871	*REF	4	LAST	883	33,3176	03734 1		DELVS		V-RELATIVE TO SURFACE AT 2(5) M/CS
0872	*				33,3177	00001 0		GE		V ALONG HBEAM AT 2(7) M/CS
0873	*				33,3200	77405 0	DMP	EXIT		
0874	*REF	1			33,3201	01355 0		FAOSKAL		SCALE TO RADAR COUNTS X 5
0875	*REF	2	LAST	85	33,3202	4 0110 0	CS	FLGWRD12		TEST LR ALTITUDE SCALE FACTOR
0876	*REF	1			33,3203	7 4743 1		MASK	ALTSCBIT	
0877	*				33,3204	0 0006 1		EXTEND		
0878	*				33,3205	1 3210 0	BZF	+3		BRANCH IF HIGH SCALE
0879	*REF	1			33,3206	3 1356 0	CA	SKALSKAL		RESCALE IF LOW SCALE
0880	*REF	10	LAST	860	33,3207	0 7307 1	TC	SHORTMP		
0881	*REF	157	LAST	884	33,3210	0 6037 0	+3	TC	INTPRET	
0882	*				33,3211	54215 0		DAD	SL	CORRECT HMEAS FOR DOPPLER EFFECT
0883	*REF	5	LAST	873	33,3212	03655 1			HMEAS	
0884	*				33,3213	20210 0			70	
0885	*				33,3214	74205 0	DMP	VXSL		SLANT RANGE AT 2(21), POSITIVE FOR HBEAM
0886	*REF	1			33,3215	26011 0		HSCAL		SLANT RANGE VECTOR AT 2(23) M
0887					33,3216	45241 1		DOT	DSU	
0888	REF	36	LAST	883	33,3217	03557 0		UNIT/R/		ALTITUDE AT 2(24) M
0889	REF	7	LAST	883	33,3220	03535 1		HCALC		DELTA-H AT 2(24) M
0890	REF	5	LAST	786	33,3221	03665 1		STORE	DELTAH	
0891					33,3222	77776 1		EXIT		
0892	REF	29	LAST	884	33,3223	3 0107 1	CA	FLGWRD11		
0893	REF	2	LAST	874	33,3224	7 4741 0		MASK	PSTHIBIT	
0894					33,3225	0 0006 1		EXTEND		DO NOT PERFORM DATA REASONABLENESS TEST
0895	REF	1			33,3226	1 3243 0	BZF	NOREASON		UNTIL AFTER HIGATE

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0897	REF 158	LAST 884	33.3227	0 6037 0	TC	INTPRET	
0898			33.3230	45246 0	ABS	DSU	
0899	REF 2	LAST 121	33.3231	02521 0		DELOFIX	ABS(DELTAH) - DEFIX 50 FT HOP
0900			33.3232	45252 0	SL3	FSU	SCALE TO 2(21)
0901	REF 8	LAST 884	33.3233	03535 1		HGALC	ABS(DELTAH) - (50 + HGALC/5) AT 2(21)
0902			33.3234	77776 1	EXIT		
0903	REF 2	LAST 150	33.3235	25*670 1	INCR	LRLECTF	
0904	REF 2	LAST 878	33.3236	0 6723 1	TC	BRANCH	
0905	REF 1		33.3237	1 3560 0	TCF	HFAIL	DELTA H TOO LARGE
0906	REF 2	LAST 885	33.3240	1 3560 0	TCF	HFAIL	DELTA H TOO LARGE
0907	REF 82	LAST 854	33.3241	0 5516 0	TC	DOWNFLAG	TURN OFF ALT FAIL LAMP
0908	REF 1		33.3242	00263 0	ADRES	HFLSHFLG	
0909	REF 30	LAST 884	33.3243	4 0107 0	NOREASON CS	FLGWRD11	
0910	REF 1		33.3244	7 4744 0	MASK	LRINHBIT	
0911	REF 260	LAST 884	33.3245	10 000 0	CCS	A	
0912	REF 2	LAST 884	33.3246	1 3310 1	TCF	VMEASCHK	UPDATE INHIBITED - TEST VELOCITY ANYWAY
0913	REF 159	LAST 885	33.3247	0 6037 0	TC	INTPRET	DB POSITION UPDATE
0914			33.3250	40545 1	DLOAD	SR4	
0915	REF 9	LAST 885	33.3251	03535 1		HGALC	RESCALE H TO 2(23)H
0916			33.3252	77776 1	EXIT		
0917			33.3253	0 0006 1	EXTEND		
0918	REF 6	LAST 884	33.3254	3 1665 0	DCA	DELTAH	STORE DELTAH IN MPAC AND
0919	REF 345	LAST 878	33.3255	52 155 1	DXCH	MPAC	BRING HGALC INTO A,L
0920	REF 1		33.3256	0 7544 0	TC	ALSIGNAG	
0921			33.3257	0 0006 1	EXTEND		IF HIGH PART OF HGALC IS NON ZERO, THEN
0922			33.3260	1 3262 0	BZP	+2	HGALC > HMAX,
0923	REF 3	LAST 885	33.3261	1 3310 1	TCF	VMEASCHK	SO UPDATE IS BYPASSED
0924	REF 346	LAST 885	33.3262	54 156 1	TS	MPAC +2	FOR LATER SHORTMP
0925	REF 137	LAST 874	33.3263	4 0001 1	CS	L	-H AT 2(14)M
0926	REF 1		33.3264	6 1420 0	AD	LRHMAX	HMAX - H
0927			33.3265	0 0006 1	EXTEND		
0928	REF 4	LAST 885	33.3266	6 3310 0	BZMF	VMEASCHK	IF H > HMAX, BYPASS UPDATE
0929			33.3267	0 0006 1	EXTEND		
0930	REF 1		33.3270	7 1421 0	MP	LRWH	WH(HMAX - H)
0931			33.3271	0 0006 1	EXTEND		
0932	REF 2	LAST 885	33.3272	11*420 1	DV	LRHMAX	WH(1 - H/HMAX)
0933	REF 4	LAST 462	33.3273	54 135 1	TS	MPTMP	
0934	REF 1		33.3274	0 7313 1	TC	SHORTMP2	DELTAH (WH)(1 - H/HMAX) IN MPAC
0935	REF 160	LAST 885	33.3275	0 6037 0	TC	INTPRET	MODE IS UP FROM ABOVE
0936			33.3276	77752 1	SL1		
0937			33.3277	53361 0	VXSC	VAD	
0938	REF 37	LAST 834	33.3300	03537 0		UNIT/R/	DELTAH = DH(WH)(1 - H/HMAX) UNIT/R/
0939	REF 11	LAST 883	33.3301	03573 0		R15	
0940	REF 1		33.3302	37657 1	STCALL	GNUR	
0941	REF 7	LAST 882	33.3303	67130 1		MUNGRAV	
0942			33.3304	77776 1	EXIT		

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0943	REF	8	LAST	882	33,3305	0 3552 0	TC	QUICKFAZ5	
0944	REF	163	LAST	878	33,3306	3 4755 1	CA	ZERO	
0945	REF	1			33,3307	0 3534 0	RUPDATED TC	GNURVST	
0946	REF	9	LAST	886	33,3310	0 3552 0	VMEASCHK TC	QUICKFAZ5	RESTART AT NEXT LOCATION
0947	REF	31	LAST	885	33,3311	4 0107 0	CS	FLGWRD11	
0948	REF	1			33,3312	7 4745 1	MASK	VELDABIT	IS V READING AVAILABLE?
0949	REF	261	LAST	885	33,3313	10 000 0	CCS	A	
0950	REF	1			33,3314	1 3514 0	TCF	VALTCHK	NO SEE IF V READING TO BE TAKEN
0951	REF	3	LAST	200	33,3315	4 1651 0	VELUPDAT CS	VSELECT	PROCESS VELOCITY DATA
0952	REF	138	LAST	885	33,3316	54 001 1	TS	L	
0953	REF	139	LAST	886	33,3317	26 001 1	ADS	L	-2 VSELECT IN L
0954	REF	140	LAST	886	33,3320	6 0001 0	AD	L	
0955	REF	141	LAST	886	33,3321	6 0001 0	AD	L	-6 VSELECT IN A
0956	REF	27	LAST	884	33,3322	50 120 1	INDEX	FIXLOC	
0957	REF	24	LAST	825	33,3323	52 047 0	DACH	X1	X1 = -6 VSELECT. X2 = -7 VSELECT
0958	REF	4	LAST	874	33,3324	3 4741 1	CA	EBANK4	
0959	REF	35	LAST	874	33,3325	54 003 0	TS	EBANK	
0960	REF	2	LAST	116	34,1654		ERANK=	LPXCDU	
0961	REF	2	LAST	116	33,3326	3 1655 0	CA	LRZCDU	STORE LRCDS IN CDUSPOTS
0962	REF	19	LAST	601	33,3327	54 766 1	TS	CDUSPOT	
0963	REF	2	LAST	116	33,3330	3 1656 0	CA	LRZCDU	
0964	REF	20	LAST	886	33,3331	54 770 0	TS	CDUSPOT +2	
0965	REF	3	LAST	886	33,3332	3 1654 1	CA	LPXCDU	
0966	REF	21	LAST	886	33,3333	54 772 1	TS	CDUSPOT +4	
0967	REF	244	LAST	879	33,3334	0 4616 1	TC	BANKCALL	
0968	REF	3	LAST	861	33,3335	47615 0	CAUR	QUICTRIG	GET SINES AND COSINES FOR NOSH
0969	REF	28	LAST	886	33,3336	3 0120 1	CA	FIXLOC	
0970	REF	10	LAST	884	33,3337	54 166 1	TS	PUSHLOC	SET PD TO ZERO
0971	REF	161	LAST	885	33,3340	0 6037 0	TC	INTPRET	
0972					33,3341	45173 0	VLOAD*	CALL	
0973	REF	2	LAST	116	33,3342	02231 0		VZBEAMNB.1	CONVERT VBEAM FROM NB TO SM
0974	REF	4	LAST	580	33,3343	47673 0		41RSSE	
0975					33,3344	54325 1	PDDL	SL	STORE IN PD 0-5
0976	REF	3	LAST	201	33,3345	03653 1		VMEAS	LOAD VELOCITY MEASUREMENT
0977					33,3346	20215 0		12D	
0978					33,3347	41403 0	DMP*	PUSH	SCALE TO M/CS AT 2(6)
0979	REF	1			33,3350	51764 0		VZSCAL.2	AND STORE IN PD 6-7
0980					33,3351	77776 1	EXIT		
0981	REF	96	LAST	861	33,3352	4 4753 0	CS	ONE	
0982	REF	14	LAST	825	33,3353	54 163 1	TS	MODE	CHANGE STORE MODE TO VECTOR
0983	REF	3	LAST	119	33,3354	3 1657 1	CA	41PTEN	STORE DELV IN MPAC

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0984				33,3355	22 007 0	ZL		
0985	REF 347	LAST	885	33,3356	52 155 1	DXCH	MPAC	
0986	REF 4	LAST	886	33,3357	3 1660 0	CA	PIPTEN +1	
0987				33,3360	22 007 0	ZL		
0988	REF 348	LAST	887	33,3361	52 160 1	DXCH	MPAC +3	
0989	REF 5	LAST	887	33,3362	3 1661 1	CA	PIPTEN +2	
0990				33,3363	22 007 0	ZL		
0991	REF 349	LAST	887	33,3364	52 162 0	DXCH	MPAC +5	
0992	REF 9	LAST	852	33,3365	3 5016 0	CA	EBANK 7	
0993	REF 36	LAST	886	33,3366	54 003 0	TS	EBANK	RESTORE EBANK 7
0994	REF 51	LAST	874	E7,1515		EBANK	DVCNTR	
0995	REF 162	LAST	886	33,3367	0 6037 0	TC	INTPRET	
0996				33,3370	65361 0	VXSC	PDDL	
0997	REF 5	LAST	880	33,3371	26022 0		KPIR	SCALE DELV TO 2(7) M/CS AND PUSH
0998	REF 2	LAST	116	33,3372	02253 1		LKVTIME	TIME OF DELV AT 2(28)CS
0999				33,3373	56225 1	DSU	DDV	
1000	REF 21	LAST	870	33,3374	01235 1		PIPTIME	TU - T(N-1)
1001	REF 1			33,3375	27151 1		ZSEC(28)	
1002				33,3376	76561 1	VXSC	VSL1	G(N-1)(TU - T(N-1))
1003	REF 10	LAST	882	33,3377	01237 0		GDT/2	SCALED AT 2(7) M/CS
1004				33,3400	53255 0	VAD	VAD	PUSH UP FOR DELV
1005	REF 18	LAST	883	33,3401	03527 1		V	VU = V(N-1) + DELVU + G(N-1) DTU
1006				33,3402	53352 0	VSL2	VAD	SCALE TO 2(5) M/CS AND SUBTRACT
1007	REF 5	LAST	884	33,3403	03734 1		DELVS	MOON ROTATION.
1008				33,3404	51406 1	PUSH	ABVAL	STORE IN PD
1009				33,3405	43202 0	SP4	DAD	ABS(VM)/8 + 7.5 AT 2(6)
1010	REF 1			33,3406	27145 1		7.5	
1011				33,3407	24025 0	STOVL	ZOD	STORE IN ZOD AND PICK UP VM
1012				33,3410	44241 0	DET	MDSU	V(EST) AT 2(6)
1013				33,3411	00001 0			DELTA V = VMFAS - V(EST)
1014				33,3412	51406 1	PUSH	ABS	
1015				33,3413	77425 1	DSU	EXIT	ABS(DV) - (7.5 + ABS(VM)/8)
1016				33,3414	00025 0		ZOD	
1017	REF 2	LAST	150	33,3415	25 672 0	INCR	LRMCTR	
1018	REF 3	LAST	885	33,3416	0 6723 1	TC	BRANCH	
1019	REF 1			33,3417	1 3575 1	TCF	VFAIL	DELTA V TOO LARGE ALARM
1020	REF 2	LAST	887	33,3420	1 3575 1	TCF	VFAIL	DELTA V TOO LARGE ALARM
1021	REF 83	LAST	885	33,3421	0 5516 0	TC	DOWNFLAG	TURN OFF VEL FAIL LAMP
1022	REF 1			33,3422	00262 1	ADRES	VFLSHFLG	
1023	REF 32	LAST	886	33,3423	3 0107 1	CA	FLGWRD11	
1024	REF 1			33,3424	7 4740 1	MASK	VXINHBIT	
1025				33,3425	0 0006 1	EXTEND		
1026	REF 1			33,3426	1 3435 1	BZF	VOPDAT	IF VX INHIBIT RESET, INCORPORATE DATA.

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1027	REF	84	LAST	887	33,3427	0 5516 0		TC	DORNFLO	
1028	REF	1			33,3430	00250 0		ADRES	VXINH	RESET VX INHIBIT
1029	REF	4	LAST	886	33,3431	3 1651 1		CA	VSELECT	
1030	REF	4	LAST	497	33,3432	6 7746 0		AD	MEG2	IF VSELECT = 2 (X AXIS).
1031					33,3433	0 0006 1		EXTEND		BYPASS-UPDATE
1032	REF	1			33,3434	1 3514 0		BZF	ENDVDAT	
1033	REF	33	LAST	887	33,3435	4 0107 0	VUPDAT	CS	FLGVPD11	
1034	REF	2	LAST	885	33,3436	7 4744 0		MASK	LRINHBIT	
1035	REF	262	LAST	886	33,3437	10 000 0		CCS	A	
1036	REF	2	LAST	886	33,3440	1 3514 0		TCF	VALTCHK	UPDATE INHIBITED
1037	REF	350	LAST	887	33,3441	54 155 1		TS	MPAC +1	
1038	REF	6	LAST	883	33,3442	3 1471 1		CA	ABVEL	STORE E7 ERASABLES NEEDED IN TEMP 5
1039	REF	1			33,3443	54 130 1		TS	ABVEL*	
1040	REF	5	LAST	888	33,3444	3 1651 1		CA	VSELECT	
1041	REF	1			33,3445	54 131 0		TS	VSELECT*	
1042	REF	9	LAST	825	33,3446	3 5014 1		CA	EBANK*	
1043	REF	37	LAST	887	33,3447	54 003 0		TS	EBANK	CHANGE EBANKS
1044	REF	2	LAST	122	33,3450	4 1527 1		CS	LRVF	
1045	REF	3	LAST	888	33,3451	6 0130 0		AD	ABVEL*	IF V < VF, USE WVF
1046	REF	2	LAST	888	33,3452	0 0006 1		EXTEND		
1047					33,3453	6 3466 0		BZMF	USEVF	
1048	REF	1								
1049	REF	3	LAST	888	33,3454	4 0130 1		CS	ABVEL*	
1050	REF	2	LAST	122	33,3455	6 1526 1		AD	LRVMAX	VMAX - V
1051					33,3456	0 0006 1		EXTEND		
1052	REF	1			33,3457	6 3471 0		BZMF	WSTOR -1	IF V > VMAX, W = 0
1053					33,3460	0 0006 1		EXTEND		
1054	REF	2	LAST	888	33,3461	5 0131 1		INDEX	VSELECT*	
1055	REF	2	LAST	122	33,3462	7 1530 1		MP	LRWVZ	WV(VMAX - V)
1056					33,3463	0 0006 1		EXTEND		
1057	REF	3	LAST	888	33,3464	11 526 0		DV	LRVMAX	WV(1 - V/VMAX)
1058	REF	2	LAST	888	33,3465	1 3472 1		TCF	WSTOR	
1059	REF	3	LAST	888	33,3466	50 131 1	USEVF	INDEX	VSELECT*	
1060	REF	2	LAST	122	33,3467	3 1533 0		CA	LRWVZ	USE APPROPRIATE CONSTANT WEIGHT
1061	REF	3	LAST	888	33,3470	1 3472 1		TCF	WSTOR	
1062	REF	164	LAST	886	33,3471	3 4755 1	-1	CA	ZEP*	
1063	REF	351	LAST	888	33,3472	54 154 0	WSTOR	TS	MPAC	
1064	REF	28	LAST	874	33,3473	4 4745 1		CS	HIT7	(=640)
1065	REF	18	LAST	835	33,3474	6 1011 0		AD	MODREG	
1066					33,3475	0 0006 1		EXTEND		

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Line	REF	LAST	Value	Code	Comment
1067			33.3476 6 3501 0	BZMF +3	IF IN P65,P66,P67, USE ANOTHER CONSTANT
1068	REF 2	LAST 122	33.3477 3 1536 0	CA LRWVFF	
1069	REF 352	LAST 888	33.3500 54 154 0	TS MPAC	
1070	REF 10	LAST 887	33.3501 3 5016 0 +3	CA EBANK7	
1071	REF 38	LAST 888	33.3502 54 003 0	TS EBANK	CHANGE EBANKS
1072	REF 7	LAST 888	E7.1471	EBANK= ABVEL	
1073	REF 163	LAST 887	33.3503 0 6037 0	TC INTERPRET	
1074			33.3504 74205 0	DMP VASC	W(Delta V)(VBEAMS) UP 6-7, 0-9
1075			33.3505 77655 1	VAD	
1076	REF 14	LAST 884	33.3506 03601 0	VIS	ADD WEIGHTED Delta V TO VELOCITY
1077	REF 1		33.3507 03657 0	STORE GRUV	
1078			33.3510 77776 1	EXIT	
1079	REF 10	LAST 886	33.3511 0 3552 0	TC QUIKFAZ5	DO NOT RE-UPDATE
1080	REF 18	LAST 878	33.3512 3 6242 0	CA SIX	
1081	REF 2	LAST 896	33.3513 0 3534 0	TC GRUVST	STORE NEW VELOCITY VECTOR
1082	REF 3	LAST 888	33.3514	ENDVDAT = VALTCHK	
1083	REF 11	LAST 889	33.3514 0 3552 0	VALTCHK TC QUIKFAZ5	DO NOT REPEAT ABOVE
1084	REF 1		33.3515 3 4747 1	CAF READVB17	TEST READVEL TO SEE IF VELOCITY READING IS DESIRED.
1085	REF 34	LAST 888	33.3516 7 0107 0	MASK FLGMPD11	
1086	REF 263	LAST 888	33.3517 10 000 0	CCS A	
1087	REF 1		33.3520 1 3527 0	TEF READV	YES - READ VELOCITY
1088	REF 8	LAST 889	33.3521 4 1471 0	CS ABVEL	NO - SEE IF VELOCITY < 2000 FT/SEC
1089	REF 1		33.3522 6 2707 0	AD 2KFT/SEC	
1090			33.3523 0 0006 1	EXTEND	
1091	REF 6	LAST 884	33.3524 6 2540 1	BZMF CONTSERV	V > 2000 FT/SEC DO NOT READ VEL
1092	REF 59	LAST 879	33.3525 0 5504 0	TC OFFLAG	V < 2000 FT/SEC SET READVEL AND READ
1093	REF 1		33.3526 00257 1	ADRES READVEL	
1094	REF 3	LAST 873	33.3527 3 7720 0	CAF PF1032	SET UP JOB TO READ VELOCITY READING.
1095	REF 24	LAST 872	33.3530 0 5072 1	TE MOVAC	
1096	REF 6	LAST 884	E7.1654	EBANK= HMEAS	
1097	REF 1		33.3531 03616 0	2CADR LRVJOB	
1097	REF 1		33.3532 66067 0		
1098	REF 7	LAST 889	33.3533 1 2540 0	TCF CONTSERV	CONTINUE WITH SERVICER
1099	REF 78	LAST 856	33.3534 54 130 1	GRUVST TS BUF	STORE GRUV (=GRUV) IN R15 OR V15
1100			33.3535 0 0006 1	EXTEND	A = 0 FOR R, A = 0 FOR V
1101	REF 2	LAST 885	33.3536 3 1657 1	DCA GRUV	
1102	REF 79	LAST 889	33.3537 50 130 0	INDEX BUF	
1103	REF 12	LAST 885	33.3540 53 573 0	DXCH P15	
1104			33.3541 0 0006 1	EXTEND	

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1105 REF 3 LAST 889 33.3542 3 1661 1
 1106 REF 80 LAST 889 33.3543 50 130 0
 1107 REF 13 LAST 889 33.3544 53 575 0
 1108 33.3545 0 0006 1
 1109 REF 4 LAST 890 33.3546 3 1663 0
 1110 REF 81 LAST 890 33.3547 50 130 0
 1111 REF 14 LAST 890 33.3550 53 577 1
 1112 REF 215 LAST 872 33.3551 0 0002 0

DCA GNUR +2
 INDEX BUF
 DXCH RIS +2
 EXTEND
 DCA GNUR +4
 INDEX BUF
 DXCH RIS +4
 TC Q

1113 REF 3 LAST 826 33.3552 3 5007 0
 1114 REF 39 LAST 889 33.3553 56 003 1
 1115 REF 142 LAST 886 33.3554 52 002 1
 1116 REF 1 E3.1446
 1117 REF 2 LAST 890 33.3555 55 446 1
 1118 REF 40 LAST 890 33.3556 22 003 1
 1119 REF 52 LAST 887 E7.1515
 1120 REF 264 LAST 889 33.3557 0 0000 1

QUICKFAZ5 CA EBANK3
 XCH EBANK SET EBANK 3
 DXCH L Q TO A, A TO L
 EBANK= PHSNAMES
 TS PHSNAMES
 LXCH EBANK
 EBANK= DVCNTR
 TC A

1121 REF 2 LAST 150 33.3560 4 1671 1
 1122 33.3561 0 0006 1
 1123 REF 1 33.3562 1 3572 0
 1124 REF 3 LAST 885 33.3563 6 1670 1
 1125 REF 1 33.3564 7 7745 1
 1126 33.3565 0 0006 1
 1127 33.3566 1 3570 1
 1128 REF 2 LAST 890 33.3567 1 3572 0

HFAIL CS LRCTR
 EXTEND
 BZF NORLITE IF R = 0, DO NOT TURN ON TRK FAIL
 AD LRCTR
 MASK NEG3
 EXTEND IF L-R LT 4, DO NOT TURN ON TRK FAIL
 BZF +2
 TCF NORLITE

1129 REF 60 LAST 889 33.3570 0 5504 0
 1130 REF 2 LAST 885 33.3571 00263 0

TC UPFLAG AND SET BIT TO TURN ON TRACKER FAIL LIGHT
 ADRES VFLSHFLG

1131 REF 4 LAST 890 33.3572 3 1670 1
 1132 REF 5 LAST 890 33.3573 55 671 1

NORLITE CA LRCTR
 TS LRCTR SET R = 1

1133 REF 5 LAST 885 33.3574 1 3310 1

TCF VFEASCHK

1134 REF 2 LAST 150 33.3575 4 1673 0
 1135 33.3576 0 0006 1
 1136 REF 1 33.3577 1 3607 1
 1137 REF 3 LAST 887 33.3600 6 1672 0
 1138 REF 2 LAST 890 33.3601 7 7745 1
 1139 33.3602 0 0006 1
 1140 33.3603 1 3605 0
 1141 REF 2 LAST 890 33.3604 1 3607 1

VFAIL CS LRCTR DELTA Q LARGE
 EXTEND IF S = 0, DO NOT TURN ON TRACKER FAIL
 BZF NORLITE
 AD LPMCTR M-S
 MASK NEG3 TEST FOR M-S > 3
 EXTEND IF M-S > 3, THEN TWO OR MORE OF THE
 BZF +2 LAST FOUR V READINGS WERE BAD.
 TCF NORLITE SO TURN ON VELOCITY FAIL LIGHT

1142 REF 61 LAST 890 33.3605 0 5504 0
 1143 REF 2 LAST 887 33.3606 00262 1

TC UPFLAG AND SET BIT TO TURN ON TRACKER FAIL LIGHT
 ADRES VFLSHFLG

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1144 REF 4 LAST 890 33.3607 3 1672 0 NOLITE
1145 REF 3 LAST 890 33.3610 55.673 0

CA LPHCTR
TS LPHCTR

SET S = M

1146 REF 6 LAST 888 33.3611 11.651 0
1147 REF 2 LAST 888 33.3612 1.3514 0

CCS VSELECT
TCF ENDVDAT

TEST FOR Z COMPONENT
NOT 2, DO NOT SET VX INHIBIT

1148 REF 62 LAST 890 33.3613 0.5504 0
1149 REF 2 LAST 888 33.3614 00250 0
1150 REF 3 LAST 891 33.3615 1.3514 0

TC UPFLAG
ADRES VXINH
TCF ENDVDAT

Z COMPONENT - SET FLAG TO SKIP X
COMPONENT, AS ERROR MAY BE DUE TO CROSS
LOBE LOCK-UP NOT DETECTED ON X AXIS.

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P1151 *****
 R1153 LRVJOB IS SET WHEN THE LEM IS BELOW 15000 FT DURING THE LANDING PHASE
 R1154 THIS JOB INITIALIZES THE LANDING RADAR READ ROUTINE FOR 5 VELOCITY
 R1155 SAMPLES AND GOES TO SLEEP WHILE THE SAMPLING IS DONE ABOUT 500 MS.
 R1156 WITH A GOOD END RETURN THE DATA IS STORED IN VMEAS AND BIT 7 OF LRSTAT
 R1157 IS SET. THE GIMBAL ANGLES ARE READ ABOUT MIDWAY IN THE SAMPLING.

1158 REF 6 LAST 447 4361 170MS EQUALS NO1

1159 REF 1 33.3616 3 4361 1 LRVJOB CA 170MS SET TASK TO READ COUS + PIPAS

1160 REF 36 LAST 859 33.3617 0 5203 0 TC WAITLIST

1161 REF 3 LAST 887 E4.1652 EBANK= LRVTIME

1162 REF 1 33.3620 03757 1 2CADR RDGIMS

1162 REF 1 33.3621 70064 1

1163 REF 7 LAST 891 33.3622 11'651 0 CCS VSELECT

1164 REF 33.3623 1 3625 1 TCF +2

1165 REF 55 LAST 878 33.3624 3 4752 0 CAF TWO

1166 33.3625 6 0000 1 DOUBLE

1167 REF 245 LAST 886 33.3626 0 4616 1 TC BANKCALL

1168 REF 1 33.3627 53107 1 CADR LRVEL

1169 REF 246 LAST 892 33.3630 0 4616 1 TC BANKCALL

1170 REF 13 LAST 606 33.3631 17714 0 CADR -ADSTALL

1171 REF 1 33.3632 1 3665 0 TCF VBAD

1172 REF 2 LAST 150 33.3633 11'675 0 CCS STILBADV

1173 REF 1 33.3634 1 3666 0 TCF VSTILBAD

IS DATA GOOD JUST PRESENT?
 JUST GOOD - MUST WAIT 4 SECONDS.

1174 33.3635 0 0004 0 INHINT

1175 33.3636 0 0006 1 EXTEND

1176 REF 8 LAST 570 33.3637 3 1102 0 DCA SAMPLSUM

1177 REF 4 LAST 886 33.3640 53'653 1 DXCH VMEAS

1178 REF 5 LAST 886 33.3641 3 4741 1 CA EBANK4

1179 REF 41 LAST 890 33.3642 54 003 0 TS EBANK

1180 REF 4 LAST 892 E4.1652 EBANK= LRVTIME

FOR DOWNLINK

1181 33.3643 0 0006 1 EXTEND

1182 REF 5 LAST 892 33.3644 3 1653 0 DCA LRVTIME

1183 REF 2 LAST 200 33.3645 53'740 1 DXCH LRVTIME

1184 33.3646 0 0006 1 EXTEND

1185 REF 4 LAST 886 33.3647 3 1655 0 DCA LRVTIME

1186 REF 3 LAST 201 33.3650 53'735 0 DXCH LRVTIME

1187 REF 3 LAST 886 33.3651 3 1656 0 CA LRVTIME

1188 REF 3 LAST 200 33.3652 55'736 0 TS LRVTIME

1189 REF 11 LAST 889 33.3653 3 5016 0 CA EBANK7

1190 REF 42 LAST 892 33.3654 54 003 0 TS EBANK

1191 REF 8 LAST 892 E7.1651 EBANK= VSELECT

1192 REF 35 LAST 889 33.3655 4 0107 0 CS FLOWR011

1193 REF 2 LAST 886 33.3656 7 4745 1 MASK VELOBIT

SET BIT TO INDICATE VELOCITY
 MEASUREMENT MADE.

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1194	REF	36	LAST	892	33.3657	26 107 0	ADS	FLGWRD11	
1195	REF	9	LAST	892	33.3660	11 651 0	CCS	VSELECT	UPDATE VSELECT
1196					33.3661	1 3663 0	TCF	+2	
1197	REF	56	LAST	892	33.3662	3 4752 0	CA	TWO	
1198	REF	10	LAST	893	33.3663	55 651 0	TS	VSELECT	
1199	REF	134	LAST	867	33.3664	1 5155 1	TCF	ENDOFJOB	
1200	REF	57	LAST	893	33.3665	3 4752 0	VBAD	CAP	TWO
1201	REF	3	LAST	892	33.3666	55 675 0	VSTILBAD	TS	STILBADV
1202	REF	1			33.3667	1 3660 0	TCF	ENDLRV	SET STILBAD TO WAIT 4 SECONDS

R1203 LRMJOB IS SET BY LRHTASK WHEN LEM IS BELOW 25000 FT. THIS JOB
 R1204 INITIALIZES THE LR READ ROUTINE FOR AN ALT MEASUREMENT AND GOES TO
 R1205 SLEEP WHILE THE SAMPLING IS DONE-ABOUT 95 MS. WITH A GOODEND RETURN
 R1206 THE ALT DATA IS STORED IN HMEAS AND BIT7 OF LRSTAT IS SET.

1207					34.3716		BANK	34	
1208	REF	1			34.2000		SETLOC	R12STUFF	
1209					34.3716		BANK		
1210	REF	1					COUNT*	11/SERV	
1211	REF	247	LAST	892	34.3716	0 4616 1	LPHJOB	TC	BANKCALL
1212	REF	2	LAST	491	34.3717	53073 0	CADR	LRALT	INITIATE LR ALT MEASUREMENT
1213	REF	248	LAST	893	34.3720	0 4616 1	TC	BANKCALL	LRHJOB TO SLEEP ABOUT 95MS
1214	REF	14	LAST	892	34.3721	17714 0	CADR	RADSTALL	
1215	REF	1			34.3722	1 3745 0	TCF	HBAD	
1216	REF	2	LAST	150	34.3723	11 674 1	CCS	STILBADH	IS DATA GOOD JUST PRESENT?
1217	REF	1			34.3724	1 3755 1	TCF	HSTILBAD	JUST GOOD - MUST WAIT 4 SECONDS.
1218					34.3725	0 0004 0	INHINT		
1219					34.3726	0 0006 1	EXTEND		
1220	REF	9	LAST	892	34.3727	3 1102 0	DCA	SAMPLE SUP	GOOD RETURN-STORE AWAY LRH DATA
1221	REF	7	LAST	889	34.3730	53 655 1	DXCH	HMEAS	LRH DATA 1.079 FT/BIT
1222					34.3731	0 0006 1	EXTEND		FOR DOWNLINK
1223	REF	10	LAST	870	34.3732	3 1561 1	DCA	PIPTIME1	
1224	REF	8	LAST	606	34.3733	53 755 0	DXCH	MKTIME	
1225					34.3734	0 0006 1	EXTEND		
1226	REF	3	LAST	872	34.3735	3 1157 0	DCA	CDUTEMPY	CDUY, Z = AIG, AMG
1227	REF	9	LAST	606	34.3736	53 460 0	DXCH	AIG	
1228	REF	3	LAST	872	34.3737	3 1155 1	CA	CDUTMPX	CDUX = AUG
1229	REF	7	LAST	606	34.3740	55 461 1	TS	AUG	
1230	REF	37	LAST	893	34.3741	4 0107 0	CS	FLGWRD11	SET BIT TO INDICATE RANGE
1231	REF	2	LAST	884	34.3742	7 4750 0	MASK	RNGEDBIT	MEASUREMENT MADE.
1232	REF	38	LAST	893	34.3743	26 107 0	ADS	FLGWRD11	
1233	REF	135	LAST	893	34.3744	0 5155 0	ENDLRH	TC	ENDOFJOB

TERMINATE LRMJOB

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1234	REF	26	LAST	831	34,3745	3 0101 1	HBAD	CA	FLAGWRDS	
1235	REF	2	LAST	571	34,3746	7 4742 0		WASK	RNGSCBIT	IS BAD RETURN DUE TO SCALE CHANGE?
1236					34,3747	0 0006 1		EXTEND		
1237	REF	2	LAST	893	34,3750	1 3754 0		BZF	HSTILBAD -1	NO RESET HSTILBAD
1238	REF	85	LAST	888	34,3751	0 5516 0		TC	DOWNFLAG	YES RESET SCALE CHANGE BIT AND IGNORE
1239	REF	4	LAST	606	34,3752	00120 1		ADRES	RNGSCFLG	
1240	REF	136	LAST	893	34,3753	0 5155 0		TC	ENDOFJOB	

1241	REF	58	LAST	893	34,3754	3 4752 0		CAF	TWO	SET STILBAD TO WAIT 4 SECONDS
1242	REF	3	LAST	893	34,3755	55 674 1	HSTILBAD	TS	STILBADH	
1243	REF	137	LAST	894	34,3756	0 5155 0		TC	ENDOFJOB	

1244					34,3757			BANK	34	
1245	REF	1			34,2000			SETLOC	SERV4	
1246					34,3757			BANK		

1247	REF	2	LAST	893 TO 894:	33	33*		COUNT*	34/SERV	
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R1248 RDGIMS IS A TASK SET UP BY LRVJOB TO PICK UP THE THU CDUS AND TIME
 R1249 AT ABOUT THE MIOPOINT OF THE LR VEL READ ROUTINE WHEN 5 VEL SAMPLES
 R1250 ARE SPECIFIED.

1251	REF	6	LAST	892	34,1652			EBANK	LRVTIME	
1252					34,3757	0 0006 1	RDGIMS	EXTEND		
1253	REF	27	LAST	870	34,3760	3 0025 0		DCA	TIME2	PICK UP TIME2, TIME1
1254	REF	7	LAST	894	34,3761	53 653 1		DXCH	LRVTIME	AND SAVE IN LRVTIME

1255					34,3762	0 0006 1		EXTEND		
1256	REF	14	LAST	870	34,3763	3 0033 1		DCA	CDUX	PICK UP CDUX AND CDUY
1257	REF	5	LAST	892	34,3764	53 655 1		DXCH	LRXCDU	AND SAVE IN LRXCDU AND LRYCDU

1258	REF	8	LAST	870	34,3765	3 0034 0		CA	CDUZ	
1259	REF	4	LAST	892	34,3766	55 656 1		TS	LRZCDU	SAVE CDUZ IN LRZCDU

1260	REF	12	LAST	871	34,3767	3 0037 0		CA	PIPAZ	
1261	REF	6	LAST	887	34,3770	55 657 0		TS	PIPTEN	SAVE PIPAZ IN PIPTEN

1262					34,3771	0 0006 1		EXTEND		
1263	REF	3	LAST	384	34,3772	3 0041 1		DCA	PIPAZ	PICK UP PIPAZ AND PIPAZ
1264	REF	7	LAST	894	34,3773	53 661 0		DXCH	PIPTEN +1	AND SAVE IN PIPTEN +1 AND PIPTEN +2
1265	REF	60	LAST	859	34,3774	0 5261 1		TC	TASKOVER	

1266					33,3670			BANK	33	
1267	REF	8	LAST	873	33,2000			SETLOC	SERVICES	
1268					33,3670			BANK		

1269	REF	8	LAST	873 TO 893:	657	855*		COUNT*	44/SERV	
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1270	REF	53	LAST	890	37,1515			EBANK	DVENTR	
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R1271 HIGATJOB IS SET APPROXIMATELY 6 SECONDS PRIOR TO HIGH GATE DURING
 R1272 THE DESCENT BURN PHASE OF LUNAR LANDING. THIS JOB INITIATES THE
 R1273 LANDING RADAR REPOSITIONING ROUTINE AND GOES TO SLEEP UNTIL THE
 R1274 LR ANTENNA MOVES FROM POSITION 1 TO POSITION 2. IF THE LR ANTENNA
 R1275 ACHIEVES POSITION 2 WITHIN 22 SECONDS THE ALTITUDE AND VELOCITY
 R1276 BEAM VECTORS ARE RECOMPUTED TO REFLECT THE NEW ORIENTATION WITH
 R1277 RESPECT TO THE NB. BIT10 OF LRSTAT IS CLEARED TO ALLOW LR
 R1278 MEASUREMENTS AND THE JOB TERMINATES.

1279	REF	249	LAST	895	33.3670	0 4616 1	HIGATJOB	TC	BANKCALL	START LRPOS2 JOB
1280	REF	2	LAST	265	33.3671	53471 0		CAOR	LRPOS2	
1281	REF	250	LAST	895	33.3672	0 4616 1		TC	BANKCALL	PUT HIGATJOB TO SLEEP UNTIL JOB IS DONE
1282	REF	15	LAST	893	33.3673	17714 0		CAOR	HADSTALL	
1283	REF	1			33.3674	1 3703 1		TCF	POSALARM	BAD END ALARM
1284	REF	2	LAST	255	33.3675	3 7711 1	POS6000	CA	PRIPOS2	REDUCE PRIORITY FOR INTERPRETIVE COMPS.
1285	REF	13	LAST	757	33.3676	0 5146 1		TC	PRIUCHNG	
1286	REF	1			33.3677	0 3737 1		TC	SETPOS2	LR IN POS2 - SET UP TRANSFORMATIONS
1287	REF	86	LAST	894	33.3700	0 5516 0		TC	DOWNFLAG	
1288	REF	1			33.3701	00252 1		ADRES	HOLRREAD	RESET HOLRREAD FLAG TO ENABLE LR READING
1289	REF	138	LAST	894	33.3702	0 5155 0		TC	ENDOFJOB	
1290	REF	1			33.3703	3 3720 1	POSALARM	CA	OCT523	
1291	REF	251	LAST	895	33.3704	0 4616 1		TC	BANKCALL	
1292	REF	7	LAST	514	33.3705	21562 0		CAOR	PRIOLARM	FLASH ALARM CODE
1293	REF	37	LAST	854	33.3706	1 6001 1		TCF	SETOP00H	TERMINATE
1294					33.3707	1 3712 1		TCF	+3	PROCEED - TRY AGAIN
1295	REF	139	LAST	895	33.3710	1 5155 1		TCF	ENDOFJOB	V 32 E TERMINATE R12
1296	REF	140	LAST	895	33.3711	0 5155 0		TC	ENDOFJOB	
1297	REF	29	LAST	888	33.3712	3 4745 0	+3	CA	BIT7	SEE IF IN POS2 YET
1298					33.3713	0 0006 1		EXTEND		
1299	REF	23	LAST	374	33.3714	02 033 0		RAND	CHAN33	
1300					33.3715	0 0006 1		EXTEND		
1301	REF	1			33.3716	1 3675 1		BZF	POS6000	POS2 ACHIEVED SET UP ANTENNA BEAMS
1302	REF	2	LAST	895	33.3717	1 3703 1		TCF	POSALARM	STILL DIDN'T MAKE IT REALARM
1303					33.3720	00523 0	OCT523	OCT	523	
1304	REF	11	LAST	748	33.3721	0 4645 1	SETPOS1	TC	MAKECAOR	MUST BE CALLED BY BANKCALL
1305	REF	1			33.3722	55 656 1		TS	LRADRET1	SAVE RETURN CAOR. SINCE BUF2 CLOBBED
1306	REF	59	LAST	894	33.3723	3 4752 0		CAF	TWO	
1307	REF	4	LAST	894	33.3724	55 674 1		TS	STILBADH	INITIALIZE STILBAD
1308	REF	4	LAST	893	33.3725	55 675 0		TS	STILBADV	INITIALIZE STILBAD
1309	REF	165	LAST	888	33.3726	3 4755 1		CA	ZERO	INDEX FOR LRALPHA.LRBETA IN POS 1.

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1310	REF	5	LAST	890	33,3727	55'670 0	TS	LRLCTR	SET L,R,R, ANS S TO ZERO	
1311	REF	5	LAST	891	33,3730	55'672 1	TS	LRMCTR		
1312	REF	4	LAST	890	33,3731	55'671 1	TS	LRRCTR		
1313	REF	4	LAST	891	33,3732	55'673 0	TS	LRSCTR		
1314	REF	11	LAST	893	33,3733	55'651 0	TS	VSELECT	INITIALIZE VSELECT	
1315	REF	1			33,3734	0 3740 1	TC	SETPUS	CONTINUE WITH COMPUTATIONS	
1316	REF	2	LAST	895	33,3735	3 1656 0	CA	LHADRET1		
1317	REF	15	LAST	864	33,3736	0 4640 1	TC	HANKJHP	RETURN TO CALLER	
1318	REF	60	LAST	895	33,3737	3 4752 0	SETPOS2	CA	TWO	INDEX FOR POS2
1319	REF	216	LAST	890	33,3740	56 002 0	SETPOS	XCH	0	SAVE INDEX IN Q
1320	REF	2	LAST	149	33,3741	55'650 1	TS	LHADRET	SAVE RETURN	
1321	REF	10	LAST	888	33,3742	3 5014 1	CA	EBANK5		
1322	REF	43	LAST	892	33,3743	54 003 0	TS	EBANK		
1323	REF	2	LAST	122	E5,1522		EBANK=	LRALPHA		
1324					33,3744	0 0006 1	EXTEND			
1325	REF	217	LAST	896	33,3745	5 0002 0	INDEX	Q		
1326	REF	3	LAST	896	33,3746	3 1523 1	DCA	LRALPHA	LRALPHA IN A, LRBETA IN L	
1327	REF	22	LAST	886	33,3747	54 772 1	TS	CDUSPUT +4	ROTATION ABOUT X	
1328	REF	23	LAST	896	33,3750	22 766 0	LXCH	CDUSPUT	ROTATION ABOUT Y	
1329	REF	166	LAST	895	33,3751	3 4755 1	CA	ZERO		
1330	REF	24	LAST	896	33,3752	54 770 0	TS	CDUSPUT +2	ZERO ROTATION ABOUT Z	
1331	REF	12	LAST	892	33,3753	3 5016 0	CA	EBANK7		
1332	REF	44	LAST	896	33,3754	54 003 0	TS	EBANK		
1333	REF	3	LAST	896	E7,1650		EBANK=	LHADRET		
1334	REF	164	LAST	889	33,3755	0 6037 0	TC	INTERPRET		
1335					33,3756	45175 0	VLOAD	CALI		
1336	REF	5	LAST	786	33,3757	06516 0		UNITY	CONVERT UNITY(ANTENNA) TO HB	
1337	REF	2	LAST	571	33,3760	47651 0		TG*SMNB		
1338	REF	2	LAST	116	33,3761	26237 0	STOVL	VYBEAMNB		
1339	REF	11	LAST	818	33,3762	06520 0		UNITX	CONVERT UNITX(ANTENNA) TO HB	
1340					33,3763	77624 1	CALL			
1341	REF	4	LAST	548	33,3764	47671 1		*SMNB*		
1342	REF	2	LAST	116	33,3765	02245 0	STORE	VXBEAMNB		
1343					33,3766	76435 1	VXV	VSL1		
1344	REF	3	LAST	896	33,3767	02237 0		VYBEAMNB		
1345	REF	3	LAST	886	33,3770	26231 0	STOVL	VZBEAMNB	Z = X * Y	
1346	REF	1			33,3771	26003 0		HBEAMANT		
1347					33,3772	77624 1	CALL			
1348	REF	5	LAST	896	33,3773	47671 1		*SMNB*	CONVERT TO HB	
1349	REF	2	LAST	884	33,3774	02273 0	STORE	HBEAMNB		
1350					33,3775	77776 1	EXIT			

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1351 REF 4 LAST 896 33.3776 0 1650 0

TC LEAD:LT

L LANDING ANALOG DISPLAYS

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0001					21,2154				BANK	21	
0002	REF	3	LAST	872	21,2000				SETLOC	R10	
0003					21,2154				BANK		
0004	REF	38	LAST	885	E7.1536				EBANK=	UNIT/R/	
0005	REF	2	LAST	42 TO	42:	6	6*		CCUNIT#	53/R10	
0006	REF	2	LAST	829	21,2154	23'714	1	LANDISP	LXCH	PIPCTR1	UPDATE TBASE2 AND PIPCTR SIMULTANEOUSLY.
0007	REF	13	LAST	859	21,2155	4 0025	1		CS	TIME1	
0008	REF	4	LAST	858	21,2156	53'056	1		DXCH	TBASE2	
0009	REF	25	LAST	865	21,2157	4 0103	1		CS	FLAGWRD7	IS LANDING ANALOG DISPLAYS FLAG SET?
0010	REF	3	LAST	740	21,2160	7 4741	0		MASK	SWANDBIT	
0011	REF	265	LAST	890	21,2161	10 000	0		CCS	A	
0012	REF	1			21,2162	1 3053	0		TCF	DISPRSET	NO.
0013	REF	29	LAST	829	21,2163	3 1303	0		CA	IMODES33	BIT 7 = 0 (NO ALTRATE). =1 (ON ALT.)
0014	REF	30	LAST	895	21,2164	7 4745	1		MASK	BIT7	
0015	REF	266	LAST	898	21,2165	10 000	0		CCS	A	
0016	REF	1			21,2166	1 2240	1		TCF	ALTRGUT	
0017	REF	1			21,2167	0 2324	0	ALTRGUT	TC	DISINDAT	CHECK RUDE SELECT SWITCH AND DIOFLG.
0018	REF	30	LAST	898	21,2170	4 1303	1		CS	IMODES33	
0019	REF	31	LAST	898	21,2171	7 4745	1		MASK	BIT7	
0020	REF	31	LAST	898	21,2172	27'303	1		ADS	IMODES33	ALTERNATE ALTITUDE RATE WITH ALTITUDE.
0021	REF	39	LAST	821	21,2173	3 4752	0		CAF	BIT2	RATE COMMAND IS EXECUTED BEFORE RANGE.
0022					21,2174	0 0006	1		EXTEND		
0023	REF	12	LAST	856	21,2175	05 014	1		WCR	CHAR:4	ALTRATE (BIT2 = 1). ALTITUDE (BIT2 = 0).
0024	REF	6	LAST	877	21,2176	3 1743	0	AFCOMP	CA	RUNIT	COMPUTE ALTRATE=RUNIT.VVECT R/CS #2(-6).
0025					21,2177	0 0006	1		EXTEND		
0026	REF	2	LAST	151	21,2200	7 1706	0		MP	VVECT	MULTIPLY X-COMPONENTS.
0027	REF	24	LAST	817	21,2201	56 070	0		XCH	RUPTRREG1	SAVE SINGLE PRECISION RESULT R/CS #2(-6).
0028	REF	7	LAST	898	21,2202	3 1744	1		CA	RUNIT +1	MULTIPLY Y-COMPONENTS.
0029					21,2203	0 0006	1		EXTEND		
0030	REF	3	LAST	898	21,2204	7 1707	1		MP	VVECT +1	
0031	REF	25	LAST	898	21,2205	26 070	1		ADS	RUPTRREG1	ACCUMULATE PARTIAL PRODUCTS.
0032	REF	8	LAST	898	21,2206	3 1745	0		CA	RUNIT +2	MULTIPLY Z-COMPONENTS.
0033					21,2207	0 0006	1		EXTEND		
0034	REF	4	LAST	898	21,2210	7 1710	1		MP	VVECT +2	
0035	REF	26	LAST	898	21,2211	26 070	1		ADS	RUPTRREG1	ALTITUDE RATE IN R/CS #2(-6).
0036	REF	1			21,2212	3 2000	0		CA	AFCOMP	CONVERT ALTRATE TO BIT UNITS (.5RPS/BIT)
0037					21,2213	0 0006	1		EXTEND		
0038	REF	27	LAST	898	21,2214	7 0070	1		MP	RUPTRREG1	
0039					21,2215	20 001	1		DDOUBL		
0040					21,2216	20 001	1		DDOUBL		
0041	REF	28	LAST	898	21,2217	56 070	0		XCH	RUPTRREG1	ALTITUDE RATE IN BIT UNITS*2(-14).
0042	REF	3	LAST	877	21,2220	3 1716	0		CA	ALTRATE	ALTITUDE RATE COMPENSATION FACTOR.
0043					21,2221	0 0006	1		EXTEND		
0044	REF	2	LAST	151	21,2222	7 1715	1		MP		
0045	REF	29	LAST	898	21,2223	6 0070	0		AD	RUPTRREG1	
0046	REF	2	LAST	151	21,2224	55'711	0		TS	ALTRATE	ALTITUDE RATE IN BIT UNITS*2(-14).
0047	REF	3	LAST	898	21,2225	4 1711	0		CS	ALTRATE	

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0048				21.2226	0 0006 1		EXTEND		CHECK POLARITY OF ALTITUDE RATE.
0049				21.2227	6 2231 0		BZMF	+2	
0050	REF	1		21.2230	1 2233 0		TCF	DATADUT	NEGATIVE - SEND POS. PULSES TO ALTH REG.
0051	REF	4	LAST	898	21.2231	3 1711 1	CA	ALTRATE	POSITIVE OR ZERO - SET SIGN BIT = 1 AND
0052	REF	32	LAST	532	21.2232	6 4735 1	AD	BIT15	SEND TO ALTH REGISTER. *DO NOT SEND +1*
0053	REF	1		21.2233	54 060 0	DATAOUT	TS	ALTH	ACTIVATE THE LANDING ANALOG DISPLAYS - -
0054	REF	31	LAST	725	21.2234	3 4751 0	CAF	BIT3	
0055				21.2235	0 0006 1		EXTEND		
0056	REF	13	LAST	898	21.2236	05 014 1	WDR	CHAN14	BIT3 DRIVES THE ALT/ALTRATE-METER.
0057	REF	61	LAST	894	21.2237	1 5261 0	TCF	TASKOVER	EXIT
0058	REF	2	LAST	898	21.2240	0 2324 0	TC	DISINBAT	CHECK MODE SELECT SWITCH AND DIFED.
0059	REF	32	LAST	898	21.2241	4 4745 1	CS	BIT7	
0060	REF	32	LAST	898	21.2242	7 1303 1	MASK	IMODES33	
0061	REF	33	LAST	899	21.2243	55 303 1	TS	IMODES3	ALTERNATE ALTITUDE RATE WITH ALTITUDE.
0062	REF	40	LAST	898	21.2244	4 4752 1	CS	BIT2	
0063				21.2245	0 0006 1		EXTEND		
0064	REF	14	LAST	899	21.2246	03 014 1	WAND	CHAN14	
0065	REF	3	LAST	876	21.2247	11 741 0	CCS	ALTRITS	=-1 IF OLD ALT. DATA TUBE EXTRAPOLATED.
0066				21.2250	1 2254 1		TCF	+4	
0067				21.2251	1 2254 1		TCF	+3	
0068	REF	1		21.2252	1 2272 0		TCF	OLDATA	
0069	REF	4	LAST	899	21.2253	55 741 0	TS	ALTRITS	SET ALTRITS FROM -0 TO +0.
0070	REF	97	LAST	886	21.2254	4 4753 0	CS	ONE	
0071	REF	5	LAST	899	21.2255	53 742 0	DXCH	ALTRITS	SET ALTRITS=-1 FOR SWITCH USE NEXT PASS.
0072	REF	2	LAST	151	21.2256	53 713 1	DXCH	ALTSAVE	
0073	REF	31	LAST	782	21.2257	3 4742 1	CA	BIT15	NEW ALTITUDE EXTRAPOLATION WITH ALTRATE.
0074	REF	218	LAST	896	21.2260	56 002 0	XCH	6	
0075				21.2261	22 007 0		LXCH	7	2L
0076	REF	3	LAST	898	21.2262	3 1715 0	CA	DT	
0077				21.2263	0 0006 1		EXTEND		
0078	REF	219	LAST	899	21.2264	10 002 1	OV	0	RESCALE DT*2(-14) TO *2(-9) TIME IN CS.
0079				21.2265	0 0006 1		EXTEND		
0080	REF	1		21.2266	7 2002 0		MP	ALTSAVE	.0021322 *2(+8)
0081	REF	2	LAST	899	21.2267	1 2273 1	TCF	OLDATA +1	RATE APPLIES FOR DT CS.
0082	REF	3	LAST	899	21.2270	53 713 1	DXCH	ALTSAVE	
0083	REF	1		21.2271	1 2313 0		TCF	OLDATA	
0084	REF	1		21.2272	3 2001 1	OLDATA	CA	ALTRATE	RATE APPLIES FOR .5 SEC. (4X/SEC. CYCLE)
0085				21.2273	0 0006 1		EXTEND		
0086	REF	5	LAST	899	21.2274	7 1711 0	MP	ALTRATE	EXTRAPOLATE WITH ALTITUDE RATE.
0087				21.2275	20 001 1		DDOUBL		
0088	REF	4	LAST	899	21.2276	6 1713 0	AD	ALTSAVE +1	
0089	REF	5	LAST	899	21.2277	55 713 1	TS	ALTSAVE +1	
0090	REF	167	LAST	896	21.2300	3 4755 1	CAF	ZERO	
0091	REF	6	LAST	899	21.2301	27 712 0	ADS	ALTSAVE	
0092	REF	20	LAST	826	21.2302	3 4733 1	CAF	PULSEMAX	FORCE SIGN AGREEMENT ASSUMING A
0093	REF	98	LAST	899	21.2303	6 4753 1	AD	ONE	NON-NEGATIVE ALTSAVE.
0094	REF	7	LAST	899	21.2304	6 1713 0	AD	ALTSAVE +1	IF ALTSAVE IS NEGATIVE, ZERO ALTSAVE
0095	REF	8	LAST	899	21.2305	55 713 1	TS	ALTSAVE +1	AND ALTSAVE +1 AT ZERODATA.

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0096	REF 168	LAST	899	21,2306	3 4755 1	CAF	ZERO	
0097	REF 21	LAST	899	21,2307	6 4733 1	AD	POS MAX	
0098	REF 9	LAST	899	21,2310	6 1712 1	AD	ALTSAVE	
0099	REF 10	LAST	900	21,2311	55 712 0	TS	ALTSAVE	POSSIBLY SKIP TO NEWDATA.
0100	REF 1			21,2312	1 3050 0	TCF	ZERODATA	
0101	REF 11	LAST	900	21,2313	11 713 1	CCS	ALTSAVE +1	
0102				21,2314	1 2320 0	TCF	+4	
0103				21,2315	1 2320 0	TCF	+3	
0104	REF 169	LAST	900	21,2316	3 4755 1	CAF	ZERO	SET NEGATIVE ALTSAVE +1 TO +0.
0105	REF 12	LAST	900	21,2317	55 713 1	TS	ALTSAVE +1	
0106	REF 13	LAST	900	21,2320	11 712 0	CCS	ALTSAVE	PROVIDE A 15 BIT UNSIGNED OUTPUT.
0107	REF 33	LAST	899	21,2321	3 4735 1	CAF	BIT 4	THE HI-ORDER PART IS +1 OR +0.
0108	REF 14	LAST	900	21,2322	6 1713 0	AD	ALTSAVE +1	
0109	REF 2	LAST	899	21,2323	1 2233 0	TCF	DATAPUT	DISPATCH UNSIGNED BITS TO ALTM REG.
0110				21,2324	0 0006 1	EXTEND		
0111	REF 3	LAST	829	21,2325	23 714 1	EXCH	LADDSAVE	SAVE RETURN TO ALTROUT +1 OR ALTROUT +1
0112	REF 43	LAST	875	21,2326	3 4746 0	CAF	BIT 6	
0113				21,2327	0 0006 1	EXTEND		WISHETH THE ASTRONAUT THE ANALOG
0114	REF 7	LAST	830	21,2330	02 030 0	RAND	CHAN30	DISPLAYS? I.E.,
0115	REF 267	LAST	898	21,2331	10 000 0	CCS	A	IS THE MODE SELECT SWITCH IN POS 5?
0116	REF 2	LAST	898	21,2332	1 3053 0	TCF	DISPSET	NO. ASTRONAUT REQUESTS NO INERTIAL DATA
0117	REF 27	LAST	801	21,2333	4 0075 1	CS	FLAGWED1	YES. CHECK STATUS OF DIDEFLAG.
0118	REF 2	LAST	217	21,2334	7 4736 0	MASK	DIDEFLAG	
0119				21,2335	0 0006 1	EXTEND		
0120	REF 1			21,2336	1 2374 1	BZF	SPEEDRUN	SET. PERFORM DATA DISPLAY SEQUENCE.
0121	REF 28	LAST	900	21,2337	4 0075 1	CS	FLAGWED1	RESET. PERFORM INITIALIZATION FUNCTIONS.
0122	REF 3	LAST	900	21,2340	7 4736 0	MASK	DIDEFLAG	
0123	REF 29	LAST	900	21,2341	26 075 1	ADS	FLAGWED1	SET DIDEFLAG.
0124	REF 33	LAST	899	21,2342	4 4745 1	CS	BIT 7	
0125	REF 34	LAST	899	21,2343	7 1303 1	MASK	TRACES33	TO DISPLAY ALTRATE FIRST AND ALT. SECOND
0126	REF 35	LAST	900	21,2344	55 303 1	TS	TRACES33	
0127	REF 27	LAST	831	21,2345	4 0074 0	CS	FLAGWED1	ARE WE IN DESCENT TRAJECTORY?
0128	REF 2	LAST	831	21,2346	7 4752 1	MASK	DIDEFLAG	
0129				21,2347	0 0006 1	EXTEND		
0130	REF 62	LAST	899	21,2350	1 5261 0	BZF	TASKOVER	NO
0131	REF 28	LAST	807	21,2351	3 4744 1	CAF	BIT 8	YES.
0132				21,2352	0 0006 1	EXTEND		
0133	REF 51	LAST	874	21,2353	05 012 1	WDR	CHAN12	SET DISPLAY INERTIAL DATA OUTPUT.
0134	REF 170	LAST	900	21,2354	3 4755 1	CAF	ZERO	
0135	REF 2	LAST	150	21,2355	55 702 1	TS	TRAKLATV	LATERAL VELOCITY MONITOR FLAG
0136	REF 2	LAST	150	21,2356	55 703 0	TS	TRAKFWDV	FORWARD VELOCITY MONITOR FLAG
0137	REF 2	LAST	150	21,2357	55 676 0	TS	LATV-ETH	LATVEL MONITOR METER
0138	REF 2	LAST	150	21,2360	55 677 1	TS	FWDV-ETH	FWDVEL MONITOR METER
0139	REF 36	LAST	836	21,2361	3 4750 1	CAF	BIT 4	
0140	REF 25	LAST	853	21,2362	0 5173 1	TC	TWIDDLE	
0141	REF 1			21,2363	02365 0	ADRES	INTLZE	
0142	REF 63	LAST	900	21,2364	1 5261 0	TCF	TASKOVER	
0143	REF 41	LAST	899	21,2365	3 4752 0	CAF	BIT 2	
0144				21,2366	0 0006 1	EXTEND		
0145	REF 52	LAST	900	21,2367	05 012 1	WDR	CHAN12	ENABLE RR ERROR COUNTER.

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0146	REF	36	LAST	900	21.2370	4 1303 1	CS	IMODES33	
0147	REF	29	LAST	900	21.2371	7 4744 0	MASK	BIT9	
0148	REF	37	LAST	901	21.2372	27*303 1	ADS	IMODES33	SET INERTIAL DATA FLAG.
0149	REF	64	LAST	900	21.2373	1 5261 0	TCH	TASKOVER	
0150	REF	22	LAST	887	21.2374	4 1235 0	SPEEDRUN CS	PIPTIME +1	UPDATE THE VELOCITY VECTOR
0151	REF	14	LAST	898	21.2375	6 0025 0	AD	TIME1	COMPUTE T - TN
0152	REF	7	LAST	532	21.2376	6 4736 1	AD	HALF	CORRECT FOR POSSIBLE OVERFLOW OF TIME1.
0153	REF	8	LAST	901	21.2377	6 4736 1	AD	HALF	
0154	REF	4	LAST	899	21.2400	57*715 0	XCH	DT	SAVE FOR LATER USE
0155	REF	17	LAST	816	21.2401	3 4777 1	CA	1SEC	
0156	REF	8	LAST	613	21.2402	54 065 0	TS	ITEMP5	INITIALIZE FOR DIVISION LATER
0157					21.2403	0 0006 1	EXTEND		
0158	REF	11	LAST	887	21.2404	3 1237 0	DCA	GET/2	COMPUTE THE X-COMPONENT OF VELOCITY.
0159					21.2405	20 001 1	DDOUBL		
0160					21.2406	20 001 1	DDOUBL		
0161					21.2407	0 0006 1	EXTEND		
0162	REF	5	LAST	901	21.2410	7 1715 1	MP	DT	
0163					21.2411	0 0006 1	EXTEND		
0164	REF	9	LAST	901	21.2412	10 065 0	DV	ITEMP5	
0165	REF	5	LAST	898	21.2413	57*706 1	XCH	VVECT	$VVECT = G(T-TN) M/CS *2(-5)$
0166					21.2414	0 0006 1	EXTEND		
0167	REF	19	LAST	887	21.2415	3 1527 0	DCA	V	$M/CS *2(-7)$
0168					21.2416	20 001 1	DDOUBL		RESCALE TO 2(-5)
0169					21.2417	20 001 1	DDOUBL		
0170	REF	6	LAST	901	21.2420	27*706 0	ADS	VVECT	$VVECT = VN + G(T-TN) M/CS *2(-5)$
0171	REF	13	LAST	894	21.2421	3 0037 0	CA	PIPAY	DELV CM/SEC *2(-14)
0172	REF	4	LAST	870	21.2422	6 1160 1	AD	PIPATMPX	IN CASE PIPAX HAS BEEN ZEROED
0173					21.2423	0 0006 1	EXTEND		
0174	REF	1			21.2424	7 2004 0	MP	KPIPI(5)	$DELV = M/CS *2(-5)$
0175	REF	7	LAST	901	21.2425	27*706 0	ADS	VVECT	$VVECT = VN + DELV + GN(T-TN) M/CS *2(-5)$
0176					21.2426	0 0006 1	EXTEND		
0177	REF	12	LAST	901	21.2427	3 1241 1	DCA	GET/2 +2	COMPUTE THE Y-COMPONENT OF VELOCITY.
0178					21.2430	20 001 1	DDOUBL		
0179					21.2431	20 001 1	DDOUBL		
0180					21.2432	0 0006 1	EXTEND		
0181	REF	6	LAST	901	21.2433	7 1715 1	MP	DT	
0182					21.2434	0 0006 1	EXTEND		
0183	REF	10	LAST	901	21.2435	10 065 0	DV	ITEMP5	
0184	REF	8	LAST	901	21.2436	57*707 0	XCH	VVECT +1	
0185					21.2437	0 0006 1	EXTEND		
0186	REF	20	LAST	901	21.2440	3 1531 1	DCA	V +2	
0187					21.2441	20 001 1	DDOUBL		
0188					21.2442	20 001 1	DDOUBL		
0189	REF	9	LAST	901	21.2443	27*707 1	ADS	VVECT +1	
0190	REF	4	LAST	894	21.2444	3 0040 0	CA	PIPAY	
0191	REF	4	LAST	870	21.2445	6 1161 0	AD	PIPATMPY	
0192					21.2446	0 0006 1	EXTEND		
0193	REF	2	LAST	901	21.2447	7 2004 0	MP	KPIPI(5)	
0194	REF	10	LAST	901	21.2450	27*707 1	ADS	VVECT +1	

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0195					21.2451	0 0006 1	EXTEND		
0196	REF	13	LAST	901	21.2452	3 1243 0	DCA	GD1/2 +4	COMPUTE THE Z-COMPONENT OF VELOCITY.
0197					21.2453	20 001 1	DDOUBL		
0198					21.2454	20 001 1	DDOUBL		
0199					21.2455	0 0006 1	EXTEND		
0200	REF	7	LAST	901	21.2456	7 1715 1	MP	DT	
0201					21.2457	0 0006 1	EXTEND		
0202	REF	11	LAST	901	21.2460	10 065 0	DV	ITEMP5	
0203	REF	11	LAST	901	21.2461	57 710 0	XCH	VVECT +2	
0204					21.2462	0 0006 1	EXTEND		
0205	REF	21	LAST	901	21.2463	3 1533 0	DCA	V +4	
0206					21.2464	20 001 1	DDOUBL		
0207					21.2465	20 001 1	DDOUBL		
0208	REF	12	LAST	902	21.2466	27 710 1	ADS	VVECT +2	
0209	REF	7	LAST	871	21.2467	3 0041 1	CA	PIPAZ	
0210	REF	4	LAST	870	21.2470	6 1162 0	AD	PIPATHPZ	
0211					21.2471	0 0006 1	EXTEND		
0212	REF	3	LAST	901	21.2472	7 2004 0	MP	*PIPI(5)	
0213	REF	13	LAST	902	21.2473	27 710 1	ADS	VVECT +2	
0214	REF	32	LAST	899	21.2474	3 4751 0	CAP	RITS	PAUSE 40 MS TO LET OTHER RUPTS IN.
0215	REF	9	LAST	857	21.2475	0 5224 0	TC	VA-DELAY	
0216	REF	28	LAST	900	21.2476	4 0074 0	CS	FLAGR400	ARE WE IN DESCENT TRAJECTORY?
0217	REF	3	LAST	900	21.2477	7 4752 1	MASK	REDFLEET	
0218	REF	268	LAST	900	21.2500	10 000 0	CCS	A	
0219					21.2501	1 2503 1	TCF	+2	YES.
0220	REF	4	LAST	900	21.2502	0 1714 1	TC	LAGGAVE	NO.
0221	REF	6	LAST	887	21.2503	3 1733 1	CA	DELVS	H1 X OF VELOCITY CORRECTION TERM.
0222	REF	14	LAST	902	21.2504	6 1706 1	AD	VVECT	H1 X OF UPDATED VELOCITY VECTOR.
0223	REF	35	LAST	868	21.2505	54 061 1	TS	ITEMP1	$= Vx - DVx \# / CS^2(-5).$
0224	REF	7	LAST	902	21.2506	3 1735 1	CA	DELVS +2	Y
0225	REF	15	LAST	902	21.2507	6 1707 0	AD	VVECT +1	Y
0226	REF	11	LAST	750	21.2510	54 062 1	TS	ITEMP2	$= Vy - DVy \# / CS^2(-5).$
0227	REF	8	LAST	902	21.2511	3 1737 0	CA	DELVS +4	Z
0228	REF	16	LAST	902	21.2512	6 1710 0	AD	VVECT +2	Z
0229	REF	20	LAST	751	21.2513	54 063 0	TS	ITEMP3	$= Vz - DVz \# / CS^2(-5).$
0230	REF	36	LAST	902	21.2514	5 0061 0	CA	ITEMP1	COMPUTE VHY, VELOCITY DIRECTED ALONG THE
0231					21.2515	0 0006 1	EXTEND		Y-COORDINATE.
0232	REF	5	LAST	876	21.2516	7 1717 0	MP	UHYP	H1 X OF CROSS-RANGE HALF-UNIT VECTOR.
0233	REF	30	LAST	898	21.2517	56 070 0	XCH	RUPTREG1	
0234	REF	12	LAST	902	21.2520	3 0062 0	CA	ITEMP2	
0235					21.2521	0 0006 1	EXTEND		
0236	REF	6	LAST	902	21.2522	7 1721 0	MP	UHYP +2	Y
0237	REF	31	LAST	902	21.2523	26 070 1	ADS	RUPTREG1	ACCUMULATE PARTIAL PRODUCTS.
0238	REF	21	LAST	902	21.2524	3 0063 1	CA	ITEMP3	
0239					21.2525	0 0006 1	EXTEND		
0240	REF	7	LAST	902	21.2526	7 1723 1	MP	UHYP +4	Z
0241	REF	32	LAST	902	21.2527	26 070 1	ADS	RUPTREG1	

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0242	REF	33	LAST	902	21.2530	3 0070 0	CA	RUPTREG1	
0243					21.2531	6 0000 1	DOUBLE		
0244	REF	2	LAST	151	21.2532	57.704 0	XCH	VHY	VHY = VMP.UHYP M/CS*2(-5).
0245	REF	37	LAST	902	21.2533	3 0061 0	CA	ITEMP1	NOW COMPUTE VHZ, VELOCITY DIRECTED ALONG
0246					21.2534	0 0006 1	EXTEND		THE Z-COORDINATE.
0247	REF	4	LAST	876	21.2535	7 1725 1	MP	UHYP	HI X OF DOWN-RANGE HALF-UNIT VECTOR.
0248	REF	34	LAST	903	21.2536	56 070 0	XCH	RUPTREG1	
0249	REF	13	LAST	902	21.2537	3 0062 0	CA	ITEMP2	
0250					21.2540	0 0006 1	EXTEND		
0251	REF	5	LAST	903	21.2541	7 1727 0	MP	UHYP +2	Y
0252	REF	35	LAST	903	21.2542	26 070 1	ADS	RUPTREG1	ACCUMULATE PARTIAL PRODUCTS.
0253	REF	22	LAST	902	21.2543	3 0063 1	CA	ITEMP3	
0254					21.2544	0 0006 1	EXTEND		
0255	REF	6	LAST	903	21.2545	7 1731 1	MP	UHYP +4	Z
0256	REF	36	LAST	903	21.2546	26 070 1	ADS	RUPTREG1	
0257	REF	37	LAST	903	21.2547	3 0070 0	CA	RUPTREG1	
0258					21.2550	6 0000 1	DOUBLE		
0259	REF	2	LAST	151	21.2551	57.705 1	XCH	VHZ	VHZ = VMP.UHYP M/CS*2(-5).
0260	REF	7	LAST	740	21.2552	3 5015 0	CAF	EBANK6	GET SIN(AUG), COS(AUG) FROM GPMATRIX.
0261	REF	45	LAST	896	21.2553	54 003 0	TS	EBANK	
0262	REF	3	LAST	188	E6.1417		EBANK=	M22	
0263	REF	4	LAST	903	21.2554	3 1417 1	CA	M22	
0264	REF	23	LAST	903	21.2555	54 063 0	TS	ITEMP3	
0265	REF	2	LAST	189	21.2556	3 1420 0	CA	M32	
0266	REF	9	LAST	751	21.2557	54 064 1	TS	ITEMP4	
0267	REF	13	LAST	896	21.2560	3 5016 0	CAF	EBANK7	
0268	REF	46	LAST	903	21.2561	54 003 0	TS	EBANK	
0269	REF	39	LAST	898	E7.1536		EBANK=	UNIT/M/	
0270	REF	10	LAST	903	21.2562	3 0064 0	CA	ITEMP4	COMPUTE LATERAL AND FORWARD VELOCITIES.
0271					21.2563	0 0006 1	EXTEND		
0272	REF	5	LAST	903	21.2564	7 1704 1	MP	VHY	
0273	REF	38	LAST	903	21.2565	56 070 0	XCH	RUPTREG1	
0274	REF	24	LAST	903	21.2566	3 0063 1	CA	ITEMP3	
0275					21.2567	0 0006 1	EXTEND		
0276	REF	3	LAST	903	21.2570	7 1705 0	MP	VHZ	
0277	REF	39	LAST	903	21.2571	26 070 1	ADS	RUPTREG1	=VHY(COS)AUG+VHZ(SIN)AUG M/CS *2(-5)
0278	REF	1			21.2572	3 2003 0	CA	VELLONV	CONVERT LATERAL VELOCITY TO BIT UNITS.
0279					21.2573	0 0006 1	EXTEND		
0280	REF	40	LAST	903	21.2574	7 0070 1	MP	RUPTREG1	
0281					21.2575	20 001 1	DOUBLE		
0282	REF	2	LAST	150	21.2576	57.700 1	XCH	LATVEL	LATERAL VELOCITY IN BIT UNITS *2(-14).
0283	REF	11	LAST	903	21.2577	3 0064 0	CA	ITEMP4	COMPUTE FORWARD VELOCITY.
0284					21.2600	0 0006 1	EXTEND		
0285	REF	4	LAST	903	21.2601	7 1705 0	MP	VHZ	
0286	REF	41	LAST	903	21.2602	56 070 0	XCH	RUPTREG1	
0287	REF	25	LAST	903	21.2603	3 0063 1	CA	ITEMP3	
0288					21.2604	0 0006 1	EXTEND		
0289	REF	4	LAST	903	21.2605	7 1704 1	MP	VHY	
0290	REF	269	LAST	902	21.2606	4 0000 0	CS	A	
0291	PLF	42	LAST	903	21.2607	26 070 1	ADS	RUPTREG1	=VHZ(COS)AUG-VHY(SIN)AUG M/CS *2(-5).

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0292	REF	2	LAST	903	21.2610	3 2003 0	CA	VELCONV	CONVERT FORWARD VELOCITY TO BIT UNITS.
0293					21.2611	0 0006 1	EXTEND		
0294	REF	43	LAST	903	21.2612	7 0070 1	MP	RUPTRREG1	
0295					21.2613	20 001 1	DDOUBL		
0296	REF	2	LAST	150	21.2614	57 701 0	XCH	FORVEL	FORWARD VELOCITY IN BIT UNITS *2(-14).
0297	REF	1			21.2615	4 2005 1	CS	MAXVBITS	ACC.=-199.9989 FT./SEC.
0298	REF	5	LAST	613	21.2616	54 066 0	TS	ITEMP6	-547 BIT UNITS (OCTAL) AT 0.5571 FPS/BIT
0299	REF	99	LAST	899	21.2617	3 4753 1	CAF	ONE	LOOP TWICE.
0300	REF	12	LAST	902	21.2620	54 065 0	VMONITOR	TS	ITEMP5
0301	REF	13	LAST	904	21.2621	50 065 1	INDEX	ITEMP5	FORWARD AND LATERAL VELOCITY LANDING
0302	REF	3	LAST	903	21.2622	11 700 0	CCS	LATVEL	ANALOG DISPLAYS MONITOR.
0303					21.2623	1 2627 1	TCF	+4	
0304	REF	1			21.2624	1 2730 0	TCF	LVLIMITS	
0305					21.2625	1 2635 1	TCF	+80	
0306	REF	2	LAST	904	21.2626	1 2730 0	TCF	LVLIMITS	
0307	REF	14	LAST	904	21.2627	50 065 1	INDEX	ITEMP5	
0308	REF	4	LAST	904	21.2630	4 1700 0	CS	LATVEL	
0309	REF	2	LAST	904	21.2631	6 2005 0	AD	MAXVBITS	+199.9989 FT./SEC.
0310					21.2632	0 0006 1	EXTEND		
0311	REF	1			21.2633	6 2643 1	BZMF	CHKLASTY	
0312	REF	3	LAST	904	21.2634	1 2730 0	TCF	LVLIMITS	
0313	REF	15	LAST	904	21.2635	50 065 1	INDEX	ITEMP5	
0314	REF	5	LAST	904	21.2636	3 1700 1	CA	LATVEL	
0315	REF	3	LAST	904	21.2637	6 2005 0	AD	MAXVBITS	
0316					21.2640	0 0006 1	EXTEND		
0317					21.2641	6 2643 1	BZMF	+2	
0318	REF	4	LAST	904	21.2642	1 2730 0	TCF	LVLIMITS	
0319	REF	16	LAST	904	21.2643	50 065 1	CHKLASTY	INDEX	ITEMP5
0320	REF	3	LAST	900	21.2644	11 676 0	CCS	LATVETR	
0321					21.2645	1 2651 0	TCF	+4	
0322	REF	1			21.2646	1 2662 0	TCF	LASTOK	
0323					21.2647	1 2656 1	TCF	+7	
0324	REF	2	LAST	904	21.2650	1 2662 0	TCF	LASTOK	
0325	REF	17	LAST	904	21.2651	50 065 1	INDEX	ITEMP5	
0326	REF	6	LAST	904	21.2652	3 1700 1	CA	LATVEL	
0327					21.2653	0 0006 1	EXTEND		
0328	REF	1			21.2654	6 2701 0	BZMF	LASTPOSY +5	
0329					21.2655	1 2662 0	TCF	+5	
0330	REF	18	LAST	904	21.2656	50 065 1	INDEX	ITEMP5	
0331	REF	7	LAST	904	21.2657	4 1700 0	CS	LATVEL	
0332					21.2660	0 0006 1	EXTEND		
0333	REF	1			21.2661	6 2716 0	BZMF	LASTNEGY +4	
0334	REF	19	LAST	904	21.2662	50 065 1	LASTOK	INDEX	ITEMP5
0335	REF	3	LAST	900	21.2663	11 702 1	CCS	TRAKLATV	
0336	REF	2	LAST	904	21.2664	1 2674 1	TCF	LASTPOSY	
0337					21.2665	1 2667 0	TCF	+2	
0338	REF	2	LAST	904	21.2666	1 2712 0	TCF	LASTNEGY	
0339	REF	20	LAST	904	21.2667	50 065 1	INDEX	ITEMP5	

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0340	REF	8	LAST	904	21,2670	3 1700 1	CA	LATVEL
0341					21,2671	0 0006 1	EXTEND	
0342	REF	1			21,2672	6 2720 0	BZMF	NEGVMAXY
0343	REF	1			21,2673	1 2703 0	TCF	POSVMAXY
0344	REF	21	LAST	904	21,2674	50 065 1	LASTPOSY INDEX	ITEMPS
0345	REF	9	LAST	905	21,2675	3 1700 1	CA	LATVEL
0346					21,2676	0 0006 1	EXTEND	
0347					21,2677	6 2701 0	BZMF	+2
0348	REF	2	LAST	905	21,2700	1 2703 0	TCF	POSVMAXY
0349	REF	4	LAST	904	21,2701	4 2005 1	CS	MAXVBITS
0350	REF	1			21,2702	1 3024 0	TCF	ZEROLSTY
0351	REF	22	LAST	905	21,2703	50 065 1	POSVMAXY INDEX	ITEMPS
0352	REF	4	LAST	904	21,2704	4 1676 0	CS	LATVMETR
0353	REF	5	LAST	905	21,2705	6 2005 0	AD	MAXVBITS
0354	REF	23	LAST	905	21,2706	50 065 1	INDEX	ITEMPS
0355	REF	4	LAST	817	21,2707	56 072 1	XCH	RUPTRREG+
0356	REF	100	LAST	904	21,2710	3 4753 1	CAF	ONE
0357	REF	2	LAST	905	21,2711	1 3027 0	TCF	ZEROLSTY +3
0358	REF	24	LAST	905	21,2712	50 065 1	LASTNEGY INDEX	ITEMPS
0359	REF	10	LAST	905	21,2713	3 1700 1	CA	LATVEL
0360					21,2714	0 0006 1	EXTEND	
0361	REF	2	LAST	905	21,2715	6 2720 0	BZMF	NEGVMAXY
0362	REF	6	LAST	905	21,2716	3 2005 0	CA	MAXVBITS
0363	REF	3	LAST	905	21,2717	1 3024 0	TCF	ZEROLSTY
0364	REF	25	LAST	905	21,2720	50 065 1	NEGVMAXY INDEX	ITEMPS
0365	REF	5	LAST	905	21,2721	3 1676 1	CA	LATVMETR
0366	REF	7	LAST	905	21,2722	6 2005 0	AD	MAXVBITS
0367					21,2723	4 0000 0	COM	
0368	REF	26	LAST	905	21,2724	50 065 1	INDEX	ITEMPS
0369	REF	5	LAST	905	21,2725	56 072 1	XCH	RUPTRREG3
0370	REF	101	LAST	905	21,2726	4 4753 0	CS	ONE
0371	REF	4	LAST	905	21,2727	1 3027 0	TCF	ZEROLSTY +3
0372	REF	27	LAST	905	21,2730	50 065 1	LVLIMITS INDEX	ITEMPS
0373	REF	4	LAST	904	21,2731	11 702 1	CCS	TRAKLATV
0374	REF	1			21,2732	1 2761 1	TCF	LATVPOS
0375					21,2733	1 2735 0	TCF	+2
0376	REF	1			21,2734	1 2766 0	TCF	LATVNEG
0377	REF	28	LAST	905	21,2735	50 065 1	INDEX	ITEMPS
0378	REF	6	LAST	905	21,2736	4 1676 0	CS	LATVMETR
0379					21,2737	0 0006 1	EXTEND	
0380					21,2740	6 2742 1	BZMF	+2
0381	REF	1			21,2741	1 2775 1	TCF	NEGLMLV
0382	REF	29	LAST	905	21,2742	50 065 1	INDEX	ITEMPS
0383	REF	11	LAST	905	21,2743	4 1700 0	CS	LATVEL
0384					21,2744	0 0006 1	EXTEND	
0385	REF	1			21,2745	6 3020 0	BZMF	LVMINLM
0386	REF	6	LAST	904	21,2746	6 0066 1	AD	ITEMPS
0387	REF	30	LAST	905	21,2747	50 065 1	INDEX	ITEMPS
0388	REF	7	LAST	905	21,2750	6 1676 1	AD	LATVMETR
0389					21,2751	0 0006 1	EXTEND	

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0390	REF	2	LAST	905	21,2752	6 3020 0	BZMF	LVMINLM
0391	REF	31	LAST	905	21,2753	50 065 1	INDEX	ITEMPS
0392	REF	12	LAST	905	21,2754	6 1700 1	AD	LATVEL
0393					21,2755	0 0006 1	EXTEND	
0394	REF	32	LAST	906	21,2756	5 0065 1	INDEX	ITEMPS
0395	REF	8	LAST	905	21,2757	61 1676 1	SU	LATVMETR
0396	REF	5	LAST	905	21,2760	1 3024 0	TCF	ZEROLSTY
0397	REF	33	LAST	906	21,2761	50 065 1	INDEX	ITEMPS
0398	REF	13	LAST	906	21,2762	4 1700 0	CS	LATVEL
0399					21,2763	0 0006 1	EXTEND	
0400	REF	3	LAST	906	21,2764	6 3020 0	BZMF	LVMINLM
0401					21,2765	1 2772 0	TCF	+5
0402	REF	34	LAST	906	21,2766	50 065 1	INDEX	ITEMPS
0403	REF	14	LAST	906	21,2767	3 1700 1	CA	LATVEL
0404					21,2770	0 0006 1	EXTEND	
0405	REF	4	LAST	906	21,2771	6 3020 0	BZMF	LVMINLM
0406	REF	35	LAST	906	21,2772	50 065 1	INDEX	ITEMPS
0407	REF	9	LAST	906	21,2773	4 1676 0	CS	LATVMETR
0408	REF	6	LAST	906	21,2774	1 3024 0	TCF	ZEROLSTY
0409	REF	36	LAST	906	21,2775	50 065 1	INDEX	ITEMPS
0410	REF	15	LAST	906	21,2776	3 1700 1	CA	LATVEL
0411					21,2777	0 0006 1	EXTEND	
0412	REF	5	LAST	906	21,3000	6 3020 0	BZMF	LVMINLM
0413	REF	8	LAST	905	21,3001	3 2005 0	CA	MAXVBITS
0414	REF	37	LAST	906	21,3002	50 065 1	INDEX	ITEMPS
0415	REF	10	LAST	906	21,3003	6 1676 1	AD	LATVMETR
0416					21,3004	4 0000 0	COM	
0417	REF	38	LAST	906	21,3005	50 065 1	INDEX	ITEMPS
0418	REF	16	LAST	906	21,3006	6 1700 1	AD	LATVEL
0419					21,3007	0 0006 1	EXTEND	
0420	REF	6	LAST	906	21,3010	6 3020 0	BZMF	LVMINLM
0421					21,3011	0 0006 1	EXTEND	
0422	REF	39	LAST	906	21,3012	5 0065 1	INDEX	ITEMPS
0423	REF	17	LAST	906	21,3013	61 1700 1	SU	LATVEL
0424	REF	40	LAST	906	21,3014	50 065 1	INDEX	ITEMPS
0425	REF	11	LAST	906	21,3015	6 1676 1	AD	LATVMETR
0426					21,3016	4 0000 0	COM	
0427	REF	7	LAST	906	21,3017	1 3024 0	TCF	ZEROLSTY
0428	REF	41	LAST	906	21,3020	50 065 1	INDEX	ITEMPS
0429	REF	12	LAST	906	21,3021	4 1676 0	CS	LATVMETR
0430	REF	42	LAST	906	21,3022	50 065 1	INDEX	ITEMPS
0431	REF	18	LAST	906	21,3023	6 1700 1	AD	LATVEL
0432	REF	43	LAST	906	21,3024	50 065 1	INDEX	ITEMPS
0433	REF	6	LAST	905	21,3025	56 072 1	ALH	RUPTRREG
0434	REF	171	LAST	900	21,3026	3 4755 1	CAF	ZERO
0435	REF	44	LAST	906	21,3027	50 065 1	INDEX	ITEMPS
0436	REF	5	LAST	905	21,3030	55 1702 1	TS	IFAKLATV
0437	REF	45	LAST	906	21,3031	50 065 1	INDEX	ITEMPS
0438	REF	7	LAST	906	21,3032	3 0072 1	CA	RUPTRREG3
0439	REF	24	LAST	872	21,3033	6 4754 0	AD	REGD

AVDIDS +D DINC HARDWARE MALFUNCTION

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0440	REF	46	LAST	906	21.3034	50 065 1	INDEX	ITEMP5	
0441	REF	2	LAST	536	21.3035	54 053 0	TS	CDUTCMD	
0442	REF	47	LAST	907	21.3036	50 065 1	INDEX	ITEMP5	
0443	REF	8	LAST	906	21.3037	3 0072 1	CA	RUPTRREG3	
0444	REF	48	LAST	907	21.3040	50 065 1	INDEX	ITEMP5	
0445	REF	13	LAST	906	21.3041	27 676 0	ADS	LATVMETR	
0446	REF	49	LAST	907	21.3042	10 065 0	CCS	ITEMP5	FIRST MONITOR FORWARD THEN LATERAL VEL.
0447	REF	1			21.3043	1 2620 0	TCF	VHMONITOR	
0448	REF	1			21.3044	3 5020 0	CAF	BITSET	DRIVE THE X-POINTER DISPLAY.
0449					21.3045	0 0006 1	EXTEND		
0450	REF	15	LAST	899	21.3046	05 014 1	WDR	CHAN14	
0451	REF	5	LAST	902	21.3047	0 1714 1	TC	LADEAVE	GO TO ALTROUT +1 OR TO ALTOUT +1
0452	REF	172	LAST	906	21.3050	3 4755 1	CAF	ZERU	ZERO ALTSAVE AND ALTSAVE +1 - - -
0453	REF	143	LAST	890	21.3051	54 001 1	TS	L	NO NEGATIVE ALTITUDES ALLOWED.
0454	REF	1			21.3052	1 2270 1	TCF	ZDAF	

R0455 *****

0456	REF	29	LAST	902	21.3053	4 0074 0	DISPSET	CS	FLAGWRD0	ARE WE IN DESCENT TRAJECTORY?
0457	REF	4	LAST	902	21.3054	7 4752 1	MASK	DIOFLBIT		
0458					21.3055	0 0006 1	EXTEND			
0459	REF	1			21.3056	1 3067 1	BZF	ABORTON	NO.	
0460	REF	30	LAST	901	21.3057	3 4744 1	CAF	BIT0	YES.	
0461	REF	38	LAST	901	21.3060	7 1303 1	MASK	IMODE33	CHECK IF INERTIAL DATA JUST DISPLAYED.	
0462	REF	270	LAST	903	21.3061	10 000 0	CCS	A		
0463	REF	42	LAST	900	21.3062	3 4752 0	CAF	BIT2	YES. DISABLE RR ERROR COUNTER	
0464	REF	31	LAST	907	21.3063	6 4744 1	AD	BIT	NO. REMOVE DISPLAY INERTIAL DATA	
0465					21.3064	4 0000 0	COM			
0466					21.3065	0 0006 1	EXTEND			
0467	REF	53	LAST	900	21.3066	03 012 1	WAND	CHAN12		
0468	REF	1			21.3067	4 3076 1	ABORTON	CS	BITS8/7	RESET INERTIAL DATA, INTERLEAVE FLAG.
0469	REF	39	LAST	907	21.3070	7 1303 1	MASK	IMODE33		
0470	REF	40	LAST	907	21.3071	55 303 1	TS	IMODE33		
0471	REF	4	LAST	900	21.3072	4 4736 0	CS	DIOFLBIT		
0472	REF	30	LAST	900	21.3073	7 0075 1	MASK	FLAGWRD1		
0473	REF	31	LAST	907	21.3074	54 075 1	TS	FLAGWRD1	RESET DIOFLAG.	
0474	REF	65	LAST	901	21.3075	1 5261 0	TCF	TASKOVER		

R0475 *****

0476					21.3076	00300 1	BITS8/7	OUT	00300	INERTIAL DATA AND INTERLEAVE FLAG.
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0477	REF	2	LAST	536	5020		BITSET		PRIMS	
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R0478 *****

L FINDCDUW - GUIDAR INTERFACE

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R0001 PROGRAM NAME: FINDCDUW

R0002 MOD NUMBER: 1 68 07 15

R0003 MOD AUTHOR: KLUPPP

R0004 OBJECTS OF MOD: 1. TO SUPPLY COMMANDED GIMBAL ANGLES FOR RUON 22.
R0005 2. TO MAINTAIN CORRECT AND CURRENT THRUST
R0006 DIRECTION DATA IN ALL MODES. THIS IS DONE BY
R0007 FETCHING FOR THE THRUST DIRECTION FILTER THE
R0008 CDUD'S IN PNGCS-AUTO, THE CDUD'S IN ALL OTHER
R0009 MODES.
R0010 3. TO SUBSTITUTE A STOPPATE FOR THE NORMAL
R0011 AUTOPILOT COMMANDS WHENEVER
R0012 1) NOT IN PNGCS-AUTO, OR
R0013 2) ENGINE IS OFF.

R0014 FUNCTIONAL DESCRIPTION:

R0015 FINDCDUW PROVIDES THE INTERFACES BETWEEN THE VARIOUS POWERED FLITE GUIDANCE PROGRAMS
R0017 AND THE DIGITAL AUTOPILOT. THE INPUTS TO FINDCDUW ARE THE THRUST COMMAND VECTOR
R0019 AND THE WINDOW COMMAND VECTOR, AND THE OUTPUTS ARE THE GIMBAL ANGLE
R0020 INCREMENTS, THE COMMANDED ATTITUDE ANGLE RATES, AND THE COMMANDED
R0021 ATTITUDE LAG ANGLES (WHICH ACCOUNT FOR THE ANGLES BY WHICH THE BODY WILL
R0022 LAG BEHIND A RAMP COMMAND IN ATTITUDE ANGLE DUE TO THE FINITE ANGULAR
R0023 ACCELERATIONS AVAILABLE).

R0024 FINDCDUW ALINES THE ESTIMATED THRUST VECTOR FROM THE THRUST DIRECTION
R0025 FILTER WITH THE THRUST COMMAND VECTOR, AND, WHEN XUVINHIS SET.
R0026 ALINES THE +Z HALF OF THE LM ZX PLANE WITH THE WINDOW COMMAND VECTOR.

L FINDCDUW - GUIDAP INTERFACE

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P0027 SPECIFICATIONS:

R0028 INITIALIZATION: A SINGLE INTERPRETIVE CALL TO INITCDUW IS REQUIRED
R0029 BEFORE EACH GUIDED MANEUVER USING FINDCDUW.

R0030 CALL: INTERPRETIVE CALL TO FINDCDUW WITH THE THRUST COMMAND
R0031 VECTOR IN MPAC. INTERPRETIVE CALL TO FINDCDUW -2 WITH
R0032 THE THRUST COMMAND VECTOR IN UNFC/2 AND NOT IN MPAC.

R0033 RETURNS: NORMAL INTERPRETIVE IN ALL CASES

R0034 1. NORMALLY ALL AUTOPILOT CMDS ARE ISSUED.

R0035 2. IF NOT PNGCS AUTO, DO STOPRATE AND RETURN
R0036 WITHOUT ISSUING AUTOPILOT CMDS.

R0037 3. IF ENGINE OFF, DO STOPRATE AND RETURN WITHOUT
R0038 ISSUING AUTOPILOT CMDS.

R0039 ALARMS: 00401 IF INPUTS DETERMINE AN ATTITUDE IN GIMBAL LOCK.
R0040 FINDCDUW DRIVES CDUW AND CDUYD TO THE RQD VALUES.
R0042 BUT DRIVES CDUZD ONLY TO THE GIMBAL LOCK CONE.
R0043 00402 IF UNFC/2 OR UNWC/2 PRODUCE OVERFLOW WHEN
R0044 UNITIZED USING NORMUNIT. FINDCDUW ISSUES
R0045 STOPRATE AS ONLY INPUT TO AUTOPILOT.

R0046 INPUTS: UNFC/2 THRUST COMMAND VECTOR, NEED NOT BE SEMI-UNIT.
R0047 UNWC/2 WINDOW COMMAND VECTOR, NEED NOT BE SEMI-UNIT.
R0048 XOVINHIB FLAG DENOTING X AXIS OVERRIDE INHIBITED.
R0049 CSMDOCKD FLAG DENOTING CSM DOCKED.
R0050 STEERSW FLAG DENOTING INSUFF THRUST FOR THrust DIR FLTR.

R0052 OUTPUTS: DELCDUX, Y, Z
R0053 DMEGAPD, +1, +2
R0054 DELPEROR, +1, +2
R0055 CPHI, +1, +2 FOR NOUN22
R0057

R0058 DEBRIS: FINDCDUW DESTROYS SINCDEX, Y, Z AND COSCDEX, Y, Z BY
R0059 WRITING INTO THESE LOCATIONS THE SINES AND COSINES
R0060 OF THE CDU'S IN PNGCS-AUTO, OF THE CDU'S OTHERWISE.

L FINDCDUW - GUIDAP INTERFACE

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P0061 INITIALIZATION FOR FINDCDUW

0062				30,3104		BANK 30
0063	REF	1		30,2000		SETLOC FCDUW
0064				30,3104		BANK
0065	REF	2	LAST	136	E6,1646	EBANK = ECDUW
0066	REF	1				COUNT* 55/FCDUW
0067				30,3104	77775 1	INITCDUW VLOAD
0068	REF	12	LAST	896	30,3105	06520 0 UNITX
0069	REF	5	LAST	136	30,3106	03270 1 STORE UNFV/2
0070	REF	9	LAST	852	30,3107	03262 1 STORE UNWC/2
0071				30,3110	77616 0	RVQ

R0072 FINDCDUW PRELIMINARIES

0073				30,3111	77775 1	VLOAD	FINDCDUW -2: ENTRY WHEN UNFC/2 PRE-STORED
0074	REF	19	LAST	852	30,3112	03254 1	UNFC/2 INPUT VECTORS NEED NOT BE SEMI-UNIT
0075				30,3113	40200 1	FINDCDUW ADV	FINDCDUW: ENTRY WHEN UNFC/2 IN MPAC
0076	REF	5	LAST	850	30,3114	61113 0	INTERPRETER NOW INITIALIZED
0077				30,3115	00023 0	22	LOCS 0-THRU-21 FOR DIRECTION-COSINE MAT
0078				30,3116	77420 1	STQ	EXIT
0079	REF	2	LAST	136	30,3117	03247 0	ECDDUWUSR SAVE RETURN ADDRESS

R0080 MORE HAUSKEEPING

0081	REF	1		30,3120	3 3761 1	CA	ECDDUWL		
0082	REF	47	LAST	903	30,3121	56 003 1	XCH	EBANK	SET EBANK
0083	REF	2	LAST	136	30,3122	55 646 0	TS	ECDDUWUSR	SAVE USER'S EBANK
0084	REF	33	LAST	863	30,3123	3 0111 0	CA	DAPBOOLS	
0085	REF	6	LAST	753	30,3124	7 4757 1	MASK	CSMDOCKD	CSMDOCKD MUST NOT BE BIT15
0086	REF	271	LAST	907	30,3125	10 000 0	CCS	A	
0087	REF	102	LAST	905	30,3126	3 4753 1	CA	DNF	INDEX IF CSM DOCKED
0088	REF	2	LAST	136	30,3127	55 650 1	TS	NDXCOW	
0089	REF	1		30,3130	3 4743 0	CA	XOVINHIB	XOVINHIB MUST NOT BE BIT15	
0090	REF	2	LAST	136	30,3131	55 652 0	TS	FLPAUTD	SET TO POS-NON-ZERO FLAG PNGUS AUTO NOT
0091	REF	34	LAST	910	30,3132	7 0111 1	MASK	DAPBOOLS	
0092	REF	2	LAST	136	30,3133	55 651 0	TS	FLAGBDR	FLAGBDR = ANY PNZ NUMBER IF XOVI INITIATED

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P0093 FETCH BASIC DATA

0094 30.3134 0 0004 0

INHINT

RELINT AT PAUTNO (TC INTERPRET)

0095 REF 15 LAST 894 30.3135 3 0032 0

CA CDUX

FETCH CDUX,CDUY,CDUZ IN ALL CASES, BUT

0096 REF 2 LAST 872 30.3136 54 772 1

TS CDUSPOTX

REPLACE BELOW IF PNGCS AUTO

0097 REF 6 LAST 870 30.3137 3 0033 1

CA CDUY

0098 REF 2 LAST 872 30.3140 54 766 1

TS CDUSPOTY

0099 REF 9 LAST 894 30.3141 3 0034 0

CA CDUZ

0100 REF 2 LAST 872 30.3142 54 770 0

TS CDUSPOTZ

0101 REF 32 LAST 899 30.3143 3 4742 1

CA BIT10

PNGCS CONTROL BIT

0102 30.3144 0 0006 1

EXTEND

0103 REF 8 LAST 900 30.3145 02 030 0

RAND CHANGE

0104 REF 272 LAST 910 30.3146 10 000 0

CCS A

0105 REF 1 30.3147 1 3164 0

TCF PAUTNO

NOT PNGCS (BITS INVERTED)

0106 REF 57 LAST 785 30.3150 3 4736 1

CA BIT14

AUTO MODE BIT

0107 30.3151 0 0006 1

EXTEND

0108 REF 7 LAST 821 30.3152 02 031 1

RAND CHANGE

0109 REF 273 LAST 911 30.3153 10 000 0

CCS A

0110 REF 2 LAST 911 30.3154 1 3164 0

TCF PAUTNO

NOT AUTO (BITS INVERTED)

0111 REF 3 LAST 910 30.3155 55 652 0

TS FLPAUTNO

RESET FLAG PNGCS AUTO BIT

0112 REF 13 LAST 520 30.3156 3 1635 0

CA CDUXD

PNGCS AUTO: FETCH CDUXD,CDUYD,CDUZD

0113 REF 3 LAST 911 30.3157 54 772 1

TS CDUSPOTX

0114 REF 3 LAST 520 30.3160 3 1636 0

CA CDUYD

0115 REF 3 LAST 911 30.3161 54 766 1

TS CDUSPOTY

0116 REF 3 LAST 518 30.3162 3 1637 1

CA CDUZD

0117 REF 3 LAST 911 30.3163 54 770 0

TS CDUSPOTZ

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P0118 FETCH INPUTS

0119	REF 165	LAST 896	30,3164	0 6037 0	PAUTNO	TC	INTERPRET	ENTERING THRUST CMD STILL IN MPAC
0120			30,3165	77634 0		RTB		
0121	REF 9	LAST 812	30,3166	21726 1			NORMUNIT	
0122	REF 1		30,3167	24001 0		STOVL	UNZ/2	SEMI-UNIT THRUST CMD AS INITIAL UNZ/2
0123	REF 10	LAST 910	30,3170	03262 1			UNWC/2	
0124			30,3171	47034 0		RTB	RTB	
0125	REF 10	LAST 912	30,3172	21726 1			NORMUNIT	
0126	REF 4	LAST 886	30,3173	47615 0			QUICTRIG	ALWAYS ROD TO OBTAIN TRIGS IF COUNTS
0127	REF 1		30,3174	24015 0		STOVL	UNZ/2	SEMI-UNIT WINDOW-CMD AS INITIAL UNZ/2
0128	REF 8	LAST 882	30,3175	00325 0			DELV	
0129			30,3176	53404 1		DOVB	UNIT	
0130	REF 1		30,3177	61750 1			NOATTENT	AT LEAST ONE ENTERING CMD VCT ZERO
0131			30,3200	45000 0		BOV	CALL	
0132	REF 1		30,3201	61215 0			AFTFLTR	IF UNIT DELV OVERFLOWS, SKIP FILTER
0133	REF 6	LAST 896	30,3202	47671 1			ASBN#	YIELDS UNIT(DELV) IN VEN COORDS FOR FLTR

P0134 THRUST DIRECTION FILTER

0135			30,3203	77776 1		EXIT		
0136	REF 1		30,3204	3 1671 0		CA	UNFVZ/2	FOR RESTARTS, UNFVZ/2 ALWAYS INTACT, MPAC
0137	REF 353	LAST 889	30,3205	22 157 1		LXCH	MPAC +3	RENEWED AFTER RETURN FROM CALLER.
0138	REF 1		30,3206	0 3503 1		TC	FLTRSUB	TWO FILTER UPDATES MAY BE DONE.
0139	REF 2	LAST 912	30,3207	55 671 1		TS	UNFVZ/2	UNFVZ/2 NEED NOT BE EXACTLY SEMI-UNIT.
0140	REF 1		30,3210	3 1673 1		CA	UNFVZ/2	
0141	REF 354	LAST 912	30,3211	22 161 1		LXCH	MPAC +5	
0142	REF 2	LAST 912	30,3212	0 3503 1		TC	FLTRSUB	
0143	REF 2	LAST 912	30,3213	55 673 0		TS	UNFVZ/2	
0144	REF 166	LAST 912	30,3214	0 6037 0		TC	INTERPRET	COMPLETES FILTER

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PO145 FIND A SUITABLE WINDOW POINTING VECTOR

0146				30,3215	46135 1	AFTERFLTR SLOAD	BPIZ	IF XOV NOT INHIBITED, GO FETCH ZND
0147	REF	3	LAST	910	30,3216		FLAGOODW	
0148	REF	1			30,3217		FETCHZNB	
0149					30,3220	VLOAD	CALL	
0150	REF	2	LAST	912	30,3221		UNZ/2	
0151	REF	1			30,3222		UNWCTEST	
0152					30,3223	FETCHZNB VLOAD		
0153	REF	1			30,3224		ZNBPIP	
0154	REF	3	LAST	913	30,3225	STCALL	UNZ/2	
0155	REF	2	LAST	915	30,3226		UNWCTEST	
0156					30,3227	VLOAD	VCOMP	Z AND -X CAN'T BOTH PARALLEL UNFC/2
0157	REF	11	LAST	884	30,3230		XNBPIP	
0158	REF	4	LAST	913	30,3231	STORE	UNZ/2	

RO159 COMPUTE THE REQUIRED DIRECTION COSINE MATRIX

0160					30,3232	47375 0	DCMCL	VLOAD	VXV	
0161	REF	5	LAST	913	30,3233	00015 0			UNZ/2	
0162	REF	2	LAST	912	30,3234	00001 0			UNX/2	
0163					30,3235	41456 0	UNIT	PUSH		UNY/2 FIRST ITERATION
0164					30,3236	76435 1	VXV	VSL1		
0165	REF	3	LAST	913	30,3237	00001 0			UNX/2	
0166	REF	6	LAST	913	30,3240	00015 0	STORE	UNZ/2		-UNZ/2 FIRST ITERATION
0167					30,3241	63361 0	VXSC	EXCH		EXCHANGE -UNFVZ/2 UNZ/2 FOR UNY/2
0168	REF	3	LAST	912	30,3242	03274 0		UNFVZ/2		MUST BE SMALL
0169					30,3243	51361 1	VXSC	EXCH		YIELDS -UNFVY/2 UNY/2-UNFVZ/2 UNZ/2
0170	REF	3	LAST	912	30,3244	03272 0		UNFVY/2		MUST BE SMALL
0171					30,3245	53372 1	VSL1	VAD		
0172	REF	4	LAST	913	30,3246	00001 0			UNX/2	
0173					30,3247	77656 1	UNIT			TOTALLY ELIMINATES THRUST POINTING ERROR
0174	REF	5	LAST	913	30,3250	00001 0	STORE	UNX/2		UNX/2
0175					30,3251	76435 1	VXV	VSL1		
0176	REF	7	LAST	913	30,3252	00015 0			UNZ/2	-UNZ/2 WAS STORED HERE REMEMBER
0177	REF	1			30,3253	00007 0	STORE	UNY/2		UNY/2
0178					30,3254	47276 1	VCOMP	VXV		
0179	REF	6	LAST	913	30,3255	00001 0			UNX/2	
0180					30,3256	77772 0	VSL1			
0181	REF	8	LAST	913	30,3257	00015 0	STORE	UNZ/2		UNZ/2

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P0182 COMPUTE THE REQUIRED GIMBAL ANGLES

0183				30,3260	77624 1	CALL		
0184	REF	1		30,3261	61533 0		HB2CDUSP	YIELDS THE REQ GIMBAL ANGLES, 2'S, PI
0185				30,3262	77776 1	EXIT		

R0186 LIMIT THE MIDDLE GIMBAL ANGLE & COMPUTE THE UNLIMITED GIMBAL ANGLE CHGS

0187	REF	355	LAST	912	30,3263	3 0156 0	CA	MPAC	+2	LIMIT THE MGA
0188	REF	144	LAST	907	30,3264	54 001 1	TS	L		CAN'T LACH: NEED UNLIMITED MGA FOR ALARM
0189	REF	1			30,3265	3 3773 1	CA	CDU2BLIM		
0190	REF	1			30,3266	0 3727 0	TC	LIMITSUB		YIELDS LIMITED MGA. 1-BIT ERROR POSSIBLE
0191	REF	356	LAST	914	30,3267	56 156 0	XCH	MPAC	+2	BECAUSE USING 2'S COMP. WHO CARES?
0192					30,3270	0 0006 1	EXTEND			
0193	REF	357	LAST	914	30,3271	20 156 1	MSU	MPAC	+2	THIS BETTER YIELD ZERO
0194					30,3272	0 0006 1	EXTEND			
0195					30,3273	1 3275 0	BZF	+2		
0196	REF	1			30,3274	1 3756 1	TCF	ALARMGA		

0197					30,3275	0 0004 0	MGARET	IRHINT		RELINT AT TC INTERPRET AFTER TORCDDW
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0198					30,3276	22 007 0	ZL			
0199	REF	61	LAST	396	30,3277	3 4752 0	CA	TWO		
0200	REF	4	LAST	98	30,3300	54 142 1	DELGMBLP	TS	TEM2	

0201	REF	145	LAST	914	30,3301	3 0001 0	CA	L		TO PREVENT FALSE STARTS ABOUT X, ZERO
0202					30,3302	0 0006 1	EXTEND			FLAGOODW IF DELGMBZ OR Y TOO BIG.

0203					30,3303	7 0000 0	SQUARE			
0204	REF	5	LAST	416	30,3304	6 4350 0	AD	H15		WITHIN 1-BIT OF -(45 DEG SQUARED)

0205					30,3305	0 0006 1	EXTEND			
0206					30,3306	6 3311 1	BZMF	+3		
0207	REF	173	LAST	907	30,3307	3 4755 1	CA	ZERO		
0208	REF	4	LAST	913	30,3310	55 651 0	TS	FLAGOODW		

0209	REF	5	LAST	914	30,3311	50 142 0	INDEX	TEM2		
0210	REF	358	LAST	914	30,3312	3 0154 1	CA	MPAC		
0211	REF	6	LAST	914	30,3313	50 142 0	INDEX	TEM2		
0212	REF	10	LAST	518	30,3314	54 321 0	TS	CPHI		OUTPUTS TO NOUN22

0213					30,3315	0 0006 1	EXTEND			
0214	REF	7	LAST	914	30,3316	5 0142 0	INDEX	TEM2		
0215	REF	14	LAST	911	30,3317	21 635 1	MSU	CDUXD		NO MATTER THAT THESE SLIGHTLY DIFFERENT
0216					30,3320	4 0000 0	COM			FROM WHEN WE INITIALLY FETCHED THEM

0217	REF	8	LAST	914	30,3321	50 142 0	INDEX	TEM2		
0218	REF	1			30,3322	55 675 0	TS	-DELGMB		-UNLIMITED GIMBAL ANGLE CHGS, 1'S, PI
0219	REF	146	LAST	914	30,3323	54 001 1	TS	L		FOR PRECEDING TEST ON NEXT LOOP PASS

0220	REF	9	LAST	914	30,3324	10 142 1	CCS	TEM2		
0221	REF	1			30,3325	1 3300 0	TCF	DELGMBLP		

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PO222 BRANCHES TO NOATTENT

0223	REF	4	LAST	911	30,3326	11'652 0
0224	REF	2	LAST	912	30,3327	1 3752 0
0225	REF	27	LAST	894	30,3330	3 0101 1
0226	REF	6	LAST	831	30,3331	7 4745 1
0227					30,3332	0 0006 1
0228	REF	3	LAST	915	30,3333	1 3752 0

CCS	FLPAUTNO	
TCF	NOATTENT +2	NOT PNGCS AUTO
CA	FLAGWD5	
MASK	ENGINEBIT	
EXTEND		
BZF	NOATTENT +2	ENGINE NOT ON

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P0229 LIMIT THE ATTITUDE ANGLE CHANGES

R0230 THIS SECTION LIMITS THE ATTITUDE ANGLE CHANGES ABOUT A SET OF ORTHOGONAL VEHICLE AXES X,YPRIME,ZPRIME.
 R0232 THESE AXES COINCIDE WITH THE COMMANDED VEHICLE AXES IF AND ONLY IF CDUW IS ZERO. THE PRIME SYSTEM IS
 R0234 THE COMMANDED VEHICLE SYSTEM ROTATED ABOUT THE X AXIS TO BRING THE Z AXIS INTO ALIGNMENT WITH THE MIDDLE GIMBAL
 R0236 AXIS. ATTITUDE ANGLE CHANGES IN THE PRIME SYSTEM ARE RELATED TO SMALL GIMBAL ANGLE CHANGES BY:

R0238 * -DELATTX * * 1 SIN(CDUZ) 0 * * -DELGMX *
 R0239 * * * * * * * *
 R0240 * -DELATTYPRIME * * 0 COS(CDUZ) 0 * * -DELGBY *
 R0241 * * * * * * * *
 R0242 * -DELATTZPRIME * * 0 0 1 * * -DELGBZ *

0243	REF	2	LAST	914	30,3334	23'677 0	LXCH	-DELGMX +2	SAME AS -DELATTZPRIME UNLIMITED
0244	REF	3	LAST	910	30,3335	51'650 0	INDEX	NDXCDUW	
0245	REF	1			30,3336	3 3767 1	CA	DAXMAX	
0246	REF	2	LAST	914	30,3337	0 3727 0	TC	LIMITSUB	
0247	REF	3	LAST	916	30,3340	55'677 1	TS	-DELGMX +2	-DELGBZ
0248	REF	4	LAST	916	30,3341	3 1676 1	CA	-DELGMX +1	
0249					30,3342	0 0006 1	EXTEND		
0250	REF	3	LAST	478	30,3343	7 0746 0	MP	CDCDUZ	YIELDS -DELATTYPRIME/2 UNLIMITED
0251	REF	147	LAST	914	30,3344	54 001 1	TS	L	
0252	REF	4	LAST	916	30,3345	51'650 0	INDEX	NDXCDUW	
0253	REF	1			30,3346	3 3771 0	CA	DAXMAX	
0254	REF	3	LAST	916	30,3347	0 3727 0	TC	LIMITSUB	
0255					30,3350	0 0006 1	EXTEND		
0256	REF	4	LAST	916	30,3351	10 746 0	DV	CDCDUZ	
0257	REF	5	LAST	916	30,3352	57'676 1	XCH	-DELGMX +1	-DELGBY, FETCHING UNLIMITED VALUE
0258					30,3353	0 0006 1	EXTEND		
0259	REF	3	LAST	478	30,3354	7 0740 0	MP	SINCDUZ	
0260					30,3355	20 001 1	DDOUBL		
0261					30,3356	4 0000 0	COM		
0262					30,3357	0 0006 1	EXTEND		YIELDS +DELATTX UNLIMITED, MAG < 180 DEG.
0263	REF	6	LAST	916	30,3360	21'675 0	MSU	-DELGMX	BASED ON UNLIMITED DELGBY.
0264	REF	148	LAST	916	30,3361	54 001 1	TS	L	ONE-BIT ERROR IF OPERANDS IN MSU
0265	REF	5	LAST	916	30,3362	51'650 0	INDEX	NDXCDUW	OF MIXED SIGNS. WHO CARES?
0266	REF	1			30,3363	3 3767 1	CA	DAXMAX	
0267	REF	4	LAST	916	30,3364	0 3727 0	TC	LIMITSUB	
0268	REF	7	LAST	916	30,3365	55'675 0	TS	-DELGMX	SAVE LIMITED +DELATTX
0269	REF	5	LAST	914	30,3366	11'651 0	CCS	FLAGOODW	
0270	REF	8	LAST	916	30,3367	4 1675 0	CS	-DELGMX	FETCH IT BACK CHGNG SIGN IF WINDOW GOOD
0271	REF	9	LAST	916	30,3370	55'675 0	TS	-DELGMX	OTHERWISE USE ZERO FOR -DELATTX
0272	REF	10	LAST	916	30,3371	4 1676 0	CS	-DELGMX +1	
0273					30,3372	0 0006 1	EXTEND		
0274	REF	4	LAST	916	30,3373	7 0740 0	MP	SINCDUZ	
0275					30,3374	20 001 1	DDOUBL		YIELDS -CONTRB TO -DELATTX FROM -DELGBY
0276	REF	11	LAST	916	30,3375	27'675 0	ADS	-DELGMX	-DELGMX. NO OVEFLOW SINCE LIMITED TO
A0277									20DEG(1+SIN(70DEG)/COS(70DEG)) < 180DEG

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P0278 COMPUTE COMMANDED ATTITUDE RATES

R0279 * OMEGAPD * * -2 -4 SINCDUZ +0 * * -DELGMBX *
 R0280 * * * * * * * * * *
 R0281 * OMEGAQD * * * +0 -8 COSCDUZ COSCDUX -4 SINCDUX * * -DELGMBY *
 R0282 * * * * * * * * * *
 R0283 * OMEGAPD * * * +0 +8 COSCDUZ SINCDUX -4 COSCDUX * * -DELGMBZ *

R0284 ATTITUDE ANGLE RATES IN UNITS OF $\pi/4$ RAD/SEC = K TRIG FCNS IN UNITS OF 2 X GIMBAL ANGLE RATES IN UNITS OF
 R0286 $\pi/2$ RAD/SEC. THE CONSTANTS ARE BASED ON DELGMB BEING THE GIMBAL ANGLE CHANGES IN UNITS OF π RADIAN.
 R0288 AND 2 SECONDS BEING THE COMPUTATION PERIOD (THE PERIOD BETWEEN SUCCESSIVE PASSES THRU FINDCDUW).

0290	REF	12	LAST	916	30.3376	4 1675 0	CS	-DELGMB
0291	REF	6	LAST	369	30.3377	55.643 0	TS	OMEGAPD
0292	REF	13	LAST	917	30.3400	4 1676 0	CS	-DELGMB +1
0293					30.3401	0 0006 1	EXTEND	
0294	REF	5	LAST	916	30.3402	7 0740 0	MP	SINCDUZ
0295					30.3403	20 001 1	DDOUBL	
0296	REF	7	LAST	917	30.3404	27.643 0	ADS	OMEGAPD
0297	REF	8	LAST	917	30.3405	27.643 0	ADS	OMEGAPD
0298	REF	14	LAST	917	30.3406	4 1676 0	CS	-DELGMB +1
0299					30.3407	0 0006 1	EXTEND	
0300	REF	4	LAST	478	30.3410	7 0750 1	MP	COSCDUX
0301					30.3411	20 001 1	DDOUBL	
0302					30.3412	0 0006 1	EXTEND	
0303	REF	5	LAST	916	30.3413	7 0746 0	MP	COSCDUZ
0304	REF	2	LAST	369	30.3414	55.644 1	TS	OMEGAQD
0305	REF	15	LAST	917	30.3415	4 1677 1	CS	-DELGMB +2
0306					30.3416	0 0006 1	EXTEND	
0307	REF	3	LAST	478	30.3417	7 0742 1	MP	SINCDUX
0308	REF	3	LAST	917	30.3420	27.644 1	ADS	OMEGAQD
0309	REF	4	LAST	917	30.3421	27.644 1	ADS	OMEGAQD
0310	REF	5	LAST	917	30.3422	27.644 1	ADS	OMEGAQD
0311	REF	16	LAST	917	30.3423	3 1676 1	CA	-DELGMB +1
0312					30.3424	0 0006 1	EXTEND	
0313	REF	4	LAST	917	30.3425	7 0742 1	MP	SINCDUX
0314					30.3426	20 001 1	DDOUBL	
0315					30.3427	0 0006 1	EXTEND	
0316	REF	6	LAST	917	30.3430	7 0746 0	MP	COSCDUZ
0317	REF	2	LAST	369	30.3431	55.645 0	TS	OMEGAPD
0318	REF	17	LAST	917	30.3432	4 1677 1	CS	-DELGMB +2
0319					30.3433	0 0006 1	EXTEND	
0320	REF	5	LAST	917	30.3434	7 0750 1	MP	COSCDUX
0321	REF	3	LAST	917	30.3435	27.645 0	ADS	OMEGAPD
0322	REF	4	LAST	917	30.3436	27.645 0	ADS	OMEGAPD
0323	REF	5	LAST	917	30.3437	27.645 0	ADS	OMEGAPD

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R0324 FINAL TRANSFER

0325	REF	62	LAST	914	30,3440	3 4752 0	CDOWXFR	CA	TWO	
0326	REF	10	LAST	914	30,3441	54 142 1		TS	TEM2	
0327	REF	11	LAST	918	30,3442	50 142 0		INDEX	TEM2	
0328	REF	18	LAST	917	30,3443	3 1675 1		CA	-DELGMB	
0329					30,3444	0 0006 1		EXTEND		
0330	REF	1			30,3445	7 3774 1		MP	DT/DELT	RATIO OF DAP INTERVAL TO CDOW INTERVAL
0331	REF	1			30,3446	0 3743 1		TC	ONESTDZS	
0332	REF	12	LAST	918	30,3447	50 142 0		INDEX	TEM2	
0333	REF	4	LAST	136	30,3450	55 640 0		TS	DELCDUX	ANGLE INTERFACE
0334	REF	13	LAST	918	30,3451	50 142 0		INDEX	TEM2	
0335	REF	9	LAST	917	30,3452	11 643 0		CCS	OMEGAPD	
0336	REF	103	LAST	910	30,3453	6 4753 1		AD	ONE	
0337					30,3454	1 3456 1		TCF	+2	
0338	REF	104	LAST	918	30,3455	6 4753 1		AD	ONE	
0339					30,3456	0 0006 1		EXTEND		WE NOW HAVE ABS(OMEGAPD, QD, RD)
0340	REF	14	LAST	918	30,3457	5 0142 0		INDEX	TEM2	
0341	REF	10	LAST	918	30,3460	7 1643 0		MP	OMEGAPD	
0342					30,3461	0 0006 1		EXTEND		
0343	REF	22	LAST	751	30,3462	7 4741 0		MP	+IT11	1/16
0344					30,3463	0 0006 1		EXTEND		
0345	REF	15	LAST	918	30,3464	5 0142 0		INDEX	TEM2	2
0346	REF	6	LAST	367	30,3465	11 530 1		DV	1JACC	UNITS PI/4 RAD/SEC
0347	REF	149	LAST	916	30,3466	54 001 1		TS	1	
0348	REF	1			30,3467	3 3771 0		CA	DELERLIM	
0349	REF	5	LAST	916	30,3470	0 3727 0		TC	LIMITSUB	
0350	REF	16	LAST	918	30,3471	50 142 0		INDEX	TEM2	
0351	REF	3	LAST	369	30,3472	55 277 0		TS	DELPERFOR	LAG ANGLE = OMEGA ABS(OMEGA)/2 ACCEL
0352	REF	17	LAST	918	30,3473	10 142 1		CCS	TEMP	
0353	REF	1			30,3474	1 3441 1		TCF	CDOWXFR	

R0354 HAUSKEEPING AND RETURN

0355	REF	3	LAST	910	30,3475	3 1646 1	TCQCDOW	CA	EDOWXFR	
0356	REF	48	LAST	910	30,3476	54 003 0		TS	EBANK	RETURN USER'S EBANK
0357	REF	167	LAST	912	30,3477	0 6037 0		TC	INTERPRET	
0358					30,3500	52001 1		SETPD	GOTO	
0359					30,3501	00001 0				
0360	REF	3	LAST	910	30,3502	03247 0			EDOWXFR	NORMAL AND ABNORMAL RETURN TO USER

L FINDCOW - GUIDAP INTERFACE

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P0361 THRUST VECTOR FILTER SUBROUTINE

0362				30,3503	0 0006 1	FLTRSUB	EXTEND	
0363	REF	18	LAST	918	30,3504	22 142 0	QXCH	TEM2
0364	REF	3	LAST	98	30,3505	54 143 0	TS	TEM3
0365					30,3506	4 0000 0	COR	
0366	REF	150	LAST	918	30,3507	6 0001 0	AD	L
0367					30,3510	0 0006 1	EXTEND	
0368	REF	6	LAST	916	30,3511	5 1650 0	INDEX	NDXCOW
0369	REF	1			30,3512	7 3762 0	MP	CAIRFLTP
0370	REF	151	LAST	919	30,3513	54 001 1	TS	L
0371	REF	1			30,3514	3 3764 1	LA	DUNFVLIM
0372	REF	6	LAST	918	30,3515	0 3727 0	TC	LIMITSUB
0373	REF	4	LAST	919	30,3516	6 0143 1	AD	TEM2
0374	REF	152	LAST	919	30,3517	54 001 1	TS	L
0375	REF	1			30,3520	3 3765 0	CA	DUNFVLIM
0376	REF	7	LAST	919	30,3521	0 3727 0	TC	LIMITSUB
0377	REF	19	LAST	919	30,3522	0 0142 0	TC	TEM2

SAVE ORIGINAL OFFSET
ONE MCT. NO WDS. CAN BE SAVED IF NEG OF
ORIG OFFSET ARRIVES IN A, BUT IT'S
NOT WORTH THE INCREASED OBSCURITY.

INCR TO OFFSET, UNLIMITED
SAME LIMIT FOR Y AND Z
YIELDS INCR TO OFFSET, LIMITED
ORIGINAL OFFSET
TOTAL OFFSET, UNLIMITED
SAME LIMIT FOR Y AND Z
YIELDS TOTAL OFFSET, LIMITED

R0378 SUBR TO TEST THE ANGLE BETWEEN THE PROPOSED WINDOW AND THRUST CPO VCTS

0379				30,3523	63441 0	UNWCTEST DOT	DSQ	
0380	REF	7	LAST	913	30,3524	00001 0	UNX/P	
0381					30,3525	50025 0	DSU	BMH
0382	REF	1			30,3526	21767 1		DOTSWFMA
0383	REF	1			30,3527	61232 0		DCMCL
0384					30,3530	43531 1	SSP	RVQ
0385	REF	6	LAST	916	30,3531	03252 1		FLAGOOD
0386					30,3532	00000 1		0

RVQ FOR ALT CHOICE IF DOT MAGN TOD LARGE
ZEROING WINDOW GOOD FLAG

L FINDCDUW - GUIDAP INTERFACE

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P0387 NB2CDUSP RETURNS THE 2'S COMPLEMENT, PI, SP CDU ANGLES X,Y,Z IN MPAC,+1,+2 GIVEN THE MATRIX WHOSE ROW VECTORS
 R0389 ARE THE SEMI-UNIT NAV BASE VECTORS X,Y,Z EXPRESSED IN STABLE MEMBER COORDINATES, LOCATED AT 0 IN THE PUSH LIST.

R0391 NB2CDUSP USES ARCTRGSP WHICH HAS A MAXIMUM ERROR OF ± 4 BITS.

0392				30,3533	63545 0	NB2CDUSP	DLOAD	DSU	
0393				30,3534	00003 1			2	
0394				30,3535	51021 0		BDSU	BPL	
0395	REF	5	LAST	647	30,3536	06512 1		DP1/4TH	
0396				30,3537	61542 0			+3	
0397				30,3540	77745 1		DLOAD		
0398	REF	16	LAST	809	30,3541	06522 1		ZEROVECS	IN CASE SIN WAS SLIGHTLY $> 1/2$
0399				30,3542	77566 1		SCRT	EXIT	YIELDS COS(CDUZ) IN UNITS OF 2
0400				30,3543	0-0006 1		EXTEND		
0401	REF	359	LAST	914	30,3544	5 0155 0	DCA	MPAC	
0402				30,3545	20-001 1		DDOUBL		
0403	REF	3	LAST	98	30,3546	54-145 0	TS	TEMP	
0404				30,3547	1-3552 1		TCF	+3	
0405	REF	22	LAST	900	30,3550	3 4733 1	CA	POS MAX	OVERFLOW. FETCH POS MAX, MPAC ALWAYS POS
0406	REF	4	LAST	920	30,3551	54-145 0	TS	TEMP	COS(CDUZ) IN TEMP. UNITS 1
0407	REF	29	LAST	886	30,3552	50 120 1	INDEX	FIX LOC	
0408				30,3553	3-0002 0		CA	2	
0409	REF	360	LAST	920	30,3554	22-154 1	LXCH	MPAC	
0410	REF	1			30,3555	0-3622 1	TC	ARCTRGSP	
0411	REF	361	LAST	920	30,3556	54-156 1	TS	MPAC +2	CDUZ
0412	REF	174	LAST	914	30,3557	3-4755 1	CA	ZERO	
0413	REF	1			30,3560	0-3600 1	TC	DVBYCOSM	
0414	REF	20	LAST	859	30,3561	3-4751 0	CA	FOUR	
0415	REF	2	LAST	920	30,3562	0-3600 1	TC	DVBYCOSM	
0416	REF	9	LAST	336	30,3563	4-0141 1	CS	TEMP	
0417	REF	2	LAST	920	30,3564	0-3622 1	TC	ARCTRGSP	
0418	REF	362	LAST	920	30,3565	54-155 1	TS	MPAC +1	CDUY
0419	REF	37	LAST	900	30,3566	3-4750 1	CA	HIT4	
0420	REF	3	LAST	920	30,3567	0-3600 1	TC	DVBYCOSM	
0421	REF	1			30,3570	3-3577 1	CA	16OCT	
0422	REF	4	LAST	920	30,3571	0-3600 1	TC	DVBYCOSM	
0423	REF	10	LAST	920	30,3572	4-0141 1	CS	TEMP	
0424	REF	3	LAST	920	30,3573	0-3622 1	TC	ARCTRGSP	
0425	REF	363	LAST	920	30,3574	54-154 0	TS	MPAC	CDUX
0426	REF	168	LAST	918	30,3575	0-6037 0	TC	INTPRET	
0427				30,3576	77616 0		RVQ		
0428				30,3577	00016 0	16OCT	OCT	16	

L FINDCOM - GUIDAP INTERFACE

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P0429 THE ELEMENTS OF THE NAV BASE MATRIX WHICH WE MUST DIVIDE BY COS(MGA)
 R0430 ALREADY CONTAIN COS(MGA)/2 AS A FACTOR. THEREFORE THE QUOTIENT SHOULD
 R0431 ORDINARILY NEVER EXCEED 1/2 IN MAGNITUDE. BUT IF THE MGA IS NEAR $\pi/2$
 R0432 THEN COS(MGA) IS NEAR ZERO, AND THERE MAY BE SOME CHAFF IN THE OTHER
 R0433 ELEMENTS OF THE MATRIX WHICH WOULD PRODUCE CHAOS UNDER DIVISION.
 R0434 BEFORE DIVIDING WE MAKE SURE COS(MGA) IS AT LEAST ONE BIT LARGER
 R0435 THAN THE MAGNITUDE OF THE HIGH-ORDER PART OF THE OPERAND.

R0436 IF ONE OR MORE DIVIDES CANNOT BE PERFORMED. THIS MEANS THAT THE
 R0437 REQUIRED MGA IS VERY NEARLY $\pm\pi/2$ AND THEREFORE THE OTHER GIMBAL
 R0438 ANGLES ARE INDETERMINATE. THE INNER AND OUTER GIMBAL ANGLES RETURNED
 R0439 IN THIS CASE WILL BE RANDOM MULTIPLES OF $\pi/2$.

0440	REF	30	LAST	920	30,3600	6 0120 1	OVBYCUM	AD	FIXLUL	
0441	REF	1			30,3601	54 116 0		TS	ADDRWD	ADRES OF OPERAND
0442	REF	2	LAST	921	30,3602	50 116 1		INDEX	ADDRWD	FETCH NEG ABS OF OPERAND. AD TEMP. AND
0443					30,3603	3 0000 1		CA	0	SKIP-DIVIDE IF RESULT NEG OR ZERO
0444					30,3604	0 0006 1		EXTEND		
0445					30,3605	6 3607 0		BZMF	+2	
0446					30,3606	4 0000 0		COM		
0447	REF	5	LAST	920	30,3607	6 0145 1		AD	TEMP	C(A) ZERO OR NEG, C(TEMP) ZERO OR POS
0448					30,3610	0 0006 1		EXTEND		
0449	REF	1			30,3611	6 3617 1		BZMF	TSL&TCQ	DIFFERENCE ALWAYS SMALL IF BRANCH
0450					30,3612	0 0006 1		EXTEND		
0451	REF	3	LAST	921	30,3613	5 0116 1		INDEX	ADDRWD	TEMP EXCEEDS ABS HIGH ORDER PART OF
0452					30,3614	3 0001 0		DCA	0	OPERAND BY AT LEAST ONE BIT.
0453					30,3615	0 0006 1		EXTEND		THEREFORE IT EXCEEDS THE OP OPERAND
0454	REF	6	LAST	921	30,3616	10 145 0		OV	TEMP	AND DIVISION WILL ALWAYS SUCCEED.
0455	REF	153	LAST	919	30,3617	54 001 1	TSL&TCQ	TS	L	
0456	REF	11	LAST	920	30,3620	22 141 0		LXCH	TEMP	
0457	REF	220	LAST	899	30,3621	0 0002 0		TC	Q	

L FINDCDUM - GUIDAP INTERFACE

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P0458 ARCTRGSP RETURNS THE 2'S COMPLEMENT, PI, SP ANGLE IN THE A REGISTER GIVEN ITS SINE IN A AND ITS COSINE IN L IN
 R0460 UNITS OF 2. THE RESULT IS AN UNAMBIGUOUS ANGLE ANYWHERE IN THE CIRCLE, WITH A MAXIMUM ERROR OF +-4 BITS.
 R0462 THE ERROR IS PRODUCED BY THE SUBROUTINE SPARCSIN WHICH IS USED ONLY IN THE REGION +-45 DEGREES.

0464				30,3622	0 0006 1	ARCTRGSP	EXTEND		
0465	REF	1		30,3623	1 3665 0	BZF	SINZERD	TO AVOID DIVIDING BY ZERO	
0466				30,3624	0 0006 1	EXTEND			
0467	REF	10	LAST	420	30,3625	22 144 0	QXCH	TEM4	
0468	REF	20	LAST	919	30,3626	54 142 1	TS	TEM2	
0469	REF	154	LAST	921	30,3627	3 0001 0	CA	L	
0470	REF	5	LAST	919	30,3630	54 143 0	TS	TEM3	
0471	REF	175	LAST	920	30,3631	3 4755 1	CA	ZERO	
0472				30,3632	0 0006 1	EXTEND			
0473	REF	21	LAST	922	30,3633	10 142 1	DV	TEM2	
0474				30,3634	0 0006 1	EXTEND			
0475	REF	1		30,3635	1 3654 1	BZF	USECOS		
0476	REF	6	LAST	922	30,3636	10 143 0	CCS	TEM3	SIN IS SMALLER OR EQUAL
0477	REF	176	LAST	922	30,3637	3 4755 1	CA	ZERO	
0478				30,3640	1 3644 0	TCF	+4		
0479	REF	22	LAST	922	30,3641	4 0142 1	CS	TEM2	IF COS NEG, REVERSE SIGN OF TEM,
0480	REF	23	LAST	922	30,3642	54 142 1	TS	TEM2	ANGLE = PI-ARCSIN(SIN)
0481	REF	4	LAST	826	30,3643	3 4735 1	CA	NEGMAX	PICK-UP PI, 2'S COMPLEMENT
0482	REF	7	LAST	922	30,3644	54 143 0	TS	TEM3	WE NO LONGER NEED COS
0483	REF	24	LAST	922	30,3645	3 0142 0	CA	TEM2	
0484	REF	2	LAST	807	30,3646	0 3672 1	TC	SPARCSIN -1	
0485	REF	2	LAST	918	30,3647	0 3743 1	TC	ONESTO25	
0486				30,3650	0 0006 1	EXTEND			
0487	REF	8	LAST	922	30,3651	20 143 0	MSU	TEM3	
0488	REF	3	LAST	922	30,3652	0 3743 1	TC	ONESTO25	
0489	REF	11	LAST	922	30,3653	0 0144 0	TC	TEM4	
0490	REF	9	LAST	922	30,3654	4 0143 0	USECOS	CS	TEM3
0491	REF	3	LAST	922	30,3655	0 3672 1	TC	SPARCSIN -1	COS IS SMALLER
0492	REF	9	LAST	901	30,3656	6 4736 1	AD	HALF	ANGLE = SIGN(SIN)(PI/2-ARCSIN(COS))
0493	REF	10	LAST	922	30,3657	54 143 0	TS	TEM3	WE NO LONGER NEED COS
0494	REF	25	LAST	922	30,3660	10 142 1	CCS	TEM2	
0495	REF	11	LAST	922	30,3661	3 0143 1	CA	TEM3	
0496	REF	1		30,3662	1 3652 1	TCF	1TO2&TCQ		
0497	REF	12	LAST	922	30,3663	4 0143 0	CS	TEM3	
0498	REF	2	LAST	922	30,3664	1 3652 1	TCF	1TO2&TCQ	
0499	REF	155	LAST	922	30,3665	10 001 1	SINZERD	CCS	L
0500	REF	177	LAST	922	30,3666	3 4755 1	CA	ZERO	
0501	REF	221	LAST	921	30,3667	0 0002 0	TC	Q	
0502	REF	5	LAST	922	30,3670	3 4735 1	CA	NEGMAX	PI, 2'S COMP
0503	REF	222	LAST	922	30,3671	0 0002 0	TC	Q	

L FINDCDUW - GUIDAP-INTERFACE

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P0504 SPARCSIN TAKES AN ARGUMENT SCALED UNITY IN A AND RETURNS AN ANGLE SCALED
 R0505 180 DEGREES IN A. IT HAS BEEN UNIT TESTED IN THE REGION $\pm .94$ (± 70
 R0506 DEGREES) AND THE MAXIMUM ERROR IS ± 5 BITS WITH AN AVERAGE TIME OF
 R0507 450 MICROSECONDS. SPARCSIN -1 TAKES THE ARGUMENT SCALED TWO (1800 CRISP)

0508				30,3672	6 0000 1	DOUBLE	
0509	REF	8	LAST	444	30,3673	54 021 0	SPARCSIN TS SR
0510					30,3674	1 3700 1	TCF +4
0511	REF	274	LAST	911	30,3675	50 000 1	INDEX A
0512	REF	1			30,3676	4 4734 1	CS LIMITS
0513	REF	9	LAST	923	30,3677	54 021 0	TS SR
0514					30,3700	0 0006 1	EXTEND
0515	REF	275	LAST	923	30,3701	7 0000 0	MP A
0516	REF	12	LAST	921	30,3702	54 141 1	TS TEM1
0517					30,3703	0 0006 1	EXTEND
0518	REF	1			30,3704	7 3726 0	MP DPL9
0519	REF	1			30,3705	6 3725 1	AD DPL7
0520					30,3706	0 0006 1	EXTEND
0521	REF	13	LAST	923	30,3707	7 0141 1	MP TEM1
0522	REF	1			30,3710	6 3724 0	AD DPL5
0523					30,3711	0 0006 1	EXTEND
0524	REF	14	LAST	923	30,3712	7 0141 1	MP TEM1
0525	REF	1			30,3713	6 3723 1	AD DPL3
0526					30,3714	0 0006 1	EXTEND
0527	REF	15	LAST	923	30,3715	7 0141 1	MP TEM1
0528	REF	1			30,3716	6 3722 0	AD DPL1
0529					30,3717	0 0006 1	EXTEND
0530	REF	10	LAST	923	30,3720	7 0021 0	MP SR
0531	REF	223	LAST	922	30,3721	0 0002 0	TC 0
0532					30,3722	24406 0	DPL1 DEC 10502
0533					30,3723	00660 1	DPL3 DEC 432
0534					30,3724	16204 0	DPL5 DEC 7300
0535					30,3725	50744 0	DPL7 DEC -11803
0536					30,3726	20315 1	DPL9 DEC 8397

L FINDCDUW - GUIDAP INTERFACE

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P0537 LIMITSUB LIMITS THE MAGNITUDE OF THE POSITIVE OR NEGATIVE VARIABLE
 R0538 ARRIVING IN L TO THE POSITIVE LIMIT ARRIVING IN A.
 R0539 THE SIGNED LIMITED VARIABLE IS RETURNED IN A.

R0540 VERSION COURTESY HUGH BLAIR-SMITH

0541	REF 16	LAST 923	30.3727	54 141 1	LIMITSUB	TS	TEM
0542	REF 178	LAST 922	30.3730	3 4755 1	CA	ZERO	
0543			30.3731	0 0006 1	EXTEND		
0544	REF 17	LAST 924	30.3732	16 141 1	DV	TEM	
0545	REF 276	LAST 923	30.3733	10 000 0	CCS	A	
0546	REF 18	LAST 924	30.3734	22 141 0	LXCH	TEM	
0547			30.3735	1 3737 0	TCF	+2	
0548			30.3736	1 3741 1	TCF	+3	
0549	REF 156	LAST 922	30.3737	3 0001 0	CA	L	
0550	REF 224	LAST 923	30.3740	0 0002 0	TC		
0551	REF 19	LAST 924	30.3741	4 0141 1	CS	TEM	
0552	PLF 225	LAST 924	30.3742	0 0002 0	TC		

R0553 SUBROUTINE TO CONVERT 1'S COMP SP TO 2'S COMP

0554	REF 277	LAST 924	30.3743	10 000 0	ONEST025	CCS	A
0555	REF 105	LAST 918	30.3744	6 4753 1	AD	ONE	
0556	REF 226	LAST 924	30.3745	0 0002 0	TC	Q	
0557	REF 278	LAST 924	30.3746	4 0000 0	CS	A	
0558	REF 227	LAST 924	30.3747	0 0002 0	TC	Q	

R0559 NO ATTITUDE CONTROL

0560	REF 35	LAST 875	30.3750	0 5567 0	NOATTCHT	TC	ALARM
0561			30.3751	00402 1	UCT	00402	NO ATTITUDE CONTROL
0562			30.3752	0 0004 0	+2	INMINI	COME HERE FOR NOATTCHT WITHOUT ALARM
0563	REF 45	LAST 875	30.3753	0 4674 0	TC	IBNKCALL	RELINT AT TC INTERPRET AFTER TCQCDUW
0564	REF 7	LAST 863	30.3754	40165 1	FCADR	STOPRATE	
0565	REF 1		30.3755	1 3475 0	TCF	TCQCDUW	RETURN TO USER SKIPPING AUTOPILOT CMDS

R0566 MIDDLE GIMBAL ANGLE ALARM

0567	REF 36	LAST 924	30.3756	0 5567 0	ALARM4GA	TC	ALARM
0568			30.3757	00401 1	UCT	00401	
0569	REF 1		30.3760	1 3275 0	TCF	MGARET	

L FINDCDUW - GUIDAP INTERFACE

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P0570 *****
R0571 CONSTANTS
P0572 *****

R0573 ADDRESS CONSTANTS

0574 REF 3 LAST 910 30.3761 03246 1 ECDUWL ECAD# ECDUW
R0575

R0576 THRUST DIRECTION FILTER CONSTANTS

0577 30.3762 06315 0 GAINFLT# DEC .2 GAIN FILTER SANS CSM
0578 30.3763 03146 1 DEC .1 GAIN FILTER WITH CSM
0579 30.3764 00071 1 UNFVLIM DEC .007 B-1 7 MR MAX CHG IN F DIR IN VEH IN 7 SECS.
A0580 THIS-DOES-NOT-ALLOW-FOR S/C ROT-PATE.

0581 30.3765 02041 0 UNFVLIM DEC .129 B-1 129 MR MAX THRUST OFFSET. 105 MR TRAVEL
A0582 +10MR-DEFL+5MR-MECH-MOUNT+9MR-ABLATION.

R0583
R0584 CONSTANTS RELATED TO GIMBAL ANGLE COMPUTATIONS

0585 30.3766 01673 1 DUTSWFMX DEC .93302 B-4 LIM COLNRTY OF UNWC/2 & UNFC/2 TO 85 DEG
A0586 LOWER-PART-COMES-FROM NEXT CONSTANT

0587 30.3767 03434 1 DAXMAX DEC .1111111111 DELATTX LIM TO 20 DEG IN 2 SECS. 1'S. PI
0588 30.3770 00266 0 DEC .0111111111 2 DEG WHEN CSM DOCKED

0589 30.3771 01616 1 DAY/2MAX DEC .0555555555 LIKEWISE FOR DELATTY
0590 30.3772 00133 0 DEC .0055555555

0591 REF 2 LAST 916 30.3767 DAZMAX = DAXMAX LIKEWISE FOR DELATTZ

0592 30.3773 14344 1 CDUZDLIM DEC .7888888888 70 DEG LIMIT FOR MGA. 1'S. PI
R0593

R0594 CONSTANTS FOR DATA TRANSFER

0595 30.3774 01463 1 DT/DELT DEC .05 .1-SEC/2-SEC WHICH IS THE AUTOPILOT
A0596 CONTROL SAMPLE PERIOD/COMPUTATION PERIOD

0597 REF 2 LAST 916 30.3771 DELERLIM = DAY/2MAX 10 DEG LIMIT FOR LAG ANGLES. 1'S. PI
R0598

*** END OF FLY .132 ***

L P51-P53

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R0001 PROGRAM NAME- PROG52
R0003 MOD NO- 0
R0005 MODIFICATION BY- LONSKE

DATE- JAN 9, 1967
LOG SECTION- P51-P53
ASSEMBLY- SUNDANCE REV 46

R0007 FUNCTIONAL DESCRIPTION-

R0008 ALIGNS THE IMU TO ONE OF THREE ORIENTATIONS SELECTED BY THE ASTRONAUT. THE PRESENT IMU ORIENTATION IS KNOWN
R0010 AND IS STORED IN REFSMMAT. THE THREE POSSIBLE ORIENTATIONS MAY BE

R0011 (A) PREFERRED ORIENTATION

R0012 AN OPTIMUM ORIENTATION FOR A PREVIOUSLY CALCULATED MANUEVER. THIS ORIENTATION MUST BE CALCULATED AND
R0014 STORED BY A PREVIOUSLY SELECTED PROGRAM.

R0015 (B) NOMINAL ORIENTATION

R0016 $X = \text{UNIT} (R)$
R0017 $-SM$

R0018 $Y = \text{UNIT} (V \times R)$
R0019 $-SM$

R0020 $Z = \text{UNIT} (X \times Y)$
R0021 $SM \quad SM \quad SM$

R0022 WHERE
R0023 $K = \text{THE GEGCENTRIC RADIUS VECTOR AT TIME T(ALIGN) SELECTED BY THE ASTRONAUT}$
R0025

R0026 $V = \text{THE INERTIAL VELOCITY VECTOR AT TIME T(ALIGN) SELECTED BY THE ASTRONAUT}$
R0028

R0029 (C) REFSMMAT ORIENTATION

R00291 (D) LANDING SITE - THIS IS NOT AVAILABLE IN SUNDANCE

R0030 THIS SELECTION CORRECTS THE PRESENT IMU ORIENTATION. THE PRESENT ORIENTATION DIFFERS FROM THAT TO WHICH IT
R0032 WAS LAST ALIGNED ONLY DUE TO GYRO DRIFT (I.E. NEITHER GIMBAL LOCK NOR IMU POWER INTERRUPTION HAS OCCURRED
R0034 SINCE THE LAST ALIGNMENT).

R0035 AFTER A IMU ORIENTATION HAS BEEN SELECTED ROUTINE S52.7 IS OPERATED TO COMPUTE THE GIMBAL ANGLES USING THE
R0037 NEW ORIENTATION AND THE PRESENT VEHICLE ATTITUDE. CAL52A THEN USES THESE ANGLES, STORED IN THETA0, +1, +2, TO
R0039 COARSE ALIGN THE IMU. THE STAR SELECTION ROUTINE, R56, IS THEN OPERATED. IF 2 STARS ARE NOT AVAILABLE AN ALARM
R0041 IS FLASHED TO NOTIFY THE ASTRONAUT. AT THIS POINT THE ASTRONAUT WILL MANUEVER THE VEHICLE AND SELECT 2 STARS
R0043 EITHER MANUALLY OR AUTOMATICALLY. AFTER 2 STARS HAVE BEEN SELECTED THE IMU IS FINE ALIGNED USING ROUTINE R51. IF
R0045 THE RENDEZVOUS NAVIGATION PROCESS IS OPERATING (INDICATED BY RNDVZFLG) P20 IS DISPLAYED. OTHERWISE P00 IS
R0047 REQUESTED.

R0048 CALLING SEQUENCE-

L P51-P53

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R0049 THE PROGRAM IS CALLED BY THE ASTRONAUT BY DSKY ENTRY.

R0050 SUBROUTINES CALLED-

R0051	1. FLAGDOWN	7. S52.2	13. NEWMODEX
R0052	2. R02BOTH	8. CAL53A	14. PRIOLARM
R0053	3. GPERF4	9. FLAGUP	
R0054	4. MATMOVE	10. R56	
R0055	5. GOFLASH	11. R51	
R0056	6. S52.3	12. GPERF3	

R0057 NORMAL EXIT MODES-

R0058 EXITS TO ENDJOB

R0059 ALARM OR ABORT EXIT MODES-

R0060 NONE

R0061 OUTPUT-

R0062 THE FOLLOWING MAY BE FLASHED ON THE DSKY

R0063	1. IMU ORIENTATION CODE
R0064	2. ALARM CODE 215 -PREFERRED IMU ORIENTATION NOT SPECIFIED
R0065	3. TIME OF NEXT IGNITION
R0066	4. GIMBAL ANGLES
R0067	5. ALARM CODE 405 -TWO STARS NOT AVAILABLE
R0068	6. PLEASE PERFORM P00
R0069	THE MODE DISPLAY MAY BE CHANGED TO 20

R0070 ERASABLE INITIALIZATION REQUIRED-

R0071 PFRATFLG SHOULD BE SET IF A PREFERRED ORIENTATION HAS BEEN COMPUTED. IF IT HAS BEEN COMPUTED IT IS STORED IN

R0073 XSMD, YSMD, ZSMD.

R0074 RNDVZFLG INDICATES WHETHER THE RENDEZVOUS NAVIGATION PROCESS IS OPERATING.

R0076 DEBRIS-

R0077 WORK AREA

0078				33,3777		BANK	33
0079	REF	2	LAST	250	15,2000	SETLOC	P505
0080					15,2050	BANK	

0081	REF	3	LAST	196	15,1755	EBANK	BEST1
0082	REF	1				COUNT*	55/P52
0085	REF	252	LAST	895	15,2050	TC	BANKCALL
0086	REF	11	LAST	838	15,2051	CADR	R02BOTH
0087	REF	1			15,2052	CAF	PFRATBIT
0088	REF	27	LAST	861	15,2053	MASK	FLAGRDZ
0089	REF	279	LAST	924	15,2054	CCS	A

IMU STATUS CHECK

IS PFRATFLG SET?

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0090	REF	1		15,2055	0 2060 0	TC	P52A	YES
0091	REF	43	LAST	907	15,2056 3 4752 0	CAF	B112	NO
0092	REF	2	LAST	928	15,2057 0 2061 1	TC	P52A +1	
0093	REF	42	LAST	852	15,2060 3 4753 1	CAF	RIT1	
0094	REF	8	LAST	725	15,2061 55 1145 1	TS	OPTION2	
0095	REF	43	LAST	928	15,2062 3 4753 1	CAF	RIT1	
0096	REF	253	LAST	927	15,2063 0 4616 1	TC	BANKCALL	FLASH OPTION CODE AND ORIENTATION CODE
0097	REF	1			15,2064 20713 0	CADR	GLPERF4F	FLASH V04N06
0098	REF	38	LAST	895	15,2065 0 6001 0	TC	GOTOPDDH	
0099					15,2066 1 2073 0	TCF	+5	V33-PROCEED
0100	REF	1			15,2067 0 2062 1	TC	P52B	NEW CODE - NEW ORIENTATION CODE INPUT
0101	REF	77	LAST	866	15,2070 0 5353 1	TC	PHASCHNG	DISPLAY RETURN
0102					15,2071 00014 1	UCT	00014	
0103	REF	141	LAST	895	15,2072 0 5155 0	TC	ENDOFJOB	
0104	REF	9	LAST	928	15,2073 3 1145 0	CA	OPTION2	
0105	REF	26	LAST	832	15,2074 7 6245 0	MASK	THREL	
0106	REF	280	LAST	927	15,2075 50 000 1	INDEX	A	
0107					15,2076 0 2077 0	TC	+1	
0108	REF	1			15,2077 1 2105 0	TCF	OPT4	OPTION 4 LANDING SITE
0109	REF	1			15,2100 1 2153 0	TCF	P52H	OPTION 1 PREFERRED
0110	REF	1			15,2101 1 2110 1	TCF	P52T	OPTION 2 NOMINAL
0111	REF	169	LAST	920	15,2102 0 6037 0	TC	INTERFET	OPTION 3 REF5MAT
0112					15,2103 77650 1	GOTO		
0113	REF	1			15,2104 32164 0		P52F	GO-DO-R51
01131					15,2105 0 0006 1	EXTEND		
01132	REF	5	LAST	786	15,2106 3 1401 0	DCA	TLAND	IF OPTION 4 DISPLAY TLAND
01133	REF	2	LAST	928	15,2107 1 2112 0	TCF	P52T +2	
0114					15,2110 0 0006 1	EXTEND		
0115	REF	25	LAST	906	15,2111 3 4755 1	DCA	REFG	
0116	REF	26	LAST	725	15,2112 53 046 0	DXCH	DSPTEN1	
0117	REF	1			15,2113 3 2170 0	CAF	V06N+44	
01171	REF	254	LAST	928	15,2114 0 4616 1	TC	BANKCALL	
01172	REF	27	LAST	854	15,2115 20476 0	CADR	GOFLASH	
0118	REF	39	LAST	928	15,2116 0 6001 0	TC	GOTOPDDH	
0119					15,2117 0 2121 1	TC	+2	
0120					15,2120 0 2113 0	TC	-5	
0121	REF	27	LAST	928	15,2121 53 046 0	DXCH	DSPTEN1	
0122					15,2122 0 0006 1	EXTEND		
0123					15,2123 6 2125 0	BZMF	+2	IF TIME ZERO OR NEG USE TIME2
0124					15,2124 1 2127 0	TCF	+3	
0125					15,2125 0 0006 1	EXTEND		
0126	REF	28	LAST	894	15,2126 3 0025 0	DCA	TIME2	
0127	REF	4	LAST	202	15,2127 53 775 1	DXCH	TALIGN	
0128	REF	10	LAST	928	15,2130 3 1145 0	CA	OPTION2	
0130	REF	44	LAST	928	15,2131 7 4752 1	MASK	RIT2	
0131	REF	281	LAST	928	15,2132 10 000 0	CCS	A	
0132	REF	1			15,2133 0 2137 0	TC	P52W	

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0133	REF 170	LAST 928	15,2134	0 6037 0
0134			15,2135	77650 1
0135	REF 1		15,2136	32220 0

TC	INTERPRET
GDTG	
	P52LS

OPTION 4 - GET LS ORIENTATION

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PU151 START ALIGNMENT

0152	REF 171	LAST 929	15,2137	0 6037 0	P52W	TC	INTPRET	
0153			15,2140	45145 0		DEGAD	CALL	PICK UP ALIGN TIME
0154	REF 5	LAST 928	15,2141	02775 0			TALIGN	COMPUTE NOMINAL IMU
0156	REF 1		15,2142	31650 0			S52.2	ORIENTATION
0157			15,2143	77624 1	P52D	CALL		READ VEHICLE ATTITUDE AND
0158	REF 1		15,2144	31617 0			S52.2	COMPUTE GIMBAL ANGLES
0162			15,2145	77776 1		EXIT		
0163	REF 2	LAST 485	15,2146	3 5010 0		CAF	V06H22	
0164	REF 255	LAST 928	15,2147	0 4616 1		TC	BANKCALL	DISPLAY GIMBAL ANGLES
0165	REF 28	LAST 928	15,2150	20476 0		CADR	GDFLASH	
0166	REF 40	LAST 928	15,2151	0 6001 0		TC	GOTOPDOH	
0167	REF 1		15,2152	1 2171 0		TCF	COARSTYP	V33-PROCEED. SEE IF GYRO TORQUE COARSE
0168	REF 172	LAST 930	15,2153	0 6037 0	P52H	TC	INTPRET	
0169			15,2154	77650 1		GGTO		
0170	REF 1		15,2155	32143 0			P52D	
0171	REF 173	LAST 930	15,2156	0 6037 0	REGCOARS	TC	INTPRET	
0172			15,2157	77624 1		CALL		DO COARSE ALIGN
0173	REF 1		15,2160	31327 0			CAL53A	ROUTINE
0174			15,2161	43014 0	COARSRET	SET	CLEAR	
0175	REF 2	LAST 680	15,2162	01462 0			REFSHFLG	
0176	REF 2	LAST 769	15,2163	01273 0			PFRAIFLG	
0177			15,2164	77624 1	P52F	CALL		
0178	REF 1		15,2165	31015 1			R51	
0179			15,2166	77776 1	P52DUT	EXIT		
0180	REF 41	LAST 930	15,2167	0 6001 0		TC	GOTOPDOH	
0196	REF 5	LAST 748	5006		VB05N09		V05N09	
0198			15,2170	01442 1	VC6H344	VR	634	

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P0200 CHECK FOR GYRO TORQUE COARSE ALIGNMENT

0201	REF	1		15,2171	3 2217 1	COARSTYP-CAF	OCT13	
0202	REF	256	LAST	930	15,2172	0 4616 1	TC	BANKCALL
0203	REF	5	LAST	789	15,2173	20623 1	CADR	GOPERF1
0204	REF	42	LAST	930	15,2174	1 6001 1	TCF	GUTOPGH
0205	REF	1			15,2175	1 2156 0	TCF	REGCOARS
0206	REF	174	LAST	930	15,2176	0 6037 0	TC	INTPRET
0207					15,2177	64375 1	VLOAD	MXV
0208	REF	4	LAST	149	15,2200	03607 0		YSMD
0209	REF	37	LAST	880	15,2201	01734 0		REFSMMAT
0210					15,2202	77656 1	UNIT	
0211	REF	3	LAST	123	15,2203	26665 0	STOVL	XDC
0212	REF	3	LAST	147	15,2204	03615 0		YSMD
0213					15,2205	53521 1	MXV	UNIT
0214	REF	38	LAST	931	15,2206	01734 0		REFSMMAT
0215	REF	3	LAST	123	15,2207	26673 1	STOVL	YDC
0216	REF	3	LAST	148	15,2210	03623 0		ZSMD
0217					15,2211	53521 1	MXV	UNIT
0218	REF	39	LAST	931	15,2212	01734 0		REFSMMAT
0219	REF	3	LAST	123	15,2213	36701 1	STCALL	ZDC
0220	REF	1			15,2214	31164 0		GYCOARS
02201					15,2215	77650 1	GDT3	
02202	REF	1			15,2216	32166 1		PERCENT
0221					15,2217	00013 0	OCT13	OCT 13

DISPLAY V 50N25 WITH COARSE ALIGN OPTION

V34-TERMIN&CE

V33-NORMAL-COARSE

V32-GYRO TORQUE-COARSE

GET SM(DESIREO) WRT SM(PRESENT)

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P0222 COMPUTE LANDING ORIENTATION FOR OPTION 4

0223				15,2220	43014 0	P52LS	SET	CLEAR	GET LANDING SITE ORIENTATION
0224	REF	4	LAST	791	15,2221			LUNAFLAG	
0225	REF	2	LAST	657	15,2222			FEADFLAG	TO PICK UP RLS
0226					15,2223		SETPD	VLOAD	
0227					15,2224			0	
0228	REF	9	LAST	842	15,2225			RLS	PICK UP LANDING SITE VEC IN REF
0229					15,2226		PDDL	PUSH	RLS-PD 0-5
0230	REF	6	LAST	930	15,2227			TALIGN	
0231	REF	8	LAST	928	15,2230		STCALL	TLAND	JAP ALIGN TIME IN TLAND FOR OPTION 4
0232	REF	3	LAST	841	15,2231			RP-TO-R	TRANS RLS TO REF
0233					15,2232		VSR2		
0234	REF	4	LAST	791	15,2233		STOOL	ALPHAV	INPUT TO LAT-LONG
0235	REF	7	LAST	932	15,2234			TALIGN	
0236					15,2235		CALL		
02361	REF	1			15,2236			N89DISP	
02362					15,2237		VLOAD	UNIT	COMPUTE LANDING SITE ORIENT (X&AD)
02363	REF	5	LAST	932	15,2240			ALPHAV	
02364	REF	5	LAST	931	15,2241		STCALL	X&AD	
02365	REF	1			15,2242			LSORIENT	
02366					15,2243		GDTB		
02367	REF	2	LAST	930	15,2244			P52D	NOW GO COMPUTE CIRCULAR ANGLES

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P0237 SUBROUTINE TO CALCULATE AND DISPLAY THE LUNAR LANDING SITE

02371	REF	2	LAST	45	14.2000		SETLOC P50S1	
02372					14.2446		BANK	
02373	REF	16	LAST	388	E5.1642		EBANK= XSM	
0238					14.2446	77620 0	NS9DISP	STQ
0239	REF	3	LAST	788	14.2447	02746 0		QMAJ
0240	*REF	14	LAST	902	14.2450	35243 1	STCALL	GET/2 +4
0241	REF	3	LAST	791	14.2451	26551 1		TEMP STORE TIME
0242					14.2452	70545 1	DLOAD	SR1
0243	REF	3	LAST	314	14.2453	01123 0		LONG
0244	REF	3	LAST	317	14.2454	16711 1	STODL	LANDLONG
0245	REF	3	LAST	314	14.2455	01125 0		ALT
0246	REF	2	LAST	317	14.2456	16713 0	STODL	LANDALT
0247	REF	3	LAST	314	14.2457	01121 1		LAT
0248	REF	3	LAST	317	14.2460	16707 0	STODL	LANDLAT
0249					14.2461	77776 1	EXIT	
0250	REF	1			14.2462	3 2505 0	LSDISP	CAF
0251	REF	257	LAST	931	14.2463	0 4616 1	TC	VO6N89* BANKCALL
0252	REF	29	LAST	930	14.2464	20476 0	CADR	GOFLASH
0253	REF	43	LAST	931	14.2465	1 6001 1	TCF	GETUPDCH
0254					14.2466	1 2470 1	TCF	+2
0255	REF	1			14.2467	1 2462 1	TCF	LSDISP
0256	REF	175	LAST	931	14.2470	0 6037 0	TC	INTERPRET
0257					14.2471	72545 0	DLOAD	SEL
0258	REF	4	LAST	933	14.2472	02711 1		LANDLONG
0259	REF	4	LAST	933	14.2473	15123 0	STODL	LONG
0260	REF	3	LAST	933	14.2474	02713 0		LANDALT
0261	REF	4	LAST	933	14.2475	15125 0	STODL	ALT
0262	REF	4	LAST	933	14.2476	02707 0		LANDLAT
0263	REF	4	LAST	933	14.2477	15121 1	STODL	LAT
0264	*REF	15	LAST	933	14.2500	01243 0		GET/2 +4
0265					14.2501	77624 1	CALL	PICK UP TIME
0266	REF	1			14.2502	26422 1		GET RLS-BACK FROM LAT.LONG. ALT
0267					14.2503	77650 1	GUTU	RLS E-29 IN MPAC AND ALPHA V
0268	REF	4	LAST	933	14.2504	02746 0		QMAJ
02681					14.2505	01531 1	VO6N89* VN	689

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R0269 NAME -SSG ALIAS - LOCSAM
 R0270 BY
 R0271 VINCENT
 R0272 FUNCTION - COMPUTE INPUTS FOR PICAPAR AND PLANET

R0273 DEFINE

R0274
 R0275 U = UNIT(SUN WRT EARTH)
 R0276 ES

R0277 U = UNIT(MOON WRT EARTH)
 R0278 EM

R0279 R = POSITION VECTOR OF LEM
 R0280 L

R0281 R = MEAN DISTANCE (384402KM) BETWEEN EARTH AND MOON
 R0282 EM

R0283 P = RATIO R / (DISTANCE SUN TO EARTH) >.00257125
 R0284 EM

R0285 R = EQUATORIAL RADIUS (6378.166KM) OF EARTH
 R0286 E

R0287 LOCSAM COMPUTES IN EARTH INFLUENCE
 R0288

R0289 VSUN = U
 R0290 ES

R0291 VEARTH = -UNIT(R)
 R0292 L

R0293 VMOON = UNIT(R .U - P)
 R0294 EM EM L

R0295 CSUN = COS 90

R0296 CEARTH = COS(5 + ARCSIN(R / MAG(R)))
 R0297 E L

R0298 CMOON = COS 5

R0299
 R0300 INPUT - TIME IN MPAC
 R0301 OUTPUT - LISTED ABOVE
 R0302 SUBROUTINES - LSPOS, LEMPREC
 R0303 DEBRIS - VAC AREA, TSIGHT

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0307	REF	2	LAST	45	TO	45:	8	8*	COUNT*	SS/LOSAM
0308	REF	1				14,2506			SSO	LOC SAM
0309						14,2506	77620	0	LOC SAM	STG
0310	REF	2	LAST	123		14,2507	02745	0		UNIT
0311	REF	2	LAST	258		14,2510	37562	1	STCALL	TSIGHT
0312	REF	1				14,2511	33664	0		LSPOS
0313						14,2512	77745	1	DLOAD	
0314	REF	3	LAST	935		14,2513	03562	0		TSIGHT
0315	REF	52	LAST	839		14,2514	34041	0	STCALL	TDECI
0316	REF	12	LAST	839		14,2515	27057	0		LEF PREC
0317						14,2516	61131	0	SSP	TIX,2
0318	REF	9	LAST	721		14,2517	00052	0		SZ
0319						14,2520	00000	1		0
0320	REF	1				14,2521	30543	0		MOONCNTR
0321						14,2522	74375	0	EARTCNTR	VLOAD
0322	REF	3	LAST	487		14,2523	02723	0		VXSC
0323	REF	1				14,2524	30001	0		RSUBEM
0324						14,2525	52372	0	VSLI	VSU
0325	REF	29	LAST	839		14,2526	00001	0		RATT
0326						14,2527	77656	1	UNIT	
0327	REF	4	LAST	935		14,2530	26723	0	STOVL	VMOON
0328	REF	30	LAST	935		14,2531	00001	0		RATT
0329						14,2532	57456	1	UNIT	VCOMP
0330	REF	3	LAST	124		14,2533	16707	0	STODL	VEARTH
0331	REF	1				14,2534	30005	1		RSUBE
0332						14,2535	77624	1	CALL	
0333	REF	1				14,2536	30575	0		OCCOS
0334	REF	1				14,2537	14017	1	STODL	VEARTH
0335	REF	1				14,2540	30604	0		CSSS
0336	REF	1				14,2541	34023	1	STCALL	CMOON
0337	REF	1				14,2542	30570	0		ENDSAM
0338						14,2543	74375	0	MOONCNTR	VLOAD
0339	REF	5	LAST	935		14,2544	02723	0		VXSC
0340	REF	1				14,2545	30007	0		VMOON
0341						14,2546	53445	1	BVSU	UNIT
0342	REF	2	LAST	123		14,2547	02715	0		VSUN
0343	REF	3	LAST	935		14,2550	26715	0	STOVL	VSUN
0344	REF	6	LAST	935		14,2551	02723	0		VMOON
0345						14,2552	53361	0	VXSC	VX
0346	REF	2	LAST	935		14,2553	30001	0		RSUBEM
0347	REF	31	LAST	935		14,2554	00001	0		RATT
0348						14,2555	57456	1	UNIT	VCOMP
0349	REF	4	LAST	935		14,2556	26707	0	STOVL	VEARTH
0350	REF	32	LAST	935		14,2557	00001	0		RATT
0351						14,2560	57456	1	UNIT	VCOMP
0352	REF	7	LAST	935		14,2561	16723	0	STODL	VMOON
0353	REF	1				14,2562	30003	1		RSUBM
0354						14,2563	77624	1	CALL	
0355	REF	2	LAST	935		14,2564	30575	0		OCCOS

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0356	REF	2	LAST	935	14.2565	14023 0		STODL	CMOON		
0357	REF	2	LAST	935	14.2566	30604 0			CSS5		
0358	REF	2	LAST	935	14.2567	00017 1		STORE	CEARTH		
0359					14.2570	77745 1	ENDSAM	OLoad			
0360	REF	1			14.2571	30606 1			CSSUN		
0361	REF	1			14.2572	00021 1		STORE	CSUN		
0362					14.2573	77650 1		GOTO			
0363	REF	3	LAST	935	14.2574	02745 0			QMIN		
0364					14.2575	70471 1	UCCUS	DDV	SR1		
0365					14.2576	00045 0			SR0		
0366					14.2577	43336 0		ASIN	DAD		
0367	REF	1			14.2600	30610 0			5DEG-EES		
0368					14.2601	70546 1		COS	SR1		
0369					14.2602	77616 0		RVQ			
0370					0016		CEARTH	=	140		
0371					0020		CSUN	=	160		
0372					0022		CMOON	=	180		
0373					14.2603	07760 1	CSS5	2DEC	.2490475	(COS 51)/4	
0373					14.2604	14473 1					
0374					14.2605	04000 0	CSSUN	2DEC	.129	(COS 60)/4	
0374					14.2606	00000 1					
0375					14.2607	00343 0	5DEGREES	2DEC	.013388889	SCALED IN FEVS	
0375					14.2610	21616 0					

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P0380 PROGRAM NAME - R56 DATE DEC 20 66
 R0381 MOD 1 LOG SECTION P51-P53
 R0382 ASSEMBLY SUNDISK REV46
 R0383 BY KEN VINCENT
 R0384
 R0385 FUNCTION
 R0386 THIS PROGRAM READ THE IMU-CDUS AND COMPUTES THE VEHICLE ORIENTATION
 R0387 WITH RESPECT TO INERTIAL SPACE. IT THEN COMPUTES THE SHAFT AXIS (SAX)
 R0388 WITH RESPECT TO REFERENCE INERTIAL. EACH STAR IN THE CATALOG IS TESTED
 R0389 TO DETERMINE IF IT IS OCCULTED BY EITHER THE EARTH, SUN OR MOON. IF A
 R0390 STAR IS NOT OCCULTED THEN IT IS PAIRED WITH ALL STAR OF LOWER INDEX.
 R0391 THE PAIRED STAR IS TESTED FOR OCCULTATION. PAIRS OF STARS THAT PASS
 R0392 THE OCCULTATION TESTS ARE TESTED FOR GOOD SEPARATION. A PAIR OF STARS
 R0393 HAVE GOOD SEPARATION IF THE ANGLE BETWEEN THEM IS LESS THAN 100 DEGREES
 R0394 AND MORE THAN 50 DEGREES. THOSE PAIRS WITH GOOD SEPARATION
 R0395 ARE THEN TESTED TO SEE IF THEY LIE IN CURRENT FIELD OF VIEW. (WITHIN
 R0396 50 DEGREE OF SAX). THE PAIR WITH MAX SEPARATION IS CHOSEN FROM
 R0397 THOSE WITH GOOD SEPARATION, AND IN FIELD OF VIEW.
 R0398

CALLING SEQUENCE

P0400 L TC BANKCALL
 R0401 L+1 CADR R56
 R0402 L+2 ERROR RETURN - NO STARS IN FIELD OF VIEW
 R0403 L+3 NORMAL RETURN
 R0404

OUTPUT

R0406 BESTI, BESTJ - SINGLE PREC. INTEGERS. STAR NUMBERS TIMES 6
 R0407 VFLAG - FLAG BIT SET IMPLIES NO STARS IN FIELD OF VIEW
 R0408

INITIALIZATION

R0410 1) A CALL TO LOCSAM MUST BE MADE
 R0411

DEBRIS

WORK AREA

R0414 X, Y, ZNB

R0415 SINCDU, COSCDU

R0416 STARAD - STAR +5

C417	REF 1	14.2611	R56	=	PICAPAR
C418	REF 1			COUNT*	34/R56
C419	REF 12 LAST 895	14.2611	0 4645 1	PICAPAR	TC MAKECADR
C420	REF 4 LAST 936	14.2612	55 745 1	TS	QMIN
C421	REF 176 LAST 933	14.2613	0 6037 0	TC	INTPRET
C422		14.2614	77624 1	CALL	
C423	REF 4 LAST 548	14.2615	47537 0		CDUTRIG
C424		14.2616	77624 1	CALL	
C425	REF 1	14.2617	20030 0		CALCSHSE
C426		14.2620	77601 0	SETPD	
C427		14.2621	00001 0		0
C428		14.2622	71214 0	SET	DLOAD VFLAG = 1
C429	REF 1	14.2623	01465 1		VFLAG

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0430	REF	1		14.2624	24007 0		GPZERO	
0431	REF	4	LAST 927	14.2625	26756 1	STOVL	DESTI	
0432	REF	3	LAST 381	14.2626	02665 0		XNB	
0433				14.2627	63361 0	VXSC	PDVL	
0434	REF	1		14.2630	24005 1		HALFOP	
0435	REF	3	LAST 374	14.2631	02701 0		ZNB	
0436				14.2632	74370 0	AXT.1	VXSE	
0437				14.2633	00344 1		ZBOP	X1 = 37 X 6 +6
0438	REF	2	LAST 938	14.2634	24005 1		HALFOP	
0439				14.2635	77655 1	VAD		
0440				14.2636	53505 1	VXM	UNIT	
0441	REF	40	LAST 931	14.2637	01734 0		REFSMAT	
0442	REF	1		14.2640	02731 0	STORE	SAX	SAX = SHAFT AXIS
0443				14.2641	66331 0	SSP	SSP	S1=S2=6
0444	REF	7	LAST 609	14.2642	00051 0		S1	
0445				14.2643	00006 1			
0446	REF	10	LAST 935	14.2644	00052 0		S2	
0447				14.2645	00006 1		6	
0448				14.2646	52100 1	PIC1	TIX.1	MAJOR STAR
0449	REF	1		14.2647	30651 0		PIC2	
0450	REF	1		14.2650	30766 0		PICEND	
0451				14.2651	50373 0	PIC2	VLOAD*	DOT
0452	REF	1		14.2652	30347 1		CATLOG.1	
0453	REF	2	LAST 938	14.2653	02731 0		SAX	
0454				14.2654	50025 0	DSU	BMN	
0455	REF	1		14.2655	30765 0		CSS33	
0456	REF	1		14.2656	30646 0		PIC1	
0457				14.2657	77754 1	LXA.2		
0458	REF	25	LAST 886	14.2660	00046 0		X1	
0459				14.2661	52104 0	PIC3	TIX.2	GOTO
0460	REF	1		14.2662	30664 0		PIC4	
0461	REF	2	LAST 938	14.2663	30646 0		PIC1	
0462				14.2664	50373 0	PIC4	VLOAD*	DOT
0463	REF	2	LAST 938	14.2665	47430 0		CATLOG.2	
0464	REF	3	LAST 938	14.2666	02731 0		SAX	
0465				14.2667	50025 0	DSU	BMN	
0466	REF	2	LAST 938	14.2670	30765 0		CSS33	
0467	REF	1		14.2671	30661 0		PIC	
0468				14.2672	47773 1	VLOAD*	DOT*	
0469	REF	3	LAST 938	14.2673	30347 1		CATLOG.1	
0470	REF	4	LAST 938	14.2674	47430 0		CATLOG.2	
0471				14.2675	51025 1	DSU	BPL	
0472	REF	1		14.2676	30763 0		CSS40	
0473	REF	2	LAST 938	14.2677	30661 0		PIC	
0474				14.2700	45173 0	VLOAD*	CALL	
0475	REF	5	LAST 938	14.2701	30347 1		CATLOG.1	
0476	REF	1		14.2702	30740 1		CCULT	
0477				14.2703	77614 1	BON		
0478	REF	1		14.2704	01710 0		CULTFLAG	
0479	REF	3	LAST 938	14.2705	30646 0		PIC1	

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0480				14,2706	45173 0	VLOAD*	CALL	
0481	REF	6	LAST	938	14,2707		CATLOG,2	
0482	REF	2	LAST	938	14,2710		OCCULT	
0483				14,2711	77614 1	BGN		
0484	REF	2	LAST	938	14,2712		CULTFLAG	
0485	REF	3	LAST	938	14,2713		PIC3	
0486				14,2714	77614 1	STRATGY	BONCLR	
0487	REF	2	LAST	937	14,2715		VFLAG	
0488	REF	1			14,2716		NEWPAR	
0489				14,2717	65120 1	XCHX,1	XCHX,2	
0490	REF	5	LAST	938	14,2720		BESTI	
0491	REF	2	LAST	124	14,2721		BESTJ	
0492				14,2722	47773 1	STRAT	VLOAD*	DOT*
0493	REF	7	LAST	939	14,2723		CATLOG,1	
0494	REF	8	LAST	939	14,2724		CATLOG,2	
0495				14,2725	43006 0	PUSH	BOFINV	
0496	REF	3	LAST	939	14,2726		VFLAG	
0497	REF	1			14,2727		STRAT-3	
0498				14,2730	45345 1	DLOAD	DSU	
0499				14,2731	77644 1	BPL		
0500	REF	4	LAST	939	14,2732		PIC3	
0501				14,2733	67130 1	NEWPAR	SXA,1	SXA,2
0502	REF	6	LAST	939	14,2734		BESTI	
0503	REF	3	LAST	939	14,2735		BESTJ	
0504				14,2736	77650 1	GOTO		
0505	REF	5	LAST	939	14,2737		PIC3	
0506				14,2740	51321 0	OCCULT	MXV	BVSU
0507	REF	1			14,2741		CULTRIX	
0508	REF	1			14,2742		CSS	
0509				14,2743	77654 0	BZE		
0510	REF	1			14,2744		CULTED	
0511				14,2745	75240 0	BNN	SIGN	
0512	REF	2	LAST	939	14,2746		CULTED	
0513	REF	364	LAST	920	14,2747		MPAC +3	
0514				14,2750	75240 0	BNN	SIGN	
0515	REF	3	LAST	939	14,2751		CULTED	
0516	REF	365	LAST	939	14,2752		MPAC +5	
0517				14,2753	42040 1	BNN	CLRCO	
0518	REF	4	LAST	939	14,2754		CULTED	
0519	REF	3	LAST	939	14,2755		CULTFLAG	
0520	REF	8	LAST	835	14,2756		QPRFF	
0521				14,2757	77614 1	CULTED	SETGO	
0522	REF	4	LAST	939	14,2760		CULTFLAG	
0523	REF	9	LAST	939	14,2761		QPRFF	
0524	REF	3	LAST	936	0016	CSS	CEARTH	
0525				14,2762	05110 1	CSS40	2DEC	COS 50 /4
0525				14,2763	35052 0			
0526				14,2764	05110 1	CSS33	2DEC	COS 50 /4
0526				14,2765	35052 0			
0527				14,2766	77414 0	PICEND	BDFP	EXIT

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0528	REF	4	LAST	939	14,2767	01745 0		VFLAG
0529	REF	1			14,2770	30772 0		PICGXT
0530	REF	1			14,2771	0 3013 0	TC	PICBXT
0531					14,2772	73150 1	PICGXT LXA+1	LXA+2
0532	REF	7	LAST	939	14,2773	02755 1		BESTI
0533	REF	4	LAST	939	14,2774	02756 1		BESTJ
0534					14,2775	47775 1	VLOAD	DOT*
0535	REF	4	LAST	938	14,2776	02731 0		SAX
0536	REF	9	LAST	939	14,2777	30347 1		CATLOG,1
0537					14,3000	47715 1	PDVL	DOT*
0538	REF	5	LAST	940	14,3001	02731 0		SAX
0539	REF	10	LAST	940	14,3002	47430 0		CATLOG,2
0540					14,3003	77625 0	DSU	
0541					14,3004	66044 1	BPL	SXA.1
0542	REF	1			14,3005	31011 0		PICNSWP
0543	REF	5	LAST	940	14,3006	02756 1		BESTJ
0544					14,3007	77734 1	SXA.2	
0545	REF	8	LAST	940	14,3010	02755 1		BESTI
0546					14,3011	77776 1	PICNSWP	EXIT
0547	REF	5	LAST	937	14,3012	251745 0	INCR	QMIN
0548	REF	6	LAST	940	14,3013	3 1745 0	PICBXT	CA
0549	REF	4	LAST	491	14,3014	0 4622 0	TC	S=CALL
0550					0000		VPD	= 00
0551					0006		VO	= 60
0552					0014		V1	= 120
0553					0022		V2	= 180
0554					0030		V3	= 240
0555					0036		DP0	= 300
0556					0040		DP1	= 320

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P0557 NAME-R51 FINE ALIGN
 R0558 FUNCTION-TO ALIGN THE STABLE MEMBER TO REFSMMAT
 R0559 CALLING SEQ- CALL R51
 R0560 INPUT - REFSMMAT
 R0561 OUTPUT- GYRO TORQUE PULSES
 R0562 SUBROUTINES -LOCSAM,PICAPAR,R52,R53,R54,R55

0563 REF 1 COUNT* 31/R51
 0564 14.3015 77620 0 R51 STO
 0565 REF 5 LAST 933 14.3016 02746 0 OMAJ
 0566 14.3017 77776 1 R51.1 EXIT
 05661 REF 78 LAST 928 14.3020 0 5353 1 TC PHASCHNG
 05662 14.3021 04024 0 OCT 04024

0567 REF 2 LAST 179 14.3022 3 4761 0 R51C CAF OCT15
 0568 REF 258 LAST 933 14.3023 0 4616 1 TC BANKCALL
 0569 REF 6 LAST 931 14.3024 20623 1 CADR GCPREF1
 0570 REF 44 LAST 933 14.3025 0 6001 0 TC GOTOPULH
 0571 14.3026 0 3030 1 TC +2 V33E
 0572 REF 1 14.3027 0 3053 1 TC R51E ENTER
 0573 REF 177 LAST 937 14.3030 0 6037 0 TC INTERPRET
 0574 14.3031 43234 0 RTB DAD
 0575 REF 25 LAST 852 14.3032 21573 0 LOADTIME
 0576 REF 1 14.3033 31163 1 TSIGHT1

0577 14.3034 77624 1 CALL
 0578 REF 2 LAST 935 14.3035 30506 1 EXIT
 0579 14.3036 77776 1 TC BANKCALL
 0580 REF 259 LAST 941 14.3037 0 4616 1 CADR R56
 0581 REF 1 14.3040 30611 1 TC R511
 0582 REF 1 14.3041 0 3043 0 TC R511
 0583 REF 2 LAST 941 14.3042 0 3053 1 R51F TC R511
 0584 REF 37 LAST 924 14.3043 0 5567 0 R511 TC ALARM

0585 14.3044 00405 0 OCT 405
 0586 REF 1 14.3045 3 5006 1 CAF VBOSN09
 0587 REF 260 LAST 941 14.3046 0 4616 1 TC BANKCALL
 0588 REF 30 LAST 933 14.3047 20476 0 CADR GCPFLASH
 0589 REF 45 LAST 941 14.3050 0 6001 0 TC GOTOPULH
 0590 REF 3 LAST 941 14.3051 0 3053 1 TC R51E
 0591 REF 1 14.3052 0 3022 1 TC R51C

0592 REF 179 LAST 924 14.3053 3 4755 1 R51E CAF ZERO
 0593 REF 3 LAST 746 14.3054 55757 1 TS STARIND
 0594 REF 178 LAST 941 14.3055 0 6037 0 R51.2 TC INTERPRET
 0595 14.3056 77776 1 R51.3 EXIT
 0596 REF 79 LAST 941 14.3057 0 5353 1 TC PHASCHNG
 0597 14.3060 04024 0 OCT 04024

0599 REF 179 LAST 941 14.3061 0 6037 0 TC INTERPRET
 0600 14.3062 77624 1 CALL
 0601 REF 1 14.3063 31670 1 R52
 0602 14.3064 77776 1 EXIT
 0603 REF 261 LAST 941 14.3065 0 4616 1 TC BANKCALL

AUP WILL MAKE CALLS TO SIGHTING

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0604 REF 1 14.3066 16000 0
 0605 REF 262 LAST 941 14.3067 0 4616 1
 0606 REF 1 14.3070 17712 0
 0607 REF 1 14.3071 0 5711 0
 0608 REF 4 LAST 941 14.3072 11 757 1
 0609 14.3073 1 3075 1
 0610 REF 1 14.3074 0 3145 1
 0611 REF 180 LAST 941 14.3075 0 6037 0
 0612 14.3076 77775 1
 0613 REF 14 LAST 317 14.3077 0 2715 0
 0614 REF 5 LAST 253 14.3100 0 2767 0
 0615 14.3101 77776 1
 0616 REF 80 LAST 941 14.3102 0 5353 1
 0617 14.3103 0 4024 0

CADR AOTMARK
 TC BANKCALL
 CADR OPTSTALL
 TC CURTAINS
 CCS STARIND
 TCF +2
 TC R51.4
 TC INTERPRET
 VLOAD
 STORE STARAD +6
 STORE STARSARV2
 EXIT
 TC PHASCHNG
 OCT 04024

0619 REF 181 LAST 942 14.3104 0 6037 0
 0620 14.3105 45145 0
 0621 REF 4 LAST 935 14.3106 0 3562 0
 0622 REF 1 14.3107 32472 1
 0623 14.3110 53521 1
 0624 REF 41 LAST 938 14.3111 0 1734 0
 0625 REF 15 LAST 942 14.3112 26715 0
 0626 REF 2 LAST 145 14.3113 0 3554 0
 0627 14.3114 53521 1
 0628 REF 42 LAST 942 14.3115 0 1734 0
 0629 REF 16 LAST 942 14.3116 26707 0
 0630 REF 3 LAST 196 14.3117 0 2761 0
 0631 14.3120 24007 0
 0632 REF 6 LAST 942 14.3121 0 2767 0
 0633 14.3122 34015 1
 0634 REF 1 14.3123 31256 1
 0635 14.3124 45014 0
 0636 REF 1 14.3125 0 0354 0
 0637 REF 1 14.3126 31134 0
 0638 REF 1 14.3127 47441 0
 0639 14.3130 77624 1
 0640 REF 1 14.3131 31224 1
 0641 14.3132 77614 1
 0642 REF 3 LAST 930 14.3133 0 1273 0
 0643 14.3134 77776 1 R51K
 0644 REF 2 LAST 181 14.3135 3 5751 1 R51P63
 0645 REF 263 LAST 942 14.3136 0 4616 1
 0646 REF 7 LAST 941 14.3137 20623 1
 0647 REF 46 LAST 941 14.3140 0 6001 0
 0648 REF 2 LAST 941 14.3141 0 3022 1
 0649 REF 182 LAST 942 14.3142 0 6037 0
 0650 14.3143 77650 1
 0651 REF 6 LAST 941 14.3144 0 2746 0
 0652 REF 183 LAST 942 14.3145 0 6037 0 R51.4
 0653 14.3146 77775 1

TC INTERPRET
 DLOAD CALL
 TSIGHT
 PLANET
 MXV UNIT
 REFSHMAT
 STOVL STARAD +6
 PLANVEC
 MXV UNIT
 REFSHMAT
 STOVL STARAD
 STARSARV1
 STOVL +6
 STARSARV2
 STCALL 128
 R54 STAR DATA TEST
 BOFF CALL
 FREEFLAG
 R51K
 AXISGEN
 CALL
 R55 GYRO TORQUE
 CLEAR
 RFRATFLG
 EXIT
 CAF OCT14
 TC BANKCALL
 CADR GUPPEFI
 TC GOTOPGON
 TC R51C
 TC INTERPRET
 GOTD
 QNAJ
 TC INTERPRET
 VLOAD

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0654	REF	17	LAST	942	14,3147	02715 0		STARAD +6
0655	REF	4	LAST	942	14,3150	02761 0	STORE	STARSAVI
0656					14,3151	45145 0	DLOAD	CALL
0657	REF	5	LAST	942	14,3152	03562 0		TSIGHT
0658	REF	2	LAST	942	14,3153	32472 1		PLANET
0659	REF	3	LAST	942	14,3154	03554 0	STORE	PLANVEC
0660					14,3155	77731 1	SSP	
0661	REF	5	LAST	942	14,3156	02760 1		STAF IND
0662					14,3157	00001 0		1
0663					14,3160	77650 1	GOTO	
0664	REF	1			14,3161	31056 0		R51.3
0665					14,3162	00002 0	TSIGHT1	2DEC 36000
0665					14,3163	06240 1		6 MIN TO MARKING

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P0666 GYRO TORQUE COARSE ALIGNMENT

0667				14,3164	45020 1	GYCDARS	STQ	CALL	
06671	REF	7	LAST	942	14,3165	02746 0		QMAJ	
0668	REF	1			14,3166	47247 0		CALEGTA	
0669					14,3167	43014 0		CLEAR	
0670	REF	2	LAST	863	14,3170	01260 1		DRIFTFLG	
0671	REF	3	LAST	930	14,3171	01662 1		REFSMFLG	
0672					14,3172	77776 1		EXIT	
0673	REF	1			14,3173	3 3223 1		CAF	V16N20 MONITOR GIMBALS
0674	REF	264	LAST	942	14,3174	0 4616 1		TC	BANKCALL
0675	REF	3	LAST	850	14,3175	20451 0		CADR	GOODSPR
0676	REF	1			14,3176	3 3255 0		CA	R55CDR
0677	REF	265	LAST	944	14,3177	0 4616 1		TC	BANKCALL
0678	REF	4	LAST	388	14,3200	17323 0		CADR	IMUPULSE
0679	REF	266	LAST	944	14,3201	0 4616 1		TC	BANKCALL
0680	REF	8	LAST	378	14,3202	17716 1		CADR	IMUSTALL
0681	REF	2	LAST	942	14,3203	0 5711 0		TC	CURTAINS
0682	REF	81	LAST	942	14,3204	0 5353 1		TC	PHASCHNG
0683					14,3205	04024 0		DCT	04024
0685	REF	184	LAST	942	14,3206	0 6037 0		TC	INTERPRET
0686					14,3207	75160 1		AXC.1	AXC.2
0687	REF	6	LAST	932	14,3210	03606 1			XSHD
0688	REF	43	LAST	942	14,3211	01733 1			REFSMHAT
0689					14,3212	77624 1		CALL	STOKE-DESIRED-REFSMHAT
0690	REF	1			14,3213	31377 0			MATMOVE
0691					14,3214	43014 0		CLEAR	SET
0692	REF	4	LAST	942	14,3215	01273 0			PIRATFLG
0693	REF	4	LAST	944	14,3216	01462 0			REFSMFLG
0694					14,3217	77624 1		CALL	
0695	REF	1			14,3220	31602 1			NOGARB
06951					14,3221	77650 1		GOTO	SET DRIFT AND INITIALIZE 1/PIRAT
0696	REF	2	LAST	942	14,3222	31134 0			K51K
0697					14,3223	04024 0	V16N20	VN	1620

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R0698 R55 GYRO TORQUE
R0699 FUNCTION-COMPUTE AND SEND GYRO PULSES
R0700 CALLING-SEQ- CALL R55
R0701 INPUT- X,Y,ZDC- REFSMMAT WRT PRESENT STABLE MEMBER
R0702 OUTPUT- GYRO PULSES
R0703 SUBROUTINES- CALCOTA, GOFFLASH, GODSPR, IMUFINE, IMUPULSE, GEPERF
0704 REF 1 COUNT* 55/R55
0705 14,3224 77620 0 R55 STQ
0706 REF 7 LAST 940 14,3225 02745 0 QMIN
0707 14,3226 77624 1 CALL
0708 REF 2 LAST 944 14,3227 47247 0 CALCOTA
0709 14,3230 77776 1 PULSEM EXIT
0710 REF 1 14,3231 3 3254 1 R55.1 CAF VO6N93
0711 REF 267 LAST 944 14,3232 0 4616 1 TC BANKCALL
0712 REF 31 LAST 941 14,3233 20476 0 CADR GOFFLASH
0713 REF 47 LAST 942 14,3234 0 6001 0 TC GODSPR
0714 REF 1 14,3235 0 5237 1 TC R55.1
0715 REF 1 14,3236 0 3251 1 TC R55KET
0716 REF 82 LAST 944 14,3237 0 5353 1 R55.2 TC PHASCHNG
0717 14,3240 00214 0 OCT 00214
0718 REF 2 LAST 944 14,3241 3 3255 0 CA R55CDR
0719 REF 268 LAST 945 14,3242 0 4616 1 TC BANKCALL
0720 REF 5 LAST 944 14,3243 17323 0 CADR IMUPULSE
0721 REF 269 LAST 945 14,3244 0 4616 1 TC BANKCALL
0722 REF 9 LAST 944 14,3245 17716 1 CADR IMUSTALL
0723 REF 3 LAST 944 14,3246 0 5711 0 TC CURTAINS
0724 REF 83 LAST 945 14,3247 0 5353 1 TC PHASCHNG
0725 14,3250 04024 0 OCT 04024

0727 REF 185 LAST 944 14,3251 0 6037 0 R55KET TC INTERET
0728 14,3252 77650 1 GOTO
0729 REF 8 LAST 945 14,3253 02745 0 QMIN
0730 14,3254 01535 0 VO6N93 VN 0693
0731 REF 11 LAST 388 14,3255 02737 0 R55CDR ECADR GOC
0732 REF 1 14,3256 R54 = CHKS DATA

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R0733 ROUTINE NAME- CHKS DATA

R0735 MOD NO- 0

R0737 MODIFICATION BY- LONSKE

DATE- JAN 9, 1967

LOG SECTION- P51-P53

ASSEMBLY-

R0739 FUNCTIONAL DESCRIPTION - CHECKS THE VALIDITY OF A PAIR OF STAR SIGHTINGS. WHEN A PAIR OF STAR SIGHTINGS ARE MADE
 R0741 BY THE ASTRONAUT THIS ROUTINE OPERATES AND CHECKS THE OBSERVED SIGHTINGS AGAINST STORED STAR VECTORS IN THE
 R0743 COMPUTER TO INSURE A PROPER SIGHTING WAS MADE. THE FOLLOWING COMPUTATIONS ARE PERFORMED.

```

R0745 OS1 = OBSERVED STAR 1 VECTOR
R0746 OS2 = OBSERVED STAR 2 VECTOR
R0747 SS1 = STORED STAR 1 VECTOR
R0748 SS2 = STORED STAR 2 VECTOR
R0749 A1 = ARCCOS(OS1 - OS2)
R0750 A2 = ARCCOS(SS1 - SS2)
R0751 A = ABS(2(A1 - A2))

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R0752 THE ANGULAR DIFFERENCE IS DISPLAYED FOR ASTRONAUT ACCEPTANCE
 R0753 EXIT MODE 1. FREEFLAG SET IMPLIES ASTRONAUT WANTS TO PROCEED
 R0754 2. FREEFLAG RESET IMPLIES ASTRONAUT WANTS TO RECYCLE (ERANCE)
 R0756 OUTPUT - 1. VERB 6. NOUN 3 - DISPLAYS ANGULAR DIFFERENCE BETWEEN 2 SETS OF STARS.
 R0758 2. STAR VECTORS FROM STAR CATALOG ARE LEFT IN 6D AND 12D.

R0759 ERASABLE INITIALIZATION REQUIRED -
 R0760 1. MARK VECTORS ARE STORED IN STARAD AND STARAD +6.
 R0761 2. CATALOG VECTORS ARE STORED IN 6D AND 12D.

R0762 DEBRIS -
 0763 REF 1 COUNT* 33/R54
 0764 14.3256 43020 1 CHKS DATA STQ SET
 0765 REF 9 LAST 945 14.3257 02745 0 QMIN
 0766 REF 2 LAST 942 14.3260 00074 1 FREEFLAG
 0767 14.3261 77760 0 CHKSAB AXC.1 SET X1 TO STORE EPHEMERIS DATA
 0768 REF 18 LAST 943 14.3262 02700 1 STARAD
 R0769
 0770 14.3263 47773 1 CHKS B VLOAD* DUT* CAL. ANGLE THETA
 0771 14.3264 00001 0 0.1
 0772 14.3265 00007 0 6.1
 0773 14.3266 65552 0 SL1 ACOS
 0774 REF 1 14.3267 00025 0 STORE THETA
 0775 14.3270 43014 0 BOFF INVERT BRANCH TO CHKS D IF THIS IS 2ND PASS
 0776 REF 3 LAST 946 14.3271 00354 0 FREEFLAG
 0777 REF 1 14.3272 31302 1 CHKS D
 0778 REF 4 LAST 946 14.3273 00174 0 FREEFLAG CLEAR FREEFLAG
 0779 14.3274 71360 1 AXC.1 DLOAD SET X1 TO MARK ANGLES
 0780 14.3275 00006 1 4D
 0781 REF 2 LAST 946 14.3276 00025 0 THETA
 0782 14.3277 00023 0 STORE 18D
 0783 14.3300 77650 1 GOTO
 0784 REF 1 14.3301 31263 1 CHKS B RETURN TO CAL. 2ND ANGLE
 0785 14.3302 45345 1 CHKS D DLOAD DSU
 0786 REF 3 LAST 946 14.3303 00025 0 THETA
 0787 14.3304 00023 0 18D COMPUTE POS DIFF
 0788 14.3305 47046 0 ABS RTB
 0789 REF 5 LAST 877 14.3306 21612 1 SGNAGREE
 0790 REF 1 14.3307 01046 1 STORE NORMTEM1
 0791 14.3310 77414 0 SET EXIT
 0792 REF 5 LAST 946 14.3311 00074 1 FREEFLAG
 0793 REF 1 14.3312 3 3326 0 CAF VB6N5
 0794 REF 270 LAST 945 14.3313 0 4616 1 TC BANKCALL
 0795 REF 32 LAST 945 14.3314 20476 0 CAD FLASH
 0796 REF 48 LAST 945 14.3315 1 6001 1 TCF GOTLPODH
 0797 REF 1 14.3316 0 3323 0 TC CHKS DA PROCEED
 0798 REF 186 LAST 945 14.3317 0 6037 0 TC INTERPRET
 0799 14.3320 52014 0 CLEAR GOTO
 0800 REF 6 LAST 946 14.3321 00274 0 FREEFLAG
 0801 REF 10 LAST 946 14.3322 02745 0 QMIN
 0802 REF 187 LAST 946 14.3323 0 6037 0 CHKS DA TC INTERPRET

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0803      14,3324  77650-1      GOTO
0804 REF 11 LAST 946 14,3325  02745-0      QMIN
0805      14,3326  01405-1  VB6N5  VN      605
R0806 NAME - CAL53A
R0807 FUNCTION - COMPUTE DESIRED GIMBAL ANGLES AND COARSE ALIGN IF NECESSARY
R0808 CALLING SEQUENCE - CALL CAL53A
R0809 INPUT - X,Y,ZSMD ,CDUX,Y,Z
R0810      DESIRED GIMBAL ANGLES - THETA D,+1,+2
R0811 OUTPUT - THE IMU COORDINATES ARE STORED IN REFSMMAT
R0812 SUBROUTINES - S52.2, IMUCOARSE, IMUFINE
0813 REF 1      COUNT* 33/R50
0814      14,3327  77624-1  CAL53A  CALL
0815 REF 2 LAST 930 14,3330  31617-0      S52.2      MAKE ONE FINAL CORP OF GIMBALE ANGLES
0817      14,3331  66234-1      RTB      SSP
0818 REF 1      14,3332  31413-0      RDODUS      READ CDUS
0819 REF 8 LAST 938 14,3333  00051-0      31
0820      14,3334  00001-0      1
0821      14,3335  40370-1      AXT,1  SETPD
0822      14,3336  00003-1      3
0823      14,3337  00005-1      4
0824      14,3340  70543-1  CALDOP  DLOAD* SR1
0825 REF 10 LAST 378 14,3341  00325-0      THETA D +30.1
0826      14,3342  70523-1      PDDL*  SR1
0827      14,3343  00005-1      4,1
0828      14,3344  51425-0      DSU      ABS
0829      14,3345  45206-1      PUSH    DSU
0830 REF 1      14,3346  31412-1      DEGREE 1
0831      14,3347  71240-1      BMN      DLOAD
0832 REF 1      14,3350  31366-0      CALDOP1
0833      14,3351  51025-1      DSU      BPL
0834 REF 1      14,3352  31413-0      DEG 359
0835 REF 2 LAST 947 14,3353  31366-0      CALDOP1
08351      14,3354  77776-1      EXIT
08352 REF 84 LAST 945 14,3355  0 5353-1      TC      PHASCHRG
08353      14,3356  04024-0      OCT      04024
08354 REF 188 LAST 946 14,3357  0 8037-0      TC      INTERPRET
0836      14,3360  77624-1  COARFNE  CALL
0837 REF 1      14,3361  31565-0      COARSE
0838      14,3362  77624-1      CALL
0839 REF 2 LAST 944 14,3363  31602-1      NCOARSE
0840      14,3364  77650-1      GOTO
0841 REF 1      14,3365  31370-1      FINEONLY
0842      14,3366  77700-0  CALDOP1  TIX,1
0843 REF 1      14,3367  31340-1      CALDOP
0844      14,3370  75160-1  FINEONLY  AXC,1  AXC,2
0845 REF 17 LAST 933 14,3371  02642-0      X54
0846 REF 44 LAST 944 14,3372  01733-1      REFSMMAT
0847      14,3373  77624-1      CALL
0848 REF 2 LAST 944 14,3374  31377-0      MATMOVE

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0849				14,3375	77650 1	GOTO		
0850	REF	1		14,3376	32161 0		COARSAET	
0851				14,3377	77773 1	MATMOVE	VLOAD*	TRANSFER MATRIX
0852				14,3400	00001 0		0.1	
0853				14,3401	10001 1	STORE	0.2	
0854				14,3402	77773 1	VLOAD*		
0855				14,3403	00007 0		60.1	
0856				14,3404	10007 1	STORE	60.2	
0857				14,3405	77773 1	VLOAD*		
0858				14,3406	00015 0		120.1	
0859				14,3407	10015 1	STORE	120.2	
0860				14,3410	77616 0	RVQ		
0861				14,3411	00056 1	DEGREE1	DEC 46	1-DEG-SCALED-CDU/2
0862				14,3412	37722 1	DEG359	DEC 16338	359 DEG SCALED CDU/2
0863				14,3413	0-0004 0	RDCDUS	INHINT	READ-CDUS
0864	REF	16	LAST 911	14,3414	3-0032 0	CA	CDUX	
0865	REF	31	LAST 921	14,3415	50-120 1	INDEX	FIXLOC	
0866				14,3416	54-001 1	TS	1	
0867	REF	7	LAST 911	14,3417	3-0033 1	CA	CDUY	
0868	REF	32	LAST 948	14,3420	50-120 1	INDEX	FIXLOC	
0869				14,3421	54-002 1	TS	2	
0870	REF	10	LAST 911	14,3422	3-0034 0	CA	CDUZ	
0871	REF	33	LAST 948	14,3423	50-120 1	INDEX	FIXLOC	
0872				14,3424	54-003 0	TS	3	
0873				14,3425	0-0003 1	RELINT		
0874	REF	1		14,3426	0-6061 0	TC	DNZ16	
0875	REF	1				COUNT*	51/INFLT	

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R0917 NAME - P51 - IMU ORIENTATION DETERMINATION
R0918 MOD.NO.1 23 JAN 67
R0920 MOD BY STURLAUGSON

LOG SECTION - P51-P53
ASSEMBLY SUNDANCE-REV56

R0922 FUNCTIONAL DESCRIPTION

R0923 DETERMINES THE INERTIAL ORIENTATION OF THE IMU. THE PROGRAM IS SELECTED BY DSKY ENTRY. THE SIGHTING
R0925 (ADTMARK) ROUTINE IS CALLED TO COLLECT AND PROCESS MARKED-STAR DATA. ADTMARK(R53) RETURNS THE STAR NUMBER AND THE
R0927 STAR LOS VECTOR IN STARAD+6. TWO STARS ARE THUS SIGHTED. THE ANGLE BETWEEN THE TWO STARS IS THEN CHECKED AT
R0929 CHKSDATA(R54). REFSMMAT IS THEN COMPUTED AT AXISGEN.

R0930 CALLING SEQUENCE

R0931 THE PROGRAM IS CALLED BY THE ASTRONAUT BY DSKY ENTRY.

R0932 SUBROUTINES CALLED.

R0933 GOPERF3
R0934 GOPERF1
R0935 GOOSPR
R0936 IMUCOARS
R0937 IMUFIN20
R0938 ADTMARK(R53)
R0939 CHKSDATA(R54)
R0940 MKRELEAS
R0941 AXISGEN
R0942 MATMOVE

R0943 ALARMS

R0944 NONE.

R0945 ERASABLE INITIALIZATION

R0946 IMU ZERO FLAG SHOULD BE SET.

R0947 OUTPUT

R0948 REFSMMAT
R0949 REFSMFLG

R0950 DEBRIS

R0951 WORK AREA
R0952 STARAD
R0953 STARIND
R0954 BESTI
R0955 BESTJ

0956 REF 1

COUNT+ 55/P51

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0957	REF 271	LAST 946	14,3427	0 4616 1	P51	TC	BANKCALL	IS ISS ON - IF NOT, IMCHK WILL SEND
0958	REF 1		14,3430	33652 0		CADR	IMCHK	ALARM CODE 210 AND EXIT VIA GUTOPDCH.
0959	REF 3	LAST 941	14,3431	3 4761 0		CAF	GCT15	
0960	REF 272	LAST 950	14,3432	0 4616 1		TC	BANKCALL	
0961	REF 8	LAST 942	14,3433	20623 1		CADR	GOPERF1	
0962	REF 49	LAST 946	14,3434	0 6001 0		TC	GUTOPDCH	TEAM.
0963	REF 1		14,3435	1 3461 0		TCF	P51B	V35
0964	REF 85	LAST 947	14,3436	0 5353 1		TC	PHASCHNG	
0965			14,3437	04024 0		OCT	04024	
0967	REF 180	LAST 941	14,3440	3 4755 1		CAF	ZERI	
0968	REF 11	LAST 947	14,3441	54 321 0		TS	THETAD	ZERO THE GIBBALS
0969	REF 12	LAST 950	14,3442	54 322 0		TS	THETAD +1	
0970	REF 13	LAST 950	14,3443	54 323 1		TS	THETAD +2	
0971	REF 3	LAST 930	14,3444	3 5010 0		CAF	V06N22	
0972	REF 273	LAST 950	14,3445	0 4616 1		TC	BANKCALL	
0973	REF 3	LAST 757	14,3446	20446 0		CADR	GODSPRET	
0974	REF 1		14,3447	3 3564 0		CAF	V41R	NOW DISPLAY COARSE ALIGN VFB 41
0975	REF 274	LAST 950	14,3450	0 4616 1		TC	BANKCALL	
0976	REF 4	LAST 950	14,3451	20446 0		CADR	GODSPRET	
0977	REF 189	LAST 947	14,3452	0 6037 0		TC	INTPRET	
0978			14,3453	77624 1		CALL		
0979	REF 2	LAST 947	14,3454	31565 0			COARSE	
0980			14,3455	77776 1		EXIT		
0981	REF 86	LAST 950	14,3456	0 5353 1		TC	PHASCHNG	
0982			14,3457	04024 0		OCT	04024	
0984	REF 2	LAST 233	14,3460	1 3431 0		TCF	P51 +2	
0985	REF 87	LAST 950	14,3461	0 5353 1	P51B	TC	PHASCHNG	
0986			14,3462	00014 1		OCT	00014	
0987	REF 190	LAST 950	14,3463	0 6037 0		TC	INTPRET	
0988			14,3464	77624 1		CALL		
0989	REF 3	LAST 947	14,3465	31602 1			COARSE	
0990			14,3466	40331 1		SSP	SEIFD	
0991	REF 6	LAST 943	14,3467	02760 1			STARIND	INDEX-STAR 1-OR 2
0992			14,3470	00000 1			0	
0993			14,3471	00001 0			0	
0994			14,3472	77776 1	P51C	EXIT		
0995	REF 88	LAST 950	14,3473	0 5353 1		TC	PHASCHNG	
0996			14,3474	04024 0		OCT	04024	
0998	REF 275	LAST 950	14,3475	0 4616 1		TC	BANKCALL	
0999	REF 2	LAST 942	14,3476	16000 0		CADR	ACTMARK	R53
1000	REF 276	LAST 950	14,3477	0 4616 1		TC	BANKCALL	
1001	REF 1		14,3500	17712 0		CADR	ACTSTALL	
1002	REF 4	LAST 945	14,3501	0 5711 0		TC	CURTAINS	
1003	REF 7	LAST 950	14,3502	11 757 1		CCS	STARIND	
1004	REF 1		14,3503	1 3511 0		TCF	P51D +1	
1005	REF 191	LAST 950	14,3504	0 6037 0		TC	INTPRET	

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1006					14.3505	77775 1		VLOAD	
1007	REF	19	LAST	946	14.3506	02715 0			STARAD +6
1008	REF	5	LAST	943	14.3507	02761 0		STORE	STARSAV1
1009					14.3510	77776 1	P51D	EXIT	
1010	REF	89	LAST	950	14.3511	0 5353 1		TC	PHASCHNG
1011					14.3512	04024 0		DCT	04024
1013	REF	8	LAST	950	14.3513	11.757 1		CCS	STARIND
1014	REF	1			14.3514	1 3530 0		TCF	P51E
1015	REF	90	LAST	951	14.3515	0 5353 1		TC	PHASCHNG
1016					14.3516	04024 0		DCT	04024
1018	REF	192	LAST	950	14.3517	0 6037 0		TC	INTERPRET
1019					14.3520	45145 0		DLOAD	CALL
1020	REF	6	LAST	943	14.3521	03562 0			TSIGHT
1021	REF	3	LAST	943	14.3522	32472 1			PLANET
1022	REF	4	LAST	943	14.3523	03554 0		STORE	PLANVEC
1023					14.3524	77776 1		EXIT	
1024	REF	44	LAST	928	14.3525	3 4753 1		CAF	BIT1
1025	REF	9	LAST	951	14.3526	55.757 1		TS	STARIND
1026	REF	1			14.3527	1 3473 0		TCF	P51C +1
1027	REF	91	LAST	951	14.3530	0 5353 1	P51E	TC	PHASCHNG
1028					14.3531	04024 0		DCT	04024
1030	REF	193	LAST	951	14.3532	0 6037 0		TC	INTERPRET
1031					14.3533	45145 0		DLOAD	CALL
1032	REF	7	LAST	951	14.3534	03562 0			TSIGHT
1033	REF	4	LAST	951	14.3535	32472 1			PLANET
1034					14.3536	24015 0		STOVL	12P
1035	REF	5	LAST	951	14.3537	03554 0			PLANVEC
1036					14.3540	24007 0		STOVL	6D
1037	REF	6	LAST	951	14.3541	02761 0			STARSAV1
1038	REF	20	LAST	951	14.3542	26707 0		STOVL	STARAD
1039	REF	7	LAST	942	14.3543	02767 0			STARSAV2
1040	REF	21	LAST	951	14.3544	36715 1		STCALL	STARAD +6
1041	REF	2	LAST	945	14.3545	31256 1			CHRSDATA
1042					14.3546	77414 0		BDN	EXIT
1043	REF	7	LAST	946	14.3547	00314 1			FREEFLAG
1044	REF	1			14.3550	31552 1			P51G
1045	REF	3	LAST	950	14.3551	0 3431 1		TC	P51 +2
1046					14.3552	77624 1	P51G	CALL	
1047	REF	2	LAST	942	14.3553	47441 0			AXISGEN
1048					14.3554	75160 1		AXC.1	AXC.2
1049	REF	4	LAST	931	14.3555	02664 1			ADC
1050	REF	45	LAST	947	14.3556	01733 1			REFSMAT
1051					14.3557	77624 1		CALL	
1052	REF	3	LAST	947	14.3560	31377 0			MATMOVE
1053					14.3561	77414 0		SET	EXIT
1054	REF	5	LAST	944	14.3562	01462 0			REFSMFLG
1056	REF	50	LAST	950	14.3563	0 6001 0		TC	GOTOPDCH

FINIS

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1061				14,3564	12200 0	V41K	VN	4100
1062				14,3565	77776 1	COARSE	EXIT	
1063	REF 277	LAST	950	14,3566	0 4616 1		TC	BANKCALL
1064	REF 4	LAST	378	14,3567	17000 1		CADR	IMUGARS
1065	REF 278	LAST	952	14,3570	0 4616 1		TC	BANKCALL
1066	REF 10	LAST	945	14,3571	17716 1		CADR	IMUSTALL
1067	REF 5	LAST	950	14,3572	0 5711 0		TC	CURTAINS
1068	REF 279	LAST	952	14,3573	0 4616 1		TC	BANKCALL
1069	REF 3	LAST	378	14,3574	17210 1		CADR	IMUFINE
1070	REF 280	LAST	952	14,3575	0 4616 1		TC	BANKCALL
1071	REF 11	LAST	952	14,3576	17716 1		CADR	IMUSTALL
1072	REF 6	LAST	952	14,3577	0 5711 0		TC	CURTAINS
1073	REF 194	LAST	951	14,3600	0 6037 0		TC	INTPRET
1074				14,3601	77616 0		RVQ	
1075				14,3602	77776 1	NCOARSE	EXIT	
1076	REF 15	LAST	901	14,3603	3 0025 0		CA	TIME1
1077	REF 9	LAST	863	14,3604	55 075 0		TS	1/PIPADT
10771	REF 181	LAST	950	14,3605	4 4755 0		CS	ZERO
10772	REF 14	LAST	901	14,3606	54 037 1		TS	PIPAX
10773	REF 5	LAST	901	14,3607	54 040 1		TS	PIPAY
10774	REF 8	LAST	902	14,3610	54 041 0		TS	PIPAZ
1078	REF 195	LAST	952	14,3611	0 6037 0		TC	INTPRET
1079				14,3612	77775 1		VLOAD	
1080	REF 3	LAST	687	14,3613	24007 0			ZEROVEC
1081	REF 24	LAST	383	14,3614	01472 1		STORE	GCDMP
1082				14,3615	43414 1		SET	RVQ
1083	REF 3	LAST	944	14,3616	01060 0			DRIFTFLG

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P1084 NAME-S52.2
R1085 FUNCTION-COMPUTE GIMBAL ANGLES FOR DESIRED SM AND PRESENT VEHICLE
R1086 CALL- CALL S52.2
R1087 INPUT- X,Y,ZSMD
R1088 OUTPUT- DGC,IGC,MGC,THETA0,+1,+2
R1089 SUBROUTINES-CDUTRIG,CALCSMSC,MATMOVE,CALCGA
1090 REF 1 COUNT* 11/S52.1
1091 14.3617 45020 1 S52.2 STO CALL
1092 REF 8 LAST 944 14.3620 02746 0 CMAJ
1094 REF 5 LAST 937 14.3621 47537 0 CDUTRIG
1095 14.3622 77624 1 CALL
1096 REF 2 LAST 937 14.3623 20030 0 CALCSMSC
1097 14.3624 66370 0 AXT,1 SSP
1098 14.3625 00022 1 18D
1099 REF 9 LAST 947 14.3626 00051 0 51
1100 14.3627 00006 1 6D
1101 14.3630 61373 1 S52.2A VLOAD* VXM
1102 REF 4 LAST 938 14.3631 02707 0 XNB +18D,1
1103 REF 46 LAST 951 14.3632 01734 0 REFSMHA1
1104 14.3633 77656 1 UNIT
1105 REF 5 LAST 953 14.3634 06707 1 STORE XNB +18D,1
1106 14.3635 77700 0 TIX,1
1107 REF 1 14.3636 31630 0 S52.2A
1108 14.3637 75160 1 S52.2.1 AXC,1 AXC,2
1109 REF 7 LAST 944 14.3640 03606 1 XSMD
1110 REF 18 LAST 947 14.3641 02642 0 XSM
1111 14.3642 77624 1 CALL
1112 REF 4 LAST 951 14.3643 31377 0 MATMOVE
1113 14.3644 77624 1 CALL
1114 REF 2 LAST 374 14.3645 47353 1 CALCGA
1115 14.3646 77650 1 COTO
1116 REF 9 LAST 953 14.3647 02746 0 CMAJ

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P1117 NAME-S52.3

R1118 FUNCTION XSMD= UNIT R

R1119 YSMD= UNIT(V-X-R)

R1120 ZSMD= UNIT(XSMD X YSMD)

R1121 CALL DLOAD CALL

R1122 TALIGN

R1123 S52.3

R1124 INPUT- TIME OF ALIGNMENT IN MPAC

R1125 OUTPUT- X,Y,ZSMD

R1126 SUBROUTINES- CSMCONIC

1127 REF 1

COUNT* 11/S52.3

1128 14,3650 77620 0 S52.3

STQ

1129 REF 10 LAST 953 14,3651 02746 0 QMAJ

1130 REF 53 LAST 935 14,3652 34041 0 STCALL TDEC1

1131 REF 5 LAST 589 14,3653 27100 0 LEMCONIC

1134 14,3654 53575 0 VLOAD UNIT

1135 REF 33 LAST 935 14,3655 00001 0 RATT

1136 REF 8 LAST 953 14,3656 27607 0 STOVL XSMD

1137 REF 24 LAST 839 14,3657 00007 0 VATT

1138 14,3660 53435 0 VXV UNIT

1139 REF 34 LAST 954 14,3661 00001 0 RATT

1140 REF 4 LAST 931 14,3662 27615 0 STOVL YSMD

1141 REF 9 LAST 954 14,3663 03607 0 XSMD

1142 14,3664 53435 0 VXV UNIT

1143 REF 5 LAST 954 14,3665 03615 0 YSMD

1144 REF 4 LAST 931 14,3666 37623 1 STCALL ZSMD

1145 REF 11 LAST 954 14,3667 02746 0 QMAJ

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P1146 NAME -R52 (AUTOMATIC OPTICS POSITIONING ROUTINE)

R1147 FUNCTION-POINT THE AOT OPTIC AXIS BY MANEUVERING THE LEM TO A NAVIGATION

R1148 STAR SELECTED BY ALIGNMENT PROGRAMS OR DISK INPUT

R1149 CALLING-CALL R52

R1150 INPUT -BESTI AND BESTJ (STAR CODES TIMES 6)

R1151 OUTPUT -STAR CODE IN BITS 1-6, DETENT CODE IN BITS 7-9

R1152 (NO CHECK IS MADE TO INSURE THE DETENT CODE TO BE VALID)

R1153 POINTVSM-1/2 UNIT NAV STAR VEC IN SM

R1154 SCAXIS-AOT OPTIC AXIS VEC IN NB X-Z PLANE

R1155 SUBROUT -R60LEM

1156	REF	1				COUNT*	14/152	
1157				14.3670	77420 1	STQ	EXIT	
1158	REF	1		14.3671	03665 1		SAVOR52	
1159	REF	10	LAST	951	14.3672	51.757 0	INDEX	STARIND
1160	REF	9	LAST	940	14.3673	3 1755 1	CA	BESTI
1161				14.3674	0 0006 1	EXTEND		PICK UP STARCODE DETERMINED BY 156
1162	REF	1		14.3675	7 3771 1	MP	1/6TH	
1163	REF	32	LAST	907	14.3676	6 4744 1	AD	BIT8
1164	REF	2	LAST	100	14.3677	54 735 1	TS	STARCODE
								SCALE AND STORE IN STARCODE
1165	REF	1		14.3700	3 3772 0	CAF	VOIN70	
1166	REF	281	LAST	952	14.3701	0 4616 1	TC	BANKCALL
1167	REF	33	LAST	946	14.3702	20476 0	CAF	GETFLASH
1168	REF	51	LAST	951	14.3703	0 6001 0	TC	GOTOPOUH
1169	REF	1		14.3704	1 3706 1	TCF	R52B	DISPLAY STARCODE AND WAIT FOR RESPONSE
1170	REF	1		14.3705	1 3700 1	TCF	R52A	V34-TERMINATE
								V33-PROCEED TO ORIENT LEM
								ENTER-SELECT NEW STARCODE-RECYCLE
1171	REF	87	LAST	895	14.3706	0 5516 0	TC	DUNKFLAG
1172	REF	7	LAST	754	14.3707	00124 0	ADRES	3AXISFLG
1173	REF	3	LAST	955	14.3710	3 0735 0	CA	STARCODE
1174	REF	3	LAST	683	14.3711	7 7744 0	MASK	HIGH9
1175				14.3712	0 0006 1	EXTEND		BIT6 OF FLAGWORD5 ZERO TO ALLOW VECPOINT
1176	REF	24	LAST	863	14.3713	7 4743 1	MP	BIT9
1177	REF	157	LAST	924	14.3714	54 001 1	TS	TEMP STORE DETENT
1178				14.3715	0 0006 1	EXTEND		
1179	REF	1		14.3716	6 3734 1	BZMF	GETAZEL	CODE 0, COAS CALIBRATION
1180	REF	2	LAST	246	14.3717	6 5660 1	AD	NEG7
1181				14.3720	0 0006 1	EXTEND		
1182	REF	2	LAST	955	14.3721	1 3734 0	BZF	GETAZEL
								CODE 7, COAS SIGHTING
1183	REF	17	LAST	260	E7.1551	EBANK	XYMARK	
1184	REF	14	LAST	903	14.3722	3 5016 0	CA	EBANK7
1185	REF	49	LAST	918	14.3723	54 003 0	TS	EBANK

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1186	REF 158	LAST	955	14,3724	50 001 0		INDEX	L	
1188	REF 4	LAST	247	14,3725	3 1403 1		CA	ACTAZ -1	PICK UP AZ CORRESPONDING TO DETECT
1189	REF 159	LAST	956	14,3726	54 001 1		TS	L	
1190	REF 19	LAST	953	E5,1642			EBANK	XSM	
1191	REF 11	LAST	896	14,3727	3 5014 1		CA	EBANK5	CHANGE TO EBANK5 BUT DONT DISTURB L
1192	REF 50	LAST	955	14,3730	54 003 0		TS	EBANK	
1193	REF 36	LAST	874	14,3731	3 4737 0		CA	BIT 3	SET ELV TO 45 DEG
1194	REF 160	LAST	956	14,3732	56 001 0		XCH	L	SET C(A)=AZ, C(L)=45 DEG
1195	REF 1			14,3733	1 3744 1		TCF	AZEL	GO COMP OPTIC AXIS
1196	REF 1			14,3734	3 3773 1	GETAZEL	CAF	V06N87	CODE 0 OR 7, GET AZ AND EL KEY IN
1197	REF 282	LAST	955	14,3735	0 4616 1		TC	BANKCALL	
1198	REF 34	LAST	955	14,3736	20476 0		CADR	GOFASH	
1199	REF 52	LAST	955	14,3737	0 6001 0		TC	GOTOPOCH	V34-TERMINATE
1200				14,3740	1 3742 1		TCF	+2	PROCEED-CALC OPTIC AXIS
1201	REF 3	LAST	955	14,3741	1 3734 0		TCF	GETAZEL	ENTER-RECYCLE
1202				14,3742	0 0006 1		EXTEND		
1203	REF 4	LAST	316	14,3743	3 1350 0		UCA	AZ	PICK UP AZ AND EL IN SP 2S COMP
1204	REF 34	LAST	948	14,3744	50 120 1	AZEL	INDEX	FIXLOC	JAM AZ AND EL IN 6 AND 9 OF VAC
1205				14,3745	52 011 0		DXCH	8D	
1206	REF 196	LAST	952	14,3746	0 6037 0		TC	INTPRET	
1207				14,3747	77624 1		CALL		GO COMPUTE OPTIC AXIS AND STORE IN
1208	REF 2	LAST	248	14,3750	10536 0			UANG	SCAXIS IN NB COORDS
1209				14,3751	45034 1		RTB	CALL	
1210	REF 26	LAST	941	14,3752	21573 0			LOADTIME	
1211	REF 5	LAST	951	14,3753	32472 1			PLANET	
1212				14,3754	53521 1		MXV	UNIT	
1213	REF 47	LAST	953	14,3755	01734 0			REFSMAT	
1214	REF 7	LAST	788	14,3756	03773 1		STORE	POINTVSH	STORE FOR VECPOINT
1215				14,3757	77776 1		EXIT		
1216	REF 283	LAST	956	14,3760	0 4616 1		TC	BANKCALL	
1217	REF 6	LAST	789	14,3761	54123 0		CADR	R6ULEP	GO TORQUE LEN OPTIC AXIS TO STA FOR
12171	REF 4	LAST	955	14,3762	3 7744 1		CAF	HIGH?	IF COAS CALIBRATION CODE 0, RECYCLE
12172	REF 4	LAST	955	14,3763	7 0735 1		MASK	STARCODE	
12173				14,3764	0 0006 1		EXTEND		
12174	REF 2	LAST	955	14,3765	1 3700 1		BZF	R52A	
1218	REF 197	LAST	956	14,3766	0 6037 0		TC	INTPRET	RETURN FROM KALCMANU
1219				14,3767	77650 1		GOTO		
1220	REF 2	LAST	955	14,3770	03665 1			SAVER52	RETURN TO CALLER
1221				14,3771	05253 0	1/6TH	DFC	.1666667	
1222				14,3772	00306 1	V01N70	VN	0170	
1223				14,3773	01527 0	V06N87	VN	687	

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P1224 LUNAR SURFACE STAR ACQUISITION

1225				15,2245				BANK	15	
1226	REF	3	LAST	927	15,2000			SETLOC	P505	
1227				15,2245				BANK		
1228	REF	2	LAST	250 TO 251:	40	40*		COUNT*	44/R59	
12281	REF	15	LAST	876	15,2245	4 0077 0	R59	CS	FLAGRDS	
12282	REF	3	LAST	213	15,2246	7 4737 1		MASK	REFSMAT	IF REFSMAT FLAG CLEAR BYPASS STAR ACQ
12283	REF	282	LAST	928	15,2247	10 000 0		CCS	A	
12284	REF	1			15,2250	1 2455 0		TCF	R59 OUT	NO REFSMAT GO TO AUTMARK
1229	REF	1			15,2251	3 2463 1		CAF	V01470*	SELECT STAR CODE FOR ACQUISITION
1230	REF	284	LAST	956	15,2252	0 4616 1		TC	BANKCALL	
1231	REF	35	LAST	956	15,2253	20476 0		CAUR	GOF LASH	
1232	REF	53	LAST	956	15,2254	0 6001 0		TC	GOTUPDCH	V34-TERMINATE
1233	REF	1			15,2255	1 2257 1		TCF	R59A	V33-PROCEED
1234	REF	1			15,2256	1 2245 1		TCF	R59	V32-RECYCLE
1235	REF	5	LAST	956	15,2257	4 7744 0	R59A	CS	HIGH?	GRAB STARCODE FOR INDEX
1236	REF	9	LAST	316	15,2260	7 0735 1		MASK	AUTCODE	
1237					15,2261	0 0006 1		EXTEND		
1238	REF	2	LAST	292	15,2262	7 6242 1		MP	REVCHT	JUST 6
1239	REF	161	LAST	956	15,2263	56 001 0		XCH	L	
1240	REF	11	LAST	955	15,2264	51 757 0		INDEX	STARIND	
1241	REF	10	LAST	955	15,2265	55 755 0		TS	BESTI	
1242	REF	35	LAST	956	15,2266	50 120 1		INDEX	FIXLOC	
1243	REF	26	LAST	933	15,2267	54 046 1		TS	XI	CODE X 6 FOR CATLOG STAR INDEX
1244					15,2270	0 0006 1		EXTEND		
1245	REF	2	LAST	957	15,2271	1 2455 0		BZF	R59 OUT	BYPASS ACQUISITION IF NOT CATLOG STAR
1246					15,2272	4 0000 0		COM		
1247	REF	1			15,2273	6 2561 1		AD	DEC227	
1248					15,2274	0 0006 1		EXTEND		
1249	REF	3	LAST	957	15,2275	6 2455 1		BZMF	R59 OUT	
1250	REF	198	LAST	956	15,2276	0 6037 0		TC	INTERET	
1253					15,2277	64373 1		VLOAD*	HXV	
1254	REF	11	LAST	940	15,2300	30347 1			EXTLOG.1	GRAB STAR VECTOR
1255	REF	48	LAST	956	15,2301	01734 0			REFSMAT	TRANSFORM-TO-SM
1256					15,2302	45056 0		UNIT	CALL	
1257	REF	3	LAST	784	15,2303	47646 0			CDU*SMNB	
1258	REF	4	LAST	241	15,2304	02731 0		STORE	STAR	TEMP STORE STAR-VEC(NB)
1259					15,2305	77776 1		EXIT		
1260	REF	45	LAST	951	15,2306	3 4753 1		CAF	P111	INITIALIZE AZ POSITION CODE TO 1 (-00)
1261	REF	2	LAST	316	15,2307	55 242 0		TS	POSCODE	
1262	REF	18	LAST	955	17,1551			EBANK=	XYMAK	
12621	REF	15	LAST	955	15,2310	3 5616 0	INCAZ	CA	EBANK7	
1263	REF	51	LAST	956	15,2311	54 003 0		TS	EBANK	

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12631	REF	3	LAST	957	15,2312	51'242 1	INDEX	POSCODE	
12632	REF	5	LAST	956	15,2313	3 1403 1	CA	ACTAZ -1	PICK UP AZ CORRESPONDING TO POSG. L
12633	REF	162	LAST	957	15,2314	54 001 1	TS	L	
1264	REF	20	LAST	956	E5,1642		EBANK	XSH	
1265	REF	12	LAST	956	15,2315	5 5014 1	CA	EBANK5	
1266	REF	52	LAST	957	15,2316	54 003 0	TS	EBANK	
12661	REF	37	LAST	956	15,2317	3 4737 0	CA	BIT13	SET ELV TO 45 DEG
12662	REF	163	LAST	956	15,2320	56 001 0	XCH	L	SET CIAI=AZ, CIL=45 DEG
12663	REF	12	LAST	947	15,2321	55'745 1	TS	QMIN	STORE QMIN=AZ FOR LATER
1267	REF	36	LAST	957	15,2322	50 120 1	INDEX	FIXLOC	
1268					15,2323	52 011 0	DXCH	8D	JAM AZ IN 8D, 45 DEG IN 9D FOR DANG
1269	REF	199	LAST	957	15,2324	0 6037 0	TC	INTERPT	
1270					15,2325	77624 1	CALL		
1271	REF	3	LAST	956	15,2326	10536 0		DANG	GO CALC OPTIC AXIS WRT NA
1272					15,2327	50375 0	VLOAD	DOT	
1273	REF	5	LAST	957	15,2330	02731 0		STAR	DOT STAR WITH OA
1274	REF	24	LAST	788	15,2331	03765 0		SCAXIS	
1275					15,2332	65552 0	SLI	ARCCDS	
1276					15,2333	00031 0	STORE	24D	TEMP STORE ARCCOS(STAR.OPTAXIS)
1277					15,2334	51025 1	DSU	BPL	
1278	REF	2	LAST	251	15,2335	32466 1		DEG30	SEE IF STAR IN AOT FIELD-OF-VIEW
1279	REF	1			15,2336	32420 0		NXAX	NOT IN FIELD - TRY NEXT POSITION
1280					15,2337	45345 1	DLOAD	DSU	SEE IF STAR AT FIELD CENTER
1281					15,2340	00031 0		24D	
1282	REF	1			15,2341	32470 0		DEG.5	
1283					15,2342	71240 1	BHN	DLOAD	CALC SPIRAL AND CURSOR
1284	REF	1			15,2343	32413 0		ZSPKR	GO ZERO CURSOR AND SPIRAL
1285					15,2344	00031 0		24D	GET SPIRAL
1286					15,2345	42405 0	DMP	SL4	
1287	REF	1			15,2346	25764 0		3/4	11 SCALED AT 16
1288					15,2347	24031 0	STOVL	24D	12(ARCCOS(AD.STAR)) SCALED IN REVS
1289	REF	25	LAST	958	15,2350	03765 0		SCAXIS	OA
1290					15,2351	53435 0	VXV	UNIT	
1291	REF	3	LAST	37	15,2352	24005 1		XUNIT	
1292					15,2353	47206 0	PUSH	VXV	OA X UNITX PD 0-5
1293	REF	26	LAST	958	15,2354	03765 0		SCAXIS	
1294					15,2355	77676 0	VCOHP		
1295					15,2356	63256 0	UNIT	PDVL	UNIT(OA X(OA X UNITX)) PD 6-11
1296	REF	27	LAST	958	15,2357	03765 0		SCAXIS	
1297					15,2360	53435 0	VXV	UNIT	
1298	REF	6	LAST	958	15,2361	02731 0		STAR	
1299					15,2362	50206 0	PUSH	DOT	1/2(OA X STAR) PD 12-17
1300					15,2363	00001 0		0	DOT WITH 1/2(OA X UNITX) FOR YROT
1301					15,2364	65552 0	SLI	ARCCDS	
1302					15,2365	24033 1	STOVL	24D	STORE THET SCALED IN REVS

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1303				15,2366	77641 1	OUT		UP 12-17, UP 6-11 FOR C2
1304				15,2367	71244 0	BPL	DLOAD	IF THET-NEG-GET-360-THET
1305	REF	1		15,2370	32375 1		R59D	
1306	REF	2	LAST	250	15,2371	32047 0		ABOUTONE
1307				15,2372	77625 0	DSU		
1308				15,2373	00033 1		26D	
1309				15,2374	00033 1	STORE	26D	360-THET SCALED IN REVS
1310				15,2375	70535 0	R59D	SLOAD	SRI
1311	REF	13	LAST	958	15,2376	02746 0		WHIN
1312				15,2377	41415 1	DAD	PUSH	PESCALE AZ(N) TO REVS
1313				15,2400	00033 1		26D	PUSH YROT + AZ(N) REVS
1314				15,2401	77634 0	RTB		
1315	REF	2	LAST	373	15,2402	21614 1		1STORS
1316	REF	3	LAST	316	15,2403	15237 0	STUDL	CURSOR
1317				15,2404	00031 0		24D	YROT IN 1/2 REVS
1318				15,2405	77615 0	DAD		LOAD SPOT IN REVS
1319				15,2406	77634 0	RTB		12(SEP) + YROT
1320	REF	3	LAST	959	15,2407	21614 1		1STORS
1321	REF	3	LAST	316	15,2410	01241 1	STORE	SPIRAL
1322				15,2411	77776 1	EXIT		SPOT IN 1/2 REVS
1323	REF	1		15,2412	1 2437 1	TCF	79DISP	GU-DISPLAY-CURSOR-SPIRAL-POS-CODE
1324				15,2413	77776 1	ZSPCR	EXIT	
1325	REF	102	LAST	952	15,2414	3 4755 1	CAF	ZERO
1326	REF	4	LAST	959	15,2415	55'236 0	TS	CURSOR
1327	REF	4	LAST	959	15,2416	55'240 1	TS	SPIRAL
1328	REF	2	LAST	959	15,2417	1 2437 1	TCF	79DISP
1329				15,2420	77776 1	NXAX	EXIT	
1330	REF	4	LAST	958	15,2421	25'242 1	INCR	POSCODE
1331	REF	5	LAST	959	15,2422	4 1242 0	CS	POSCODE
1332	REF	12	LAST	858	15,2423	6 4757 0	AD	SEVEN
1333				15,2424	0 0006 1	EXTEND		
1334	REF	1		15,2425	6 2427 1	BZNF	R59ALM	THIS STAR NOT AT ANY POSITION
1337	REF	1		15,2426	1 2310 0	TCF	INCA2	
1338	REF	38	LAST	941	15,2427	0 5567 0	R59ALM	TC
1339				15,2430	00404 1	UCT	404	THIS STAR CANT BE LOCATED IN ANT FIELD
1340	REF	2	LAST	941	15,2431	3 5006 1	CAF	VB05409
1341	REF	285	LAST	957	15,2432	0 4616 1	TC	BANKCALL
1342	REF	36	LAST	957	15,2433	20476 0	CADR	GOFLASH
1343	REF	54	LAST	957	15,2434	1 6001 1	TCF	GO TOPDCH
1344	REF	4	LAST	957	15,2435	1 2455 0	TCF	R59OUT
1345	REF	2	LAST	957	15,2436	1 2245 1	TCF	R59
1346	REF	1		15,2437	3 2464 0	79DISP	CAF	VB06779
1347	REF	286	LAST	959	15,2440	0 4616 1	TC	BANKCALL
1348	REF	37	LAST	959	15,2441	20476 0	CADR	GOFLASH
1349	REF	55	LAST	959	15,2442	1 6001 1	TCF	GO TOPDCH

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1350	REF	1		15,2443	1 2445 1	TCF	R59E	V33-PROCEED TO MARK ROUTINE		
1351	REF	3	LAST	959	15,2444	1 2245 1	TCF	R59	V32-RECYCLE TO TOP OF R59 AGAIN	
1352	REF	13	LAST	959	15,2445	3 4757 0	R59E	CAF	SEVEN	GET DETENT CODE CORRESPONDING TO POSCODE
1353	REF	6	LAST	959	15,2446	7 1242 0		MASK	POSCODE	
1354					15,2447	0 0006 1		EXTEND		
1355	REF	34	LAST	900	15,2450	7 4745 1		MP	BIT 7	DETENT CODE NOW IN L
1356	REF	6	LAST	957	15,2451	4 7744 0		CS	HIGH9	
1357	REF	10	LAST	957	15,2452	7 0735 1		MASK	AOTCODE	ISOLATE STAR NO IN BIT 1-6
1358	REF	164	LAST	958	15,2453	6 0001 0		AD	L	
1359	REF	11	LAST	960	15,2454	54 735 1		TS	AOTCODE	STORE DETENT 7-9
1367	REF	267	LAST	959	15,2455	0 4616 1	R59OUT	TC	BANKCALL	GO TO AOTMARK FOR SIGHTING
1368	REF	3	LAST	950	15,2456	16000 0		CADR	AOTMARK	
1369	REF	288	LAST	960	15,2457	0 4616 1		TC	BANKCALL	
1370	REF	2	LAST	950	15,2460	17712 0		CADR	AOTSTALL	SLEEP TILL SIGHTING DONE
1371	REF	7	LAST	952	15,2461	0 5711 0		TC	CURTAINS	END RETURN FROM AOTMARK
1372	REF	1			15,2462	1 3054 1		TCF	R59SET	RETURN TO 1 STAR OR 2STAR
1373					15,2463	00306 1	VO1N70*	VN	170	
1374					15,2464	01517 0	VO6N79	VN	679	
1375					15,2465	02525 1	DEG30	2DEC	.083333333	30 DEGREES
1375					15,2466	12525 0				
1376					15,2467	00026 0	DEG.5	2DEC	.00138888	.5 DEGREE SCALED IN REVS
1376					15,2470	30131 1				
1377					15,2471	12525 0	DEG60	DEC	12525	60 DEG COU SCALING
1378	REF	16	LAST	933	1236		CURSOR	EQUALS	GDT/2	
1379	*REF	17	LAST	960	1240		SPIRAL	EQUALS	GDT/2 +2	
1380	*REF	18	LAST	960	1242		POSCODE	EQUALS	GDT/2 +4	

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P1381 NAME - PLANET
 R1382 FUNCTION - TO PROVIDE THE REFERENCE VECTOR FOR THE SIGHTED CELESTIAL
 R1383 BODY. STARS ARE FETCHED FROM THE CATALOG, SUN, EARTH AND
 R1384 MOON ARE COMPUTED BY LOCSAM, PLANET VECTORS ARE ENTERED
 R1385 BY DSDY INPUT
 R1386 CALL - CALL
 R1387 PLANET
 R1388 INPUT - TIME IN MPAC
 R1389 OUTPUT - VECTOR IN MPAC
 R1390 SUBROUTINES - LOCSAM
 R1391 DEBRIS - VAC, STARAD - STARAD +17

1392	REF	4	LAST	957	15.2000		SETLOC P505	
1393					15.2472		BANK	
1394	REF	1					COUNT = 51/P51	
1395	REF	8	LAST	951	15.2472	27562 0	PLANET	STOVL TSIGHT
13951	REF	4	LAST	952	15.2473	24007 0		ZEROVEC ZERO N88 DISPLAY VEC
13952	REF	22	LAST	951	15.2474	02707 0	STORE	STARAD
1396					15.2475	77420 1	STQ	EXIT
1397	REF	4	LAST	249	15.2476	02736 1		GCTK
1398	REF	7	LAST	960	15.2477	4 7744 0	CS	HIGH
1399	REF	12	LAST	960	15.2500	7 0735 1	MASK	AOTCODE
1400					15.2501	0 0006 1	EXTEND	
1401	REF	3	LAST	957	15.2502	7 6242 1	MP	REVCNT
1402	REF	165	LAST	960	15.2503	56 001 0	XCH	L
1403	REF	12	LAST	957	15.2504	51 757 0	INDEX	STARIND
1404	REF	11	LAST	957	15.2505	55 755 0	TS	BESTI
1405	REF	283	LAST	957	15.2506	10 000 0	CCS	A
1406	REF	1			15.2507	1 2523 0	TCF	NOTPLAN
1407	REF	1			15.2510	3 2562 1	CAF	VNPLANV
1408	REF	289	LAST	960	15.2511	0 4616 1	TC	BANKCALL
1409	REF	38	LAST	959	15.2512	20476 0	CADR	GOFASH
1410					15.2513	0 2510 1	TL	-5
1411					15.2514	0 2516 1	TC	+2
1412					15.2515	0 2510 1	TC	-5
1413	REF	200	LAST	958	15.2516	0 6037 0	TC	INTPRET
1414					15.2517	53575 0	VLOAD	UNIT
1415	REF	23	LAST	961	15.2520	02707 0		STARAD
1416					15.2521	77650 1	GOTO	
1417	REF	5	LAST	961	15.2522	02736 1		GCTR
1418	REF	284	LAST	961	15.2523	4 0000 0	NOTPLAN	CS A
1419	REF	2	LAST	957	15.2524	6 2561 1	AD	DEC227
1420					15.2525	0 0006 1	EXTEND	
1421	REF	1			15.2526	6 2537 1	BZMF	CALSAM1
1422	REF	13	LAST	961	15.2527	51 757 0	INDEX	STARIND
1423	REF	12	LAST	961	15.2530	3 1755 1	CA	BESTI
1424	REF	37	LAST	958	15.2531	50 120 1	INDEX	FIXLOC
1425	REF	27	LAST	957	15.2532	54 046 1	TS	X1
1426	REF	201	LAST	961	15.2533	0 6037 0	TC	INTPRET

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1427				15.2534	52173 0		VLOAD*	GOTO	
1428	REF 12	LAST 957		15.2535	30347-1			CATLOG.1	
1429	REF 6	LAST 961		15.2536	02736-1			GCTR	
1430	REF 202	LAST 961		15.2537	0 6037-0	CALSAM1	TC	INTPRET	
1431				15.2540	45145-0	CALSAM	DLOAD	CALL	
1432	REF 9	LAST 961		15.2541	03562 0			TSIGHT	
1433	REF 3	LAST 941		15.2542	30506-1			LOC SAM	
1434				15.2543	77340-0		LXC.1	VLOAD	
1435	REF 14	LAST 961		15.2544	02757 0			STARIND	
1436	REF 5	LAST 935		15.2545	02707 0			VEARTH	
1437				15.2546	24001-0		STOVL	OD	
1438	REF 4	LAST 935		15.2547	02715-0			VSUN	
1439	REF 6	LAST 962		15.2550	26707-0		STOVL	VEARTH	
1440				15.2551	00001 0			UD	
1441	REF 5	LAST 962		15.2552	02715-0		STORE	VSUN	
1442				15.2553	70143-0		DLOAD*	LXC.1	
1443	REF 13	LAST 961		15.2554	02756-1			BESTI.1	
1444	REF 366	LAST 939		15.2555	00154-1			MPAC	
1445				15.2556	52173-0		VLOAD*	GOTO	
1446	REF 24	LAST 961		15.2557	02343 1			STARAD -2250.1	
1447	REF 7	LAST 962		15.2560	02736 1			GCTR	
1448				15.2561	00343-0	DEG227	DEC	227	
1449				15.2562	01530-0	VNPLANV	VH	0688	
1450	REF 4	LAST 858		37.3544		PIPSINE	=	PIPSK +3	EGANK NOT 4 SO DONT LOAD PIPLINE

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P1451 GRAVITY VECTOR DETERMINATION ROUTINE
R1452 BY KEN VINCENT
R1453 FOR DETAILED DESCRIPTION SEE 504GSOP 5.6.3.2.5
R1454 THIS PROGRAM FINDS THE DIRECTION OF THE MOONS GRAVITY
R1455 WHILE THE LM IS ON THE MOONS SURFACE. IT WILL BE USED
R1456 FOR LUNAR SURFACE ALIGNMENT. THE GRAVITY VECTOR IS
R1457 DETERMINED BY READING THE PIPAS WITH THE IMU AT TWO
R1458 PARTICULAR ORIENTATIONS. THE TWO READINGS ARE AVERAGED
R1459 AND UNITIZED AND TRANSFORMED TO NB COORDINATES. THE TWO
R1460 ORIENTATION WERE CHOSEN TO REDUCE BIAS ERRORS IN THE
R1461 READINGS.
R1462
R1463 CALL-
R1464 TC BANKCALL
R1465 CADR GVDETER
R1466 INPUTS-
R1467 PIPAS,CDUS
R1468 OUTPUTS-
R1469 STARSAT = UNIT GRAVITY
R1470 GSAV = DITTO
R1471 GRAVBIT = 1
R1472 SUBROUTINES-
R1473 PIPASR,IMUCOARS,IMUFIN,IMUSTALL,1/PIPA,DELAYJOB,CDUTPIS,
R1474 *NBSM*,*SNMB*,CALCGA,FOFLASH
R1475 DEBRIS-
R1476 VAC,SAC,STARAD,XSM,XNB,THETAD,DELV,COSLOU,SINCOU
R1477 *REF 1 15,2563 3 2772 1 GVDETER CAF 42DEG
R1478 *REF 14 LAST 950 15,2564 54 321 0 TS THETAD
R1479 * 15,2565 4 0000 0 COM
R1480 *REF 15 LAST 963 15,2566 54 322 0 TS THETAD +1
R1481 *REF 1 15,2567 3 2773 0 CAF 35DEG
R1482 *REF 16 LAST 963 15,2570 54 323 1 TS THETAD +2
R1483 REF 203 LAST 962 15,2571 0 6037 0 TC INTPRET
R1484 REF 6 LAST 951 15,2572 45014 0 CLEAR CALL
R1485 REF 1 15,2573 01662 1 REFSMFLC
R1486 REF 1 15,2574 32670 1 LUNG
R1487 FIND CIBAL ANGLES WHICH ROTATE SM 180DEG ABOUT G VEC
R1488
R1489 DEFINE G COOR SYS
R1490 X UNIT G
R1491 *
R1492 M= Y= UNITEZSM * X )
R1493 *
R1494 Z UNITIX * Y )
R1495 THEN ROTATED SM WRT PRESENT IS
R1496
R1497
R1498 1. 0. 0
R1499 * *T * *

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R1500 XSM = M 0, -1, 0 M = 2 (X X) - 1/2 I *

R1501 I-J

R1502 0. 0 -1

R1503

R1504 ALSO NB WRT PRES SM IS

R1505

R1506 *

R1507 XNB = NBSM I

R1508 *

R1509 GIMBAL ANGLES = CALCGAI XSM . XNB I

R1510

1511 REF 5 LAST 961 15.2000

1512 15.2575

1513 REF 1

1514 15.2575 66370 0

1515 15.2576 00022 1

1516 REF 10 LAST 953 15.2577 00051 0

1517 15.2600 00006 1

1518 15.2601 77744 0

1519 REF 11 LAST 964 15.2602 00050 1

1520 15.2603 45173 0 GRAVEL

1521 REF 4 LAST 958 15.2604 54000 0

1522 REF 5 LAST 886 15.2605 47673 0

1523 REF 6 LAST 953 15.2606 06707 1

1524 15.2607 77775 1

1525 REF 7 LAST 958 15.2610 02731 0

1526 15.2611 73744 1

1527 REF 15 LAST 880 15.2612 00047 1

1528 REF 8 LAST 964 15.2613 75040 1

1529 15.2614 71152 1

1530 REF 16 LAST 964 15.2615 00047 1

1531 15.2616 63047 1

1532 REF 5 LAST 964 15.2617 54000 0

1533 15.2620 00002 0

1534 REF 21 LAST 958 15.2621 06665 1

1535 15.2622 45100 1

1536 REF 1 15.2623 32603 0

1537 REF 3 LAST 953 15.2624 47353 1

1538 15.2625 74575 0

1539 REF 1 15.2626 02715 0

1540 REF 25 LAST 962 15.2627 36723 1

1541 REF 2 LAST 963 15.2630 32670 1

1542 15.2631 74575 0

1543 REF 2 LAST 964 15.2632 02715 0

1544 15.2633 53455 0

1545 REF 26 LAST 964 15.2634 02723 0

1546 REF 7 LAST 951 15.2635 02761 0

1547 15.2636 77641 1

1548 REF 6 LAST 792 15.2637 02231 0

1549 15.2640 65552 0

SETLOC P505

BANK

COUNT* 54/P57

AXT,1 SSP X1=18

100 S1=0

S1 X2=-2

60

LXC.2

S1

VLOAD* CALL

XUNIT -6,2

+NBSM

STORE XNB +180,1 SIN AND COS COMPUTED IN LUNG

VLOAD

STAF

LXC.2 VXSE* COMPLEMENT- UNITX ARE BACKWARD

X2

STAF +6,2 OUTER PRODUCT

VSL2 LXC.2

X2

VSU- INCH,2

XUNIT -6,2

20

STORE XSM +180,1

TIX.1

CALL

GRAVEL

CALCGA

VLOAD VSR1

GOUT

STCALL STAFAD +120

LUNG

VLOAD VSR1

GOUT

VAD UNIT

STAFAD +120

STORE STAF SAVI

DOT

GSAV

SL1 ACUS

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1550	REF	28	LAST	928	15,2641	01046 1	STORE	DSPTM1	
1551					15,2642	77776 1	EXIT		
1552	REF	88	LAST	955	15,2643	0 5516 0	TC	DOANFLAG	CLEAR FREEFLAG IN CASE OF RECYCLE
1553	REF	8	LAST	951	15,2644	00014 1	ADRES	FREEFLAG	
1554	REF	1			15,2645	3 2771 1	CA	DISCOVER	
1555	REF	290	LAST	961	15,2646	0 4616 1	TC	BANKCALL	
1556	REF	39	LAST	961	15,2647	20476 0	CADR	GUFLASH	
1557	REF	56	LAST	959	15,2650	0 6001 0	TC	GOTOPUGH	
1558	REF	1			15,2651	1 2654 0	TCF	PROGRAV	V833-PROCEED
1559	REF	63	LAST	891	15,2652	0 5504 0	TC	UPFLAG	V832-RECYCLE-STORE GRAV AND DO IT AGAIN
1560	REF	9	LAST	965	15,2653	00014 1	ADRES	FREEFLAG	AND SET FREEFLAG TO SHOW RECYCLE
1561	REF	92	LAST	951	15,2654	0 5353 1	PROGRAV	TC	PHASCHNG
1562					15,2655	04024 0	DCT	04024	
1564	REF	204	LAST	963	15,2656	0 6037 0	TC	INTPRET	
1565					15,2657	77775 1	VLOAD		
1566	REF	8	LAST	964	15,2660	02761 0		STARSAVL	
1567	REF	7	LAST	964	15,2661	02231 0	STORE	GSAV	
1568					15,2662	77776 1	EXIT		
1569	REF	1			15,2663	3 4751 0	CAF	FREEFBIT	IF FREEFLAG SET, RE-COMPUTE GRAVITY.
1570	REF	30	LAST	907	15,2664	7 0074 0	MASK	FLAGWRDO	
1571	REF	285	LAST	961	15,2665	10 000 0	CCS	A	
1572	REF	1			15,2666	1 2563 1	TCF	GVDETER	SET
1573	REF	1			15,2667	1 3553 0	TCF	ATTCHK	EXIT FROM GVDETER
1574					15,2670	77220 1	LUNG	STQ	VLOAD
1575	REF	14	LAST	959	15,2671	02745 0		QMIN	
1576	REF	5	LAST	961	15,2672	24007 0		ZERUVEC	
1577	REF	1			15,2673	02707 0	STORE	GACC	
1578					15,2674	77776 1	EXIT		
1579	REF	93	LAST	965	15,2675	0 5353 1	TC	PHASCHNG	
1580					15,2676	04024 0	DCT	04024	
1582	REF	291	LAST	965	15,2677	0 4616 1	TC	BANKCALL	
1583	REF	5	LAST	952	15,2700	17000 1	CADR	IMUOARS	
1584	REF	292	LAST	965	15,2701	0 4616 1	TC	BANKCALL	
1585	REF	12	LAST	952	15,2702	17716 1	CADR	IMUSTALL	
1586	REF	8	LAST	960	15,2703	0 5711 0	TC	CURTAINS	
1587	REF	293	LAST	965	15,2704	0 4616 1	TC	BANKCALL	
1588	REF	4	LAST	952	15,2705	17210 1	CADR	IMUFIN	
1589	REF	294	LAST	965	15,2706	0 4616 1	TC	BANKCALL	
1590	REF	13	LAST	965	15,2707	17716 1	CADR	IMUSTALL	
1591	REF	9	LAST	965	15,2710	0 5711 0	TC	CURTAINS	
1592	REF	1			15,2711	3 2770 0	CA	T/2 SEC	
1593	REF	8	LAST	962	15,2712	55 736 0	TS	GCTR	
1594	REF	3	LAST	860	15,2713	3 7716 0	CA	P/11 31	
1595	REF	10	LAST	952	15,2714	55 075 0	TS	1/PIPADT	
1596	REF	295	LAST	965	15,2715	0 4616 1	TC	BANKCALL	

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1597	REF	1		15.2716	15701 0		CADR	GCOMPZER	INITIALIZE COMPENSATION
1598	REF	94	LAST 965	15.2717	0 5353 1		TC	PHASCHNG	
1599				15.2720	04024 0		DCT	04024	
1601	REF	296	LAST 965	15.2721	0 4616 1		TC	BANKCALL	DONT NEED TO INHIN THIS USED TO
1602	REF	1		15.2722	77544 1		CADR	PIPSRINE	INITIALIZE PIPAS--DONT USE DATA
1603	REF	205	LAST 965	15.2723	0 6037 0		TC	INTPRET	
1604				15.2724	77776 1	GREED	EXIT		= MASK 7776 IN BASIC SO DONT CARE
1605	REF	7	LAST 857	15.2725	3 5000 1		CAF	2SECS	
1606	REF	26	LAST 900	15.2726	0 5173 1		TC	1-100LE	SET UP 2-SEC TASK TO READ PIPAS
1608	REF	1		15.2727	02731 0		ADRES	GRABGRAV	
1609	REF	142	LAST 928	15.2730	0 5155 0		TC	ENDDEFJOB	
1610	REF	46	LAST 924	15.2731	0 4674 0	GRABGRAV	TC	BANKCALL	
1611	REF	2	LAST 966	15.2732	77544 1		CADR	PIPSRINE	
16141	REF	2	LAST 746	15.2733	3 5023 0		CAF	PR1113	RE-ESTABLISH MAINLINE JOB
16142	REF	40	LAST 873	15.2734	0 5105 0		TC	FINDVAC	
16143	REF	27	LAST 964	15.1706			EBANK	STARAD	
16144	REF	1		15.2735	02740 0		2CADR	ADDGRAV	
16144	REF	1		15.2736	32065 0				
16145	REF	66	LAST 907	15.2737	0 5261 1		TC	TASKOVER	
16146	REF	297	LAST 966	15.2740	0 4616 1	ADDGRAV	TC	BANKCALL	
16147	REF	3	LAST 860	15.2741	15263 1		CADR	1/PIPA	
16148	REF	9	LAST 965	15.2742	25 736 1		INCR	GCTR	
1615	REF	206	LAST 966	15.2743	0 6037 0		TC	INTPRET	
1616				15.2744	53375 0		VLOAD	VAD	
1617	REF	9	LAST 912	15.2745	00325 0			DELV	
1618	REF	2	LAST 965	15.2746	02707 0			GACC	
1619	REF	3	LAST 966	15.2747	02707 0		STORE	GACC	ACCUMULATE G VECTOR
1620				15.2750	50135 0		SLOAD	BMN	
1621	REF	10	LAST 966	15.2751	02737 0			GCTR	
1622	REF	1		15.2752	32724 1			GREED	
1623				15.2753	53575 0		VLOAD	UNIT	
1624	REF	4	LAST 966	15.2754	02707 0			GACC	
1625	REF	9	LAST 964	15.2755	36731 1		STCALL	STAR	
1626	REF	6	LAST 953	15.2756	47537 0			GOUTRIG	TRANSFORM IN NB COOR AND STORE
1627				15.2757	77624 1		CALL		IN OUTPUT
1628	REF	7	LAST 912	15.2760	47671 1			*SMN3*	
1629	REF	3	LAST 964	15.2761	02715 0		STORE	GOUT	
1630				15.2762	77776 1		EXIT		
1631	REF	95	LAST 966	15.2763	0 5353 1		TC	PHASCHNG	
1632				15.2764	04024 0		DCT	04024	
1634	*REF	207	LAST 966	15.2765	0 6037 0	QMINEXIT	TC	INTPRET	
1635				15.2766	77650 1		GOTO		
1636	REF	15	LAST 965	15.2767	02745 0			QMIN	
1637				15.2770	77753 0	T/2SEC	DEC	-20	

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1638	15.2771	01404 0	DISGRVER	VN	0604
16381 *	15.2772	07357 1	42DEG	OCT	07357
16382 *	15.2773	06211 0	35DEG	OCT	06211

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P1639 NAME GYROTRIM

R1640

R1641 THIS PROGRAM COMPUTES AND SENDS GYRO COMMANDS WHICH CAUSE THE CDUS

P1642 TO ATTAIN A PRESCRIBED SET OF ANGLES. THIS ROUTINE ASSUMES THE

R1643 VEHICLES ATTITUDE REMAINS STATIONARY DURING ITS OPERATION.

R1644

R1645 CALL CALL

R1646 GYROTRIM

R1647

R1648 INPUT THETAD,+1,+2 = DESIRED CDU ANGLES

R1649 CDUX,CDUY,CDUZ

R1650

R1651 OUTPUT - GYRO TORQUE PULSES

R1652

R1653 SUBROUTINES- TRG*NBSM,*NBSM*,CDUTRIG,AXISGEN,CALCOTA,IMUFINE

R1654 IMPULSE,IMUSTALL

R1655

R1656 DEBRIS - CDUSPOT,SINCDU,COSCDU,STARAD,VAC,XDC,BGC

1657 REF 2 LAST 964 TO 968 127 127* COUNTER 55/P57

1658 15,2774 71220 1 GYROTRIM STQ OLLAD

1659 REF 16 LAST 966 15,2775 02745 0 QMIN

1660 REF 17 LAST 963 15,2776 00322 1 THETAD

1661 15,2777 65325 0 PEDI PEDI

1662 REF 18 LAST 968 15,3000 00324 1 THETAD +2

1663 REF 19 LAST 968 15,3001 00323 0 THETAD +1

1664 15,3002 77666 1 VDEF

1665 REF 25 LAST 896 15,3003 24767 1 STOVLC CDUSPOT

1666 REF 6 LAST 964 15,3004 24005 1 XUNIT

1667 15,3005 77624 1 CALL

1668 REF 5 LAST 580 15,3006 47664 0 TRG*NBSM

1669 REF 28 LAST 966 15,3007 26707 0 STOVLC STARAD

1670 REF 2 LAST 37 15,3010 24003 1 YUNIT

1671 15,3011 77624 1 CALL

1672 REF 6 LAST 964 15,3012 47673 0 XNBSM

1673 REF 29 LAST 968 15,3013 36715 1 STCALL STARAD +6

1674 REF 7 LAST 966 15,3014 47537 0 CDUTRIG

1675 15,3015 77624 1 CALL

1676 REF 3 LAST 953 15,3016 20030 0 CALCSMSC

1677 15,3017 77775 1 VLOAD

1678 REF 7 LAST 964 15,3020 02665 0 XNB

1679 15,3021 24007 0 STOVLC 60

1680 REF 3 LAST 374 15,3022 02673 1 YNB

1681 15,3023 34015 1 STCALL 120

1682 REF 3 LAST 951 15,3024 47441 0 AXISGEN

1683 15,3025 77624 1 CALL

1684 REF 3 LAST 945 15,3026 47247 0 CALCOTA

1685 15,3027 77776 1 JUSTTRIM EXIT

1686 REF 298 LAST 966 15,3030 0 4616 1 TC BANKCALL

1687 REF 5 LAST 965 15,3031 17210 1 CADR IMUFINE

1688 REF 299 LAST 968 15,3032 0 4616 1 TL BANKCALL

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1689	REF	14	LAST	965	15,3033	17716 1	CAOR	IMUSTALL
1690	REF	10	LAST	965	15,3034	0 5711 0	TC	CURTAINS
1691	REF	1			15,3035	3 3044 1	CA	GYRCOR
1692	REF	300	LAST	968	15,3036	0 4616 1	TC	BANKCALI
1693	REF	6	LAST	945	15,3037	17323 0	CAOR	IMUPULSE
1694	REF	301	LAST	969	15,3040	0 4616 1	TC	BANKCALI
1695	REF	15	LAST	969	15,3041	17716 1	CAOR	IMUSTALL
1696	REF	11	LAST	969	15,3042	0 5711 0	TC	CURTAINS
1697	*REF	1			15,3043	1 2765 0	TCF	MINEXIT
1700	REF	12	LAST	945	15,3044	02737 0	GYRCOR	ECADH 100

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P1701 PERFORM STAR AQUISITION AND STAR SIGHTINGS

1702	REF 183	LAST 959	15.3045	3 4755 1	2STARS	CAF	ZERO	INITIALIZE STARIND
1703			15.3046	1 3050 0		TCF	+2	ZERO FOR 1ST STAR + ONE FOR 2ND STAR
1704	REF 46	LAST 957	15.3047	3 4753 1	1STAR	CAF	BIT1	
1705	REF 15	LAST 962	15.3050	55 757 1		TS	STARIND	
17051	REF 96	LAST 966	15.3051	0 5353 1		TC	PHASCHNG	
17052			15.3052	04024 0		DCT	04024	
1706	REF 4	LAST 960	15.3053	1 2245 1		TCF	R59	GO DO STAR ACQUIRE AND NOT MARK
1707	REF 16	LAST 970	15.3054	3 1757 0	R59RET	CA	STARIND	BACK FROM SURFACE MARKING
1708			15.3055	0 0006 1		EXTEND		
1709	REF 1		15.3056	1 3067 1		BZF	ASTAR	1ST STAR MARKED
1715	REF 97	LAST 970	15.3057	0 5353 1		TC	PHASCHNG	
1716			15.3060	04024 0		DCT	04024	
1718	REF 208	LAST 966	15.3061	0 6037 0		TC	INTPRET	
1719			15.3062	45145 0		DLOAD	CALL	
1720	REF 10	LAST 962	15.3063	03562 0			TSIGHT	TIME OF 2ND MARK
1721	REF 6	LAST 956	15.3064	32472 1			PLANET	
1722	REF 1		15.3065	36731 1		STCALL	VEC2	STORE 2ND CATALOG VEC (REF)
1723	REF 1		15.3066	33101 1			SURFLINE	
1724	REF 209	LAST 970	15.3067	0 6037 0	ASTAR	TC	INTPRET	
1725			15.3070	77775 1		VLOAD		
1726	REF 30	LAST 968	15.3071	02715 0			STARAD +0	
1727	REF 9	LAST 965	15.3072	02761 0		STORE	STAR SAVI	1ST OBSERVED STAR (SM)
1728			15.3073	45145 0		DLOAD	CALL	
1729	REF 11	LAST 970	15.3074	03562 0			TSIGHT	TIME OF 1ST MARK
1730	REF 7	LAST 970	15.3075	32472 1			PLANET	
1731	REF 1		15.3076	02723 0		STORE	VEC1	STORE 1ST CATALOG VEC (REF)
1732			15.3077	77776 1		EXIT		
1733	REF 1		15.3100	1 3047 0		TCF	1STAR	GO GET 2ND STAR SIGHTING

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P1734 DO FINE OR COARSE ALIGNMENT OF IMU

1735				15.3101	77131 1	SURFLINE SSP	AXT,2	
1736	REF	11	LAST	938	15.3102	00052 0	52	
1737				15.3103	00006 1		6	
1738				15.3104	00014 1		120	
1739				15.3105	64373 1	WRTDESIR VLOAD*	EXV	
1740	REF	2	LAST	970	15.3106	75040 1	VEC1 +120.2	PICK UP VEC IN REF. TRANS TO DESIRE H
1741	REF	10	LAST	954	15.3107	03607 0	XSMO	
1742				15.3110	77656 1		UNIT	
1743	REF	31	LAST	970	15.3111	12723 1	STORE	STARAD +120.2 VEC IN SM
1744				15.3112	77773 1		VLOAD*	
1745	REF	10	LAST	970	15.3113	75002 1		STARSAVI +120.2 PICK UP VEC IN PRESENT SM
1746				15.3114	10023 1		STORE	120.2
1747				15.3115	43104 0		TIX.2	HON
1748	REF	1			15.3116	33105 0		WRTDESIR
17481	REF	1			15.3117	04315 1		INITALON
17482	REF	1			15.3120	33126 1		INITBY
1749				15.3121	77624 1		DOALIGN	CALL
1750	REF	2	LAST	942	15.3122	31256 1		BOFF
1751				15.3123	77614 1			FREEFLAG
1752	REF	10	LAST	965	15.3124	00354 0		P57POST
1753	REF	1			15.3125	33206 0		
17531				15.3126	77624 1		INITBY	CALL
1754	REF	4	LAST	968	15.3127	47441 0		AXISGEN
1755				15.3130	77624 1			CALL
1756	REF	4	LAST	968	15.3131	47247 0		CALCOTA
1757				15.3132	77776 1			EXIT
17571	REF	1			15.3133	3 4752 0		CAP
17572	REF	14	LAST	860	15.3134	7 0104 0		MASK
17573	REF	286	LAST	965	15.3135	10 000 0		CCS
17574	REF	1			15.3136	1 3145 0		TCF
1758	REF	1			15.3137	3 3313 0		CAF
1759	REF	302	LAST	969	15.3140	0 4616 1		TC
1760	REF	40	LAST	965	15.3141	20476 0		CADR
1761	REF	57	LAST	965	15.3142	0 6001 0		TC
1762	REF	2	LAST	971	15.3143	1 3145 0		TCF
1763	REF	2	LAST	971	15.3144	1 3207 0		TCF
1764	REF	210	LAST	970	15.3145	0 6037 0		SDOCTEST
1765				15.3146	40175 0			TO
1766	REF	13	LAST	969	15.3147	02740 0		VLOAD
1767	REF	1			15.3150	33151 1		
1768	REF	2	LAST	124	15.3151	02750 1		SURFSUP
1769				15.3152	40141 1			STORE
1770	REF	2	LAST	936	15.3153	30610 0		V/SC
1771	REF	1			15.3154	33254 1		
1772				15.3155	52131 0			SSP
1773	REF	17	LAST	968	15.3156	02746 0		
1774	REF	1			15.3157	33161 1		

IF INITIAL PASS (OPTION 0) BYPASS FOR
 DO CHKS DATA
 ASTRO DOES NOT LIKE DATA TEST RESULTS
 GET DESIRED ORIENT WRT PRES.XDC,YDC,ZDC
 GET GYRO TORQ ANGLES, DGC,IQC,MGC
 IF INITIAL PASS BYPASS HONOR NO DISPLAY
 DISPLAY GYRO TORQ ANGLES V 06N93
 V34-TERMINATE
 V633-PROCEED TO COARSE OR FINE
 V632-RECYCLE, MAYBE RE-ALIGN
 IF ANGLES GREATER THAN 5 DEGS, DO COARSE

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1775	REF	1		15,3160	33027 1		JUSTTRIM	ANGLES LESS THAN 5DEG. DO CYCLE TORQ
1776				15,3161	77776 1	SURFDISP	EXIT	
1777	REF	98	LAST	970	15,3162	0 5353 1	TC	PHASCHNG
1778					15,3163	04024 0	OCT	04024
1780	REF	211	LAST	971	15,3164	0 6037 0	TC	INTPRET
1781					15,3165	75160 1	AXC.1	AXC.2
1782	REF	11	LAST	971	15,3166	03606 1		XSMO
1783	REF	49	LAST	957	15,3167	01733 1		REFSMAT
1784					15,3170	45014 0	SET	CALL
1785	REF	7	LAST	963	15,3171	01462 0		REFSMFLG
1786	REF	5	LAST	953	15,3172	31377 0		MATMOVE
1787					15,3173	77776 1	EXIT	
1788	REF	11	LAST	928	15,3174	11 145 1	CCS	OPTION1
1789	REF	1			15,3175	1 3177 1	TCF	B2F8
1790	REF	3	LAST	971	15,3176	1 3207 0	TCF	P57POST #1
1791	REF	2	LAST	971	15,3177	3 4752 0	B2F8	CAF
1792	REF	15	LAST	971	15,3200	7 0164 0	HASK	INITIABIT
1793	REF	287	LAST	971	15,3201	10 000 0	CCS	FLAG=008
1794	REF	1			15,3202	1 3561 1	TCF	A
1795	REF	212	LAST	972	15,3203	0 6037 0	TCF	P57JUMP
1796					15,3204	77624 1	TC	ITS SET
1797	REF	2	LAST	792	15,3205	33506 1	CALL	INTPRET
1798					15,3206	77776 1	REFMF	GO-GET-ATTITUDE-VEC-IN-MF(LYNBSAV,XNBSAV)
1799	REF	3	LAST	942	15,3207	3 5751 1	P57POST	EXIT
1800	REF	303	LAST	971	15,3210	0 4616 1	CAF	OCT14
1801	REF	9	LAST	950	15,3211	20623 1	TC	DISPLAY-V50N25-CHK-CODE-14
1802	REF	58	LAST	971	15,3212	1 6001 1	CASH	BARRECALL
1803	REF	2	LAST	972	15,3213	1 3561 1	TCF	GOPEKF1
1804	REF	45	LAST	928	15,3214	4 4752 1	TCF	GOTDPODH
1805	REF	12	LAST	972	15,3215	6 1145 0	TCF	V834-TERMINATE
1806					15,3216	0 0006 1	CS	V833-PROCEED TO RE-ALIGN
1807					15,3217	1 3221 1	AD	TEST TO SE IF ALIGNED BY OPTION 2
1808	REF	59	LAST	972	15,3220	1 6001 1	EXTEND	
1809	REF	99	LAST	972	15,3221	0 5353 1	BZF	#2
1810					15,3222	04024 0	TCF	YES-GO CALCULATE LANDING SITE
1811	REF	213	LAST	972	15,3223	0 6037 0	TCF	NO-EXIT-P57
1812					15,3224	45175 0	TC	RESTART-PLACE
1813	REF	8	LAST	965	15,3225	02231 0	OCT	04024
1814	REF	3	LAST	818	15,3226	47661 0	TC	INTPRET
1815					15,3227	43105 1	VLOAD	CALL
1816	REF	50	LAST	972	15,3230	01734 0		USE GND
1817	REF	5	LAST	932	15,3231	01463 1		
1818					15,3232	51515 1		
1819	REF	10	LAST	932	15,3233	02023 1	VXN	GO TO SH COORDS
1820					15,3234	45561 1		ON MOON SO SET LUNAFLAG
1821	REF	6	LAST	932	15,3235	75745 0		G(REF) = (REFSMAT)T (NBSMAT)G
1822					15,3236	47014 1	PDVL	
							ABVAL	
							RLS	
							VXSC	STADR
							STORE	ALPHAV
							CLEAR	RTB
								ALPHAV = RLSMAG * G(REF)

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1823	REF	3	LAST	932	15,3237	00662 0
1824	REF	27	LAST	956	15,3240	21573 0
1825					15,3241	77624 1
1826	REF	2	LAST	932	15,3242	30446 1
1827	REF	15	LAST	881	15,3243	01221 1
1828					15,3244	65352 0
1829	*REF	19	LAST	960	15,3245	01243 0
1830					15,3246	77606 1
1831	REF	23	LAST	901	15,3247	35235 0
1832	REF	2	LAST	791	15,3250	51670 1
1833	REF	11	LAST	972	15,3251	02023 1
1834					15,3252	77776 1
1835	REF	60	LAST	972	15,3253	1 6001 1

LEAF FLAG
LEADTIME

CALL

N89DISP

STORE RN

VSL2

PDDL

COT/2 +4

PUSH

STCALL PIPTIME

R-TO-RP

STORE RLS

EXIT

TCF GOTOPDDH

SUBROUTINE TO CALC LS AND GIVE RLS BACK

RN=RLS-B-29 = LM POSITION

R-TO-RP GETS RLS-B-27 AT 0-50 IN PDLIST

TIME TEMP STORED IN N89DISP

TIME AT 6-7 IN PDLIST

PIPTIME = LM STATE TIME

RLS IN MOON-FIXED COORDS

EXIT P57

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P1836 COARSE AND FINE ALIGN IMU

1837				15,3254	75160 1	COATRIM	AXC.1	AXC.2	
1838	REF	5	LAST	951	15,3255			ADL	
1839	REF	22	LAST	964	15,3256			XSH	
1840					15,3257		CALL		
1841	REF	6	LAST	972	15,3260			MATROVE	
1842					15,3261		CALL		
1843	REF	8	LAST	968	15,3262			COUVRIG	
1844					15,3263		CALL		
1845	REF	4	LAST	968	15,3264			CALESMSC	
1846					15,3265		CALL		
1847	REF	4	LAST	964	15,3266			CALCGA	
18471					15,3267		BOFF	EXIT	
18472	REF	2	LAST	971	15,3270			INITALGN	IF INITIAL ALIGNMENT DISPLAY FINAL
18473	REF	1			15,3271			CORSIT	GIMBAL ANGLES IF COARSE ANGLES GREATER
18474	REF	4	LAST	950	15,3272		CAF	VG6422	THAN 5 DEGREES
18475	REF	304	LAST	972	15,3273		TC	BANKCALL	
18476	REF	41	LAST	971	15,3274		CADR	GOFLASH	
18477	REF	61	LAST	973	15,3275		TC	GOTOPDOH	
18478					15,3276		TCF	+2	
18479					15,3277		TCF	-5	
184791	REF	100	LAST	972	15,3300		TC	PHASCHNG	
184792					15,3301		UCT	04024	
1848	REF	214	LAST	972	15,3302		TC	INTPRET	
18481					15,3303		CORSIT	CALL	
1849	REF	3	LAST	950	15,3304			COARSE	
1850					15,3305		CALL		
1851	REF	4	LAST	950	15,3306			NCOARSE	
1852					15,3307		CALL		
1853	REF	1			15,3310			GYROTRIM	
1854					15,3311		OUTD		
1855	REF	2	LAST	971	15,3312			SURFDISP	
1856					15,3313		DISPGYRO VN	0693	

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P1857 LUNAR SURFACE IMU ALIGNMENT PROGRAM

1850	REF 305	LAST 974	15,3314	0 4616 1	P57	TC	BANKCALL	IS ISS ON - IF NOT, IMUCHK WILL SEND
1859	REF 2	LAST 950	15,3315	33652 0		CADR	IMUCHK	ALARM CODE 210 AND EXIT VIA GUTOPDCH
1860	REF 27	LAST 928	15,3316	3 6245 1		CAF	THREE	JAM REFSMMAT OPTION 3 FOR INITIAL DISP.
1861	REF 13	LAST 972	15,3317	55 145 1		TS	OPTION2	
1862	REF 47	LAST 970	15,3320	3 4753 1	P57CPT	CAF	BIT3	
1863	REF 306	LAST 975	15,3321	0 4616 1		TC	BANKCALL	
1864	REF 2	LAST 928	15,3322	20713 0		CADR	GOPERF4F	FLASH V04N06 FOR ALIGNMENT CODE
1865	REF 62	LAST 974	15,3323	0 6001 0		TC	GUTOPDCH	V34 TERMINATE
1866	REF 1		15,3324	1 3331 1		TCF	ALIGNOPT	V33-PROCEED
1867	REF 1		15,3325	1 3320 1		TCF	P57 PT	V32 RECYCLE
1868	REF 101	LAST 974	15,3326	0 5353 1		TC	PHASCHNO	
1869			15,3327	00014 1		GCT	00014	
1870	REF 143	LAST 966	15,3330	0 5155 0		TC	ENDOFJOB	
1871	*REF 14	LAST 975	15,3331	3 1145 0	ALIGNOPT	CA	OPTION2	
1872	REF 28	LAST 975	15,3332	7 6245 0		MASK	THREE	
1873	REF 288	LAST 972	15,3333	50 000 1		INDEX	A	
1874			15,3334	1 3335 0		TCF	+1	
1875	REF 1		15,3335	1 3350 0		TCF	TDISP	OPTION 4 LS ORIENTATION
1876	REF 1		15,3336	1 3411 1		TCF	PACKOPTN	OPTION 1-PREFERRED
1877	REF 2	LAST 975	15,3337	1 3320 1		TCF	P57 PT	OPTION 2 INVALID IN P57, RECYCLE
1878	REF 215	LAST 974	15,3340	0 6037 0		TC	INTERPRET	OPTION 3 REFSMMAT
1879			15,3341	75160 1		AXC,1	AXC,2	JAM REFSMMAT IN XSMO LOC
1880	REF 51	LAST 972	15,3342	01733 1			REFSMMAT	
1881	REF 12	LAST 972	15,3343	03606 1			XSMO	
1882			15,3344	77624 1		CALL		
1883	REF 7	LAST 974	15,3345	31377 0			RATROVE	
1884			15,3346	77650 1		GOTO		
1885	REF 2	LAST 975	15,3347	33410 1			PACKOPTN -1	
1886	REF 216	LAST 975	15,3350	0 6037 0	TDISP	TC	INTERPRET	
1887			15,3351	77745 1		DLOAD		
1888	REF 42	LAST 839	15,3352	03442 0			TIG	LOAD ASCENT TIME FOR DISPLAY
1889	REF 29	LAST 965	15,3353	01046 1	P57A	STORE	DSPTEN1	
1890			15,3354	77776 1		EXIT		
1891	REF 2	LAST 928	15,3355	3 2170 0	P57AA	CAF	V06N34	DISPLAY TALIGN, TALIGN : DSPTEN1
1892	REF 307	LAST 975	15,3356	0 4616 1		TC	BANKCALL	
1893	REF 42	LAST 974	15,3357	20476 0		CADR	GUFLASH	
1894	REF 63	LAST 975	15,3360	1 6001 1		TCF	GUTOPDCH	V34-TERMINATE
1895			15,3361	1 3363 0		TCF	+7	
1896	REF 1		15,3362	1 3355 0		TCF	P57AA	V32-RECYCLE
1897	REF 217	LAST 975	15,3363	0 6037 0		TC	INTERPRET	
1898			15,3364	65234 1		RTB	PDDL	
1899	REF 28	LAST 973	15,3365	21573 0			LOADTIME	PUSH CURRENT TIME AND PICK UP KEY IN
1900	REF 30	LAST 975	15,3366	01046 1			DSPTEN1	

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1901				15,3367	65254 1	BZE	POOL			
1902	REF	1		15,3370	33400 0		P57C	IF KEY IN TIME ZERO-TALIGN=CURRENT TIME		
1903				15,3371	51025 1	DSU	BPL	NOT ZERO-SD-EXCHANGE PD WITH DSPTEN1		
1904	REF	31	LAST	975	15,3372		DSPTEN1			
1905	REF	2	LAST	976	15,3373		P57C			
1906				15,3374	45545 1	DLOAD	STADR	IF KEYIN TIME GREATER THAN CURRENT TIME		
1907	REF	43	LAST	975	15,3375		TIG	STORE IT IN TIG		
1908	REF	8	LAST	932	15,3376		TALIGN			
1909	REF	1		15,3377	33402 1		P57D			
1910				15,3400	45545 1	P57C	DLOAD	STADR		
1911	REF	9	LAST	976	15,3401		STORE	TALIGN		
1912	REF	54	LAST	954	15,3402	P57D	STCALL	TDEC1		
1913	REF	13	LAST	935	15,3403		LEMPREC	COMPUTE DESIRED IMU ORIENTATION STORE		
1914				15,3404	53575 0	VLOAD	UNIT	IN X,Y,ZSHD		
1915	REF	35	LAST	954	15,3405		RATT			
1916	REF	13	LAST	975	15,3406		STCALL	XSHD		
1917	REF	2	LAST	932	15,3407		LSORIENT			
1918				15,3410	77776 1		EXIT			
1919	REF	184	LAST	970	15,3411	3 4755 1	PACKOPTN	CAF	ZERO	PACK FLAG BITS FOR OPTION DISPLAY
1920	REF	3	LAST	725	15,3412	55'145 1		TS	OPTION1 +1	JAM ZERO IN ALIGNMENT OPTION
1921	REF	4	LAST	976	15,3413	55'146 1		TS	OPTION1 +2	INITIALIZE FLAG-BIT CONFIGURATION
1922	REF	4	LAST	957	15,3414	3 4737 0		CAF	REFSMBIT	
1923	REF	16	LAST	957	15,3415	7 0077 0		MASK	FLAGWRD3	REFSMFLG
1924	REF	289	LAST	975	15,3416	10 000 0		CCS	A	
1925	REF	35	LAST	960	15,3417	3 4745 0		CAF	BIT7	SET
1926	REF	5	LAST	976	15,3420	27'146 1		ADS	OPTION1 +2	CLEAR-JUST ZERO
1927	REF	1		15,3421	3 4753 1		CAF	ATTFLBIT		
1928	REF	15	LAST	865	15,3422	7 0102 0		MASK	FLAGWRD6	ATTFLG
1929	REF	290	LAST	976	15,3423	10 000 0		CCS	A	
1930	REF	38	LAST	920	15,3424	3 4750 1		CAF	BIT4	SET
1931	REF	6	LAST	976	15,3425	27'146 1		ADS	OPTION1 +2	CLEAR-ZERO IN A
1932	REF	39	LAST	976	15,3426	3 4750 1		CAF	BIT4	
1933	REF	7	LAST	976	15,3427	55'144 0		TS	OPTION1	JAM 00010 IN OPTION1 FOR CHECK LIST
1934	REF	1		15,3430	3 3651 0	DSPOPTN	CAF	V05H06		DISPLAY OPTION CODE AND FLAG BITS
1935	REF	308	LAST	975	15,3431	0 4616 1		TC	BANKCALL	
1936	REF	43	LAST	975	15,3432	20476 0		CADR	GOFASH	
1937	REF	64	LAST	975	15,3433	1 6001 1		TCF	GOTOPODH	V034-TERMINATE
1938				15,3434	1 3436 1		TCF	+2		V33-PROCEED
1939	REF	1		15,3435	1 3430 1		TCF	DSPOPTH		V32-RECYCLE
1940	REF	5	LAST	976	15,3436	3 4737 0		CAF	REFSMBIT	
1941	REF	17	LAST	976	15,3437	7 0077 0		MASK	FLAGWRD3	
1942	REF	291	LAST	976	15,3440	10 000 0		CCS	A	
1943	REF	1		15,3441	1 3541 0		TCF	GETLMATT		SET, GO COMPUTE LM ATTITUDE
1944	REF	2	LAST	976	15,3442	3 4753 1		CAF	ATTFLBIT	CLEAR-CHECK ATTFLAG FOR STORED ATTITUDE.
1945	REF	14	LAST	976	15,3443	7 0102 0		MASK	FLAGWRD6	
1946	REF	292	LAST	976	15,3444	10 000 0		CCS	A	
1947	REF	1		15,3445	1 3545 1		TCF	BYLMATT		ALLFLG-SET, CHK-OPTION-FOR-GRAVITY-COMP
1948	REF	46	LAST	972	15,3446	3 4752 0		CAF	BIT2	SEE IF-OPTION-2-OR-3

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1949	REF 15 LAST 975	15,3447 7 1145 1	MASK	OPTION2	
1950	REF 293 LAST 976	15,3450 10 000 0	CCS	A	
1951	REF 2 LAST 976	15,3451 1 3545 1	TCF	BYLMATT	OPTION 2 OR 3 BUT DONT HAVE ATTITUDE
1952	REF 39 LAST 959	15,3452 0 5567 0	TC	ALARM	OPTION INCONSISTANT WITH FLAGS-ALARM 10
1953		15,3453 00701 1	GCT	701	
1954	REF 3 LAST 959	15,3454 3 5006 1	CAF	V805H09	DISPLAY-ALARM-FOR-ACTION
1955	REF 309 LAST 976	15,3455 0 4616 1	TC	BANKCALL	
1956	REF 44 LAST 976	15,3456 20476 0	CADR	COFLASH	
1957	REF 65 LAST 976	15,3457 1 6001 1	TCF	GOTUPCH	V834-TERMINATE
1958	REF 2 LAST 976	15,3460 1 3430 1	TCF	DSOPTN	V33-PROCEED *****TEMPORARY
1959	REF 3 LAST 977	15,3461 1 3430 1	TCF	DSOPTN	V832-RECYCLE TO-OPTION DISPLAY V 05H06

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P1960 TRANSFORM VEC1,2 FROM MOON FIXED TO REF AND JAM BACK IN VEC1,2

1961				15.3462	40220 0	MRREF	STQ	SETRD
1962	REF	12	LAST	954	15.3463	02746 0		QHAJ
1963				15.3464	00001 0			0
1964				15.3465	77634 0		RTB	
1965	REF	29	LAST	975	15.3466	21573 0		LOADTIME
1966	REF	12	LAST	970	15.3467	27562 0	STOVL	TSIGHT
1967	REF	3	LAST	971	15.3470	02723 0		VEC1
1968				15.3471	41525 0		PDDL	PUSH
1969	REF	13	LAST	978	15.3472	03562 0		TSIGHT
1970				15.3473	77624 1		CALL	
1971	REF	4	LAST	932	15.3474	55716 1		RP-T-R
1972	REF	4	LAST	978	15.3475	26723 0	STOVL	VEC1
1973	REF	2	LAST	970	15.3476	02731 0		VEC1
1974				15.3477	65201 1		SETRD	PDDL
1975				15.3500	00001 0			0
1976	REF	14	LAST	978	15.3501	03562 0		TSIGHT
1977				15.3502	45006 0		PUSH	CALL
1978	REF	5	LAST	978	15.3503	55716 1		RP-TD-R
1979	REF	3	LAST	978	15.3504	36731 1	STCALL	VEC2
1980	REF	13	LAST	978	15.3505	02746 0		QHAJ

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P1981 COMPUTE LM ATTITUDE IN MOON FIXED COORDINATES USING REFSMMAT AND
 R1982 STORE IN YNBSAV AND ZNBSAV

1983				15.3506	45020 1	REFMF	STQ	CALL	
1984	REF	14	LAST	978	15.3507			CMAX	
1985	REF	9	LAST	974	15.3510			CDUTHIG	GET SIN AND COS OF CDUS
1986				15.3511	40234 0		RTB	SETPD	
1987	REF	30	LAST	978	15.3512			LOADTIME	
1988				15.3513	00001 0			0	
1989	REF	15	LAST	978	15.3514		STCALL	TSIGHT	
1990	REF	5	LAST	974	15.3515			CALCSMSC	GET YNB IN SM
1991				15.3516	61375 1		VLOAD	VXM	
1992	REF	4	LAST	968	15.3517			YNB	
1993	REF	52	LAST	975	15.3520			REFSMMAT	YNB TO REF
1994				15.3521	65256 0		UNIT	PDDL	
1995	REF	16	LAST	979	15.3522			TSIGHT	
1996				15.3523	45006 0		PUSH	CALL	
1997	REF	3	LAST	973	15.3524			R-TO-RP	
1998	REF	3	LAST	202	15.3525		STOVL	YNBSAV	YNB TO MF
1999	REF	4	LAST	938	15.3526			ZNB	
2000				15.3527	53505 1		VXM	UNIT	
2001	REF	53	LAST	979	15.3530			REFSMMAT	ZNB TO REF
2002				15.3531	41925 0		PDDL	PUSH	
2003	REF	17	LAST	979	15.3532			TSIGHT	
2004				15.3533	77624 1		CALL		
2005	REF	4	LAST	979	15.3534			R-TO-RP	ZNB TO MF
2006	REF	1			15.3535		STORE	ZNBSAV	
2007					15.3536		SETGG		
2008	REF	1			15.3537			ATTFLAG	
2009	REF	15	LAST	979	15.3540			CMAX	

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P2010 BRANCH TO ALIGNMENT OPTION

2011	REF 218	LAST 975	15,3541	0 6037 0	GETLMATT	TC	INTERPRET	
2012			15,3542	77624 1		CALL		
2013	REF 3	LAST 972	15,3543	33506 1		REFME		GO TRANSFORM TO ME IN YAGSAV.ZR000V
2014			15,3544	77776 1		EXIT		
2015	REF 64	LAST 965	15,3545	0 5504 0	BYLMATT	TC	UPFLAG	SET INITIAL ALIGN FLAG
2016	REF 3	LAST 974	15,3546	00205 0		ADRES	INITALGN	
2017	REF 48	LAST 975	15,3547	3 4753 1		CAF	BIT1	
2018	REF 16	LAST 977	15,3550	7 1145 1		MASK	OPTION2	SEE IF OPTION 1 OR 3
2019	REF 294	LAST 977	15,3551	10 000 0		CCS	A	
2020	REF 2	LAST 965	15,3552	1 2563 1		TCF	GOVLETC	OPTION 1 OR 2, GET GRAVITY
2021	REF 102	LAST 975	15,3553	0 5353 1	ATTCHK	TC	PHASCHNG	
2022			15,3554	04024 0		DCT	04024	
2023	REF 3	LAST 976	15,3555	3 4753 1		CAF	ATTFLBIT	NOT 1 OR 3, CHECK ATTFLAG
2024	REF 15	LAST 976	15,3556	7 0102 0		MASK	FLAGWDS	
2025	REF 295	LAST 980	15,3557	10 000 0		CCS	A	
2026	REF 1		15,3560	1 3575 1		TCF	P57OPT0	GET ALIGNMENT VECs FOR OPTION 0
2027	REF 103	LAST 980	15,3561	0 5353 1	P57JUMP	TC	PHASCHNG	
2028			15,3562	04024 0		DCT	04024	
2029	REF 69	LAST 965	15,3563	0 5516 0		TL	DOWNFLAG	ATTFLAG CLEAR-RESET INTALIGN FLAG
2030	REF 4	LAST 980	15,3564	00205 0		ADRES	INITALGN	
2031	REF 29	LAST 975	15,3565	3 6245 1		CAF	THREE	
2032	REF 17	LAST 980	15,3566	7 1145 1		MASK	OPTION2	BRANCH ON OPTION CODE
2033	REF 296	LAST 980	15,3567	50 000 1		INDEX	A	
2034			15,3570	1 3571 0		TCF	+1	
2035	REF 2	LAST 980	15,3571	1 3575 1		TCF	P57OPT0	OPTION IS 0
2036	REF 1		15,3572	1 3616 1		TCF	P57OPT1	OPTION IS 1
2037	REF 1		15,3573	1 3634 1		TCF	P57OPT2	OPTION IS 2
2038	REF 1		15,3574	1 3635 0		TCF	P57OPT3	OPTION IS 3

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P2039 OPTION 0, GET TWO ATTITUDE VECs

2040	REF 219	LAST 980	15.3575	0 6037 0	P57OPT0	TC	INTERPRET	
2041			15.3576	77775 1		VLOAD		
2042	REF 4	LAST 979	15.3577	02237 0			YNBSAV	Y AND Z ATTITUDE WILL BE PUT IN REF
2043	REF 5	LAST 978	15.3600	26723 0		STOVL	VEC1	
2044	REF 2	LAST 979	15.3601	02245 0			ZNBSAV	
2045	REF 4	LAST 978	15.3602	36731 1		STCALL	VEC2	
2046	REF 10	LAST 979	15.3603	47537 0			CDUTRIG	
2047			15.3604	77624 1		CALL		
2048	REF 6	LAST 979	15.3605	20030 0			CALCSMSE	COMPUTE SC AXIS WRT PRESENT SM
2049			15.3606	77775 1		VLOAD		
2050	REF 5	LAST 979	15.3607	02673 1			YNB	
2051	REF 11	LAST 971	15.3610	26761 0	SAMETYP	STOVL	STARSAV1	Y SC AXIS WRT PRESENT SM
2052	REF 5	LAST 979	15.3611	02701 0			ZNB	
2053	REF 8	LAST 951	15.3612	36767 1		STCALL	STARSAV2	Z SC AXIS WRT PRESENT SM
2054	REF 1		15.3613	33462 1			REFEF	TRANSFORM VEC1,2 FROM MF TO REF
2055			15.3614	77650 1		GOTO		
2056	REF 2	LAST 970	15.3615	33101 1			SURFLINE	

P2057 OPTION 1, GET LANDING SITE AND Z-ATTITUDE VEC

2058	REF 220	LAST 981	15.3616	0 6037 0	P57OPT1	TC	INTERPRET	
2059			15.3617	53575 0		VLOAD	UNIT	
2060	REF 12	LAST 973	15.3620	02023 1			FLS	LANDING SITE VEC
2061	REF 6	LAST 981	15.3621	26723 0		STOVL	VEC1	
2062	REF 3	LAST 981	15.3622	02245 0			ZNBSAV	Z-ATTITUDE VEC
2063	REF 5	LAST 981	15.3623	36731 1		STCALL	VEC2	
2064	REF 11	LAST 981	15.3624	47537 0			CDUTRIG	
2065			15.3625	77624 1		CALL		
2066	REF 7	LAST 981	15.3626	20030 0			CALCSMSE	GET ZNB AXIS WRT PRES SM FOR STARSAV2
2067			15.3627	45175 0		VLOAD	CALL	
2068	REF 9	LAST 972	15.3630	02231 0			NSAV	TRANS CSAV FROM NB TO SM FOR STARSAV1
2069	REF 4	LAST 972	15.3631	47661 0			CDUTRIG	
2070			15.3632	77650 1		GOTO		
2071	REF 1		15.3633	33610 0			SAMETYP	NOW DO SAME AS OPTION 0

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P2072 OPTION 2. GET TWO STAR SIGHTINGS

2073	REF	1		15.3634	1 3045 1	P57OPT2	TCF	PSTARS	DO SIGHTING ON 2 STARS
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P2074 OPTION 3. GET LANDING SITE VEC AND ONE STAR SIGHTING

2075	REF	221	LAST	981	15.3635	0 6037 0	P57OPT3	TC	INTERPRET	
2076					15.3636	53575 0		VL0AD	UNIT	
2077	REF	13	LAST	981	15.3637	02023 1			FLS	LANDING SITE VEC
2078	REF	7	LAST	981	15.3640	02723 0		STORE	VEC1	
2079	REF	6	LAST	981	15.3641	26731 0		STOVL	VEC2	DUMMY VEC2 FOR 2ND CATALOG STAR
2080	REF	10	LAST	981	15.3642	02231 0			GSAV	GRAVITY VEC NO
2081					15.3643	77624 1		CALL		
2082	REF	5	LAST	981	15.3644	47661 0			CDOWNRSE	TRANS GSAV FROM NB TO SN FOR STARSAV1
2083	REF	12	LAST	981	15.3645	36761 1		STCALL	STARSAV1	
2084	REF	2	LAST	981	15.3646	33462 1			REF1	STARSAV2 IS STORED AS 2ND OBSERVED STAR
2085					15.3647	77776 1		EXIT		
2086	REF	2	LAST	970	15.3650	1 3047 0		TCF	1STAR	1STAR GET VEC2, STARSAV2, GOES TO NEXT LINE
2087					15.3651	01206 1	V805N06	VN	500	

L P51-P53

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P2088 CHECK IMODES30 TO VERIFY IMU IS ON

2089	REF 46	LAST 470	15.3652	4 1302 0	IMUCHK	CS	IMODES30	
2090	REF 25	LAST 955	15.3653	7 4743 1		MASK	BIT9	
2091	REF 207	LAST 980	15.3654	10 000 0		CCS	R	IS IMU ON
2092			15.3655	1 3661 1		TCF	+4	YES
2093	REF 40	LAST 977	15.3656	0 5567 0		TC	ALARM	NO. SEND ALARM AND EXIT
2094			15.3657	00210 1		UCT	210	
2095	REF 66	LAST 977	15.3660	0 6001 0		TC	GOTOPDCH	
2096	REF 65	LAST 980	15.3661	0 5504 0		TC	UPFLAG	
2097	REF 5	LAST 388	15.3662	00007 0		ADRES	IMUSE	SET IMUSE FLAG
2098	REF 5	LAST 878	15.3663	0 4631 1		TC	SWRETURN	
2099			04.3013			BANK	04	
2100	REF 2	LAST 249	04.2000			SETLOC	ADTMARK2	
2101			04.3013			BANK		
2102	REF 1					COUNT*	33/P57	
2103			04.3013	77220 1	LSORIENT	STQ	VLOAD	
2104	REF 16	LAST 979	04.3014	02746 0			QMAJ	
2105	REF 6	LAST 841	04.3015	01555 0			VRECTCSM	
2106			04.3016	47235 0		VXV	VXV	
2107	REF 2	LAST 841	04.3017	01563 0			VRECTCSM	
2108	REF 14	LAST 976	04.3020	03607 0			XSMO	
2109			04.3021	77656 1		UNIT		
2110	REF 5	LAST 954	04.3022	03623 0		STORE	ZSMO	
2111			04.3023	53435 0		VXV	UNIT	
2112	REF 15	LAST 983	04.3024	03607 0			XSMO	
2113	REF 6	LAST 954	04.3025	37615 1		STCALL	YSMO	
2114	REF 17	LAST 983	04.3026	02746 0			QMAJ	

L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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R2000 NAME - LSPOS - LOCATE SUN AND MOON

DATE - 25 OCT 67

R2002 MOD NO.1

R2004 MOD BY NEVILLE

ASSEMBLY SUNDANCE

R2006 FUNCTIONAL DESCRIPTION

R2007 COMPUTES UNIT POSITION VECTOR OF THE SUN AND MOON IN THE BASIC REFERENCE SYSTEM. THE SUN VECTOR IS
 R2009 LOCATED VIA TWO ANGLES. THE FIRST ANGLE(OBLIQUITY) IS THE ANGLE BETWEEN THE EARTH EQUATOR AND THE ECLIPTIC. THE
 R2011 SECOND ANGLE IS THE LONGITUDE OF THE SUN MEASURED IN THE ECLIPTIC.
 R2012 THE POSITION VECTOR OF THE SUN IS

R2013 $S = (\cos(LOS), \cos(OBL) * \sin(LOS), \sin(OBL) * \sin(LOS))$, WHERE
 R2014

R2015 $LOS = LOS_0 + LOS * T - (C * \sin(2\pi * T) / 365.24 + C * \cos(2\pi * T) / 365.24)$

R2016 LOS_0 (RAD) IS THE LONGITUDE OF THE SUN FOR MIDNIGHT JUNE 30TH OF THE PARTICULAR YEAR.
 R2017

R2019 LOS (RAD/DAY) IS THE MEAN RATE FOR THE PARTICULAR YEAR.
 R2020

R2021 LOS AND LOS ARE STORED AS LOS_0 AND LOS_R IN RATESP.
 R2022

R2023 $\cos(OBL)$ AND $\sin(OBL)$ ARE STORED IN THE MATRIX KONMAT.
 R2024

R2025 T , TIME MEASURED IN DAYS(24 HOURS), IS STORED IN TIMEP.
 R2026 C AND C ARE FUDGE FACTORS TO MINIMIZE THE DEVIATION. THEY ARE STORED AS ONE CONSTANT(CMOD), TIMEP

R2028 $C * \sin(x) + C * \cos(x)$ CAN BE WRITTEN AS $(C + C) * \sin(x + \phi)$, WHERE $\phi = \arctan(C / C)$.
 R2029

R2031 THE MOON IS LOCATED VIA FOUR ANGLES. THE FIRST IS THE OBLIQUITY. THE SECOND IS THE MEAN LONGITUDE OF THE MOON,
 R2033 MEASURED IN THE ECLIPTIC FROM THE MEAN EQUINOX TO THE MEAN ASCENDING NODE OF THE LUNAR ORBIT, AND THE THIRD IS THE LONGITUDE
 R2035 OF THE NODE OF THE MOON, MEASURED IN THE LUNAR ORBIT. LET THESE ANGLES BE OBL, LOM, IN, AND LON RESPECTIVELY.
 R2037

R2041 THE SIMPLIFIED POSITION VECTOR OF THE MOON IS

R2042 $M = (\cos(LON), \cos(OBL) * \sin(LON) - \sin(OBL) * \sin(IN) * \sin(LON - LON), \sin(OBL) * \sin(LON) + \cos(OBL) * \sin(IN) * \sin(LON - LON))$
 R2043

R2045 WHERE
 R2046 $LON = LON_0 + LON * T - (A * \sin(2\pi * T / 27.5545) + A * \cos(2\pi * T / 27.5545) + B * \sin(2\pi * T / 32) + B * \cos(2\pi * T / 32))$, AND

R2048 LON_0 (RAD) IS THE LONGITUDE OF THE MOON FOR MIDNIGHT JUNE 30TH OF THE PARTICULAR YEAR.
 R2050

R2051 LON (RAD/DAY) IS THE MEAN RATE FOR THE PARTICULAR YEAR.
 R2052

R2053 A , A , B AND B ARE STORED AS AMOD AND BMOD (SEE DESCRIPTION OF CMOD, ABOVE). $\cos(OBL)$, $\sin(OBL) * \sin(IN)$,
 R2054

R2055 $\sin(OBL)$, AND $\cos(OBL) * \sin(IN)$ ARE STORED IN KONMAT AS K1, K2, K3 AND K4, RESPECTIVELY. LOS_0 , LOS_R , LON_0 , LON_R
 R2057 ARE STORED AS LOMD, LOMR, LOND, AND LONR IN RATESP.

R2059 THE THREE PHIS ARE STORED AS AARG, BARG, AND CARG(SUN). ALL CONSTANTS ARE UPDATED BY YEAR.

R2061 CALLING SEQUENCE

L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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R2062 CALL LSPOS. RETURN IS VIA QPDET.

R2063 ALARMS OR ABORTS

R2064 NONE

R2065 ERASABLE INITIALIZATION REQUIRED

R2066 TEPHEM - TIME FROM MIDNIGHT 1 JULY PRECEDING THE LAUNCH TO THE TIME OF THE LAUNCH (WHEN THE AGC CLOCK WENT

R2068 TO ZERO). TEPHEM IS TP WITH UNITS OF CENTI-SECONDS.

R2069 TIME2 AND TIME1 ARE IN MPAC AND MPAC +1 WHEN PROGRAM IS CALLED.

R2070 OUTPUT

R2071 UNIT POSITIONAL VECTOR OF SUN IN VSUN. (SCALED B-1)

R2072 UNIT POSITIONAL VECTOR OF MOON IN VMOON. (SCALED B-1)

R2073 SUBROUTINES USED

R2074 NONE

R2075 DEBRIS

R2076 CURRENT CORE SET, WORK AREA AND FREEFLAG

2077				04,3027		BANK	04
207701	REF	1		15,2000		SETLOC	EPHEM
207702				15,3664		BANK	
2078	REF	6	LAST	962	ES,1714	EBANK=	VSUN
20785	REF	1				COUNT*	33/EPHEM
20786	REF	2	LAST	935	15,3664	LUNPOS	EQUALS LSPOS
2079				15,3664	54201 0	LSPOS	SETPD SR
2080				15,3665	00001 0		0
2082				15,3666	20617 0		140. TP
2083				15,3667	56371 1	TAD	DDV
2084	REF	3	LAST	243	15,3670	TEPHEM	TIME OF LAUNCH in centisecc B 42
2086	REF	1		15,3671	12024 1	CSTODAY	24-HOURS-8640000 CENTI-SECS/DAY-B-33
2087	REF	1		15,3672	00031 0	STORE	TIMEP T-IN-DAYS @ B 9 = 512 days
2088				15,3673	77170 1	AXT.1	AXT.2
2089				15,3674	00000 1		0
2090				15,3675	00000 1		0
2091				15,3676	77614 1	CLEAR	
2092	REF	11	LAST	971	15,3677	00274 0	FREEFLAG
2093				15,3700	77745 1	POSITA	DLOAD
2094	REF	1		15,3701	12004 0		KONMAT +2
2095	REF	1		15,3702	00027 1	STORE	GTMP
2096				15,3703	40745 0	POSITB	DLOAD
2097	REF	2	LAST	985	15,3704	00031 0	TIMEP
2098	REF	1		15,3705	12050 1	VAL67 +4.1	1/27 OR 1/32 OR 1/365

granularity ≈ 0.164 sec

L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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2099				15,3706	42661-0	SL	DAD*	
2100				15,3707	20211-1		BD	
2101	REF	2	LAST	985	15,3710		VAL67+2,1	AARG
2102					15,3711	SIN	DMP*	SIN(T/27+PHI) OR T/32 OR T/365
2103	REF	3	LAST	986	15,3712		VAL67,1	(AO**2+A1**2)**1/2SIN(X+PHIA)
2104					15,3713	DAD	INCR,1	PLUS
2105	REF	2	LAST	985	15,3714		CTMP	(BO**2+B1**2)**1/2SIN(X+PHIB)
2106					15,3715	DEC	-6	
2107	REF	3	LAST	986	15,3716	STORE	CTMP	OR (CO**2+C1**2)**1/2SIN(X+PHIC)
2108					15,3717	BOFSET		
2109	REF	12	LAST	985	15,3720		FREEFLAG	
2110	REF	1			15,3721		POSITB	
2111					15,3722	POSITD	DLOAD	
2112	REF	3	LAST	985	15,3723		DMP*	
2113	REF	1			15,3724		TIMER	T
2114					15,3725		RATESP,2	LOMR,LOSR,LONR
2115					15,3726	SL	DAD*	
2116	REF	2	LAST	986	15,3727		BD	
2117					15,3730		RATESP +6,2	LOMO,LOSO,LONO
2118	REF	4	LAST	986	15,3731	DSU		
2119	REF	1			15,3732		CTMP	
2120					15,3733	STORE	STMP,2	LOM,LOS,LON
2121	REF	17	LAST	964	15,3734	SLDAD	INCR,2	
2122					15,3735		X2	
2123					15,3736	DEC	-2	
2124	REF	1			15,3737	DAD	RZE	
2125	REF	1			15,3740		PCB-13	PLUS 2
2126					15,3741		POSITE	2ND
2127	REF	1			15,3742	RPL		
2128					15,3743	POSITF	DLOAD	
2129	REF	2	LAST	986	15,3744		DSU	1ST
2130	REF	3	LAST	986	15,3745		STMP	3RD
2131					15,3746		STMP +4	LOM
2132	REF	4	LAST	986	15,3747	SIN	PDOL	SIN(LOM-LON)
2133					15,3750		STMP	
2134	REF	5	LAST	986	15,3751	SIN	PDOL	SIN LOM
2135					15,3752		STMP	
2136					15,3753	COS	VDEF	COS LOM
2137	REF	2	LAST	985	15,3754	MXV	UNIT	
2138	REF	8	LAST	935	15,3755		KONMAT	K1,K2,K3,K4,
2139					15,3756	STORE	VWOD	
2140	REF	3	LAST	986	15,3757	DLOAD	PDOL	
2141	REF	6	LAST	986	15,3760		KONMAT +2	ZERO
2142					15,3761		STMP +2	
2143	REF	7	LAST	986	15,3762	SIN	PDOL	SIN LOS
2144					15,3763		STMP +2	
2145					15,3764	COS	VDEF	COS LOS
2146	REF	4	LAST	986	15,3765	MXV	UNIT	
2147	REF	7	LAST	985	15,3766		KONMAT	
2148					15,3767	STORE	VSUR	
						RVQ		

L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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2149					15.3770	77745 1	POSITE	DLUAD		
2150	REF	5	LAST	986	15.3771	12004 0		KONPAT +2	ZEROS	
2151	REF	5	LAST	986	15.3772	00027 1		STORE GTMP		
2152					15.3773	77650 1		GOTO		
2153	REF	1			15.3774	33722 0		POSITD		
21535					15.3775	77616 0	LUNVEL	RVQ	TC FUEL INTEGRATION	
21536	REF	2	LAST	51	05.2000			SETLOC EPHEM		
21537					05.3506			BANK		
21538	REF	2	LAST	51 TO	52:	52	52*	COUNT* 11/EPHEM		
2163					0020		STMP	EQUALS 100		
2164					0026		GTMP	EQUALS 275		
2165					0030		TIMEP	EQUALS 240		

*** END OF LEMP505 .115 ***

L DOWN-TELEMETRY PROGRAM

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R0001 PROGRAM NAME- DOWN-TELEMETRY PROGRAM
 R0002 MOD NO.- 0 TO COMPLETELY REWRITE THE DOWN TELEMETRY PROGRAM AND DOWNLINK ERASABLE DUMP PROGRAM FOR THE
 R0004 PURPOSE OF SAVING APPROXIMATELY 150 WORDS OF CORE STORAGE.
 R0006 THIS CHANGE REQUIRES AN ENTIRELY NEW METHOD OF SPECIFYING DOWNLINK LISTS. REFER TO DOWNLINK
 R0008 LISTS LOG SECTION FOR MORE DETAILS. HOWEVER THIS CHANGE WILL NOT AFFECT THE GROUND PROCESSING
 R0010 OF DOWN-TELEMETRY DATA.
 R0011 MOD BY- KILROY, SMITH, DEWITT
 R0012 DATE- 02OCT67
 R0013 AUTHORS- KILROY, SMITH, DEWITT, DEWOLF, FAGIN
 R0014 LOG SECTION- DOWN-TELEMETRY PROGRAM
 R0015 FUNCTIONAL DESCRIPTION- THIS ROUTINE IS INITIATED BY TELEMETRY END
 R0016 PULSE FROM THE DOWNLINK TELEMETRY CONVERTER. THIS PULSE OCCURS
 R0017 AT 50 TIMES PER SEC (EVERY 20 MS) THEREFORE DODOWNTM IS
 R0018 EXECUTED AT THESE RATES. THIS ROUTINE SELECTS THE APPROPRIATE
 R0019 AGC DATA TO BE TRANSMITTED DOWNLINK AND LOADS IT INTO OUTPUT
 R0020 CHANNELS 34 AND 35. THE INFORMATION IS THEN GATED OUT FROM THE
 R0021 LGC IN SERIAL FASHION.
 R0022 THIS PROGRAM IS CODED FOR A 2 SECOND DOWNLIST. SINCE DOWNRUPTS
 R0023 OCCUR EVERY 20MS AND 2 AGC COMPUTER WORDS CAN BE PLACED IN
 R0024 CHANNELS 34 AND 35 DURING EACH DOWNRUPT THE PROGRAM IS CAPABLE
 R0025 OF SENDING 200 AGC WORDS EVERY 2 SECONDS.
 R0026 CALLING SEQUENCE- NONE
 R0027 PROGRAM IS ENTERED VIA TCF DODOWNTM WHICH IS EXECUTED AS A
 R0028 RESULT OF A DOWNRUPT. CONTROL IS RETURNED VIA TCF RESUME WHICH
 R0029 IN EFFECT IS A RESUME.
 R0030 SUBROUTINES CALLED- NONE
 R0031 NORMAL EXIT MODE- TCF RESUME
 R0032 ALARM OR ABORT EXIT MODE- NONE
 R0033 RESTART PROTECTION:
 R0034 ON A FRESH START AND RESTART THE 'STARTSUB' SUBROUTINE WILL INITIALIZE THE DOWNLIST POINTER (ACTUALLY
 R0036 DNTMGOTO) TO THE BEGINNING OF THE CURRENT DOWNLIST (I.E. CURRENT CONTENTS OF DNLSTADR). THIS HAS THE
 R0038 EFFECT OF IGNORING THE REMAINDER OF THE DOWNLIST WHICH THE DOWN-TELEMETRY PROGRAM WAS WORKING ON WHEN
 R0040 THE RESTART (OR FRESH START) OCCURRED AND RESUME DOWN TELEMETRY FROM THE BEGINNING OF THE CURRENT
 R0042 DOWNLIST.
 R0043 ALSO OF INTEREST IS THE FACT THAT ON A RESTART THE AGC WILL ZERO DOWNLINK CHANNELS 13, 34 AND 35.
 R0047 DOWNLINK LIST SELECTION:
 R0048 THE APPROPRIATE DOWNLINK LISTS ARE SELECTED BY THE FOLLOWING:
 R0049 1. FRESH START
 R0050 2. V37EXXE WHERE XX = THE MAJOR MODE BEING SELECTED.
 R0051 3. UPDATE PROGRAM (P27)
 R0052 4. NON-V37 SELECTABLE TYPE PROGRAMS (E.G. AGS INITIALIZATION (SUNDANCE, LUMINARY) AND P61-P62
 R00522 TRANSITION (COLOSSUS) ETC.).
 R00525 DOWNLINK LIST RULES AND LIMITATIONS:
 R00526 READ SECTION(S) WHICH FOLLOW 'DEBRIS' WRITEUP.
 R0053 OUTPUT- EVERY 2 SECONDS 100 DOUBLE PRECISION WORDS (I.E. 200 LGC
 R0054 COMPUTER WORDS) ARE TRANSMITTED VIA DOWNLINK.
 R0055 ERASABLE INITIALIZATION REQUIRED- NONE
 R0056 'DNTMGOTO' AND 'DNLSTADR' ARE INITIALIZED BY THE FRESH START PROGRAM.
 R0058 DEBRIS (ERASABLE LOCATIONS DESTROYED BY THIS PROGRAM)-
 R0059 LDATA1ST, DNTMBUFF TO DNTMBUFF + 21D, THINDEX, DNQ.

GAP: ASSEMBLE REVISION 001 OF AGC PROGRAM LMY99 BY NASA 2021112-061

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L DOWN-TELEMETRY PROGRAM

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R0060

L DOWN-TELEMETRY PROGRAM

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PO065 DODOWNTM IS ENTERED EVERY 20 MS BY AN INTERRUPT TRIGGERED BY THE
RO066 RECEIPT OF AN ENDPULSE FROM THE SPACECRAFT TELEMETRY PROGRAMMER.

RO067 NOTES REGARDING DOWNLINK LISTS ASSOCIATED WITH THIS PROGRAM:

RO068 1. DOWNLISTS. - DOWNLISTS MUST BE COMPILED IN THE SAME BANK AS THE
RO069 DOWN-TELEMETRY PROGRAM. THIS IS DONE FOR EASE OF CODING, FASTER
RO070 EXECUTION.

RO071 2. EACH DOWNLINK LIST CONSISTS OF A CONTROL LIST AND A NUMBER OF
RO072 SUBLISTS.

RO073 3. A SUBLIST REFERS TO A SNAPSHOT OR DATA COMMON TO THE SAME OR OTHER
RO074 DOWNLINK LISTS. ANY SUBLIST CONTAINING COMMON DATA NEEDS TO BE
RO075 CODED ONLY ONCE FOR THE APPLICABLE DOWNLINK LISTS.

RO076 4. SNAPSHOT SUBLISTS REFER SPECIFICALLY TO HOMOGENOUS DATA WHICH MUST BE
RO077 SAVED IN A BUFFER DURING ONE DOWNRUPT.

RO078 5. THE 1DNADR FOR THE 1ST WORD OF SNAPSHOT DATA IS FOUND AT THE END
RO079 OF EACH SNAPSHOT SUBLIST. SINCE THE PROGRAM CODING SENDS THIS 1ST WORD
RO080 IMMEDIATELY AFTER STOPPING THE OTHERS IN THE SNAPSHOT BUFFER.

RO081 6. ALL LISTS ARE COMBINATIONS OF CODED ERASABLE ADDRESS CONSTANTS
RO082 CREATED FOR THE DOWNLIST PROGRAM.

RO083 A. 1DNADR 1-WORD DOWNLIST ADDRESS.
RO084 SAME AS ECADR, BUT USED WHEN THE WORD ADDRESSED IS THE LEFT
RO085 HALF OF A DOUBLE-PRECISION WORD FOR DOWN TELEMETRY.

RO086 B. 2DNADR - 6DNADR N-WORD DOWNLIST ADDRESS, N = 2 - 6.
RO087 SAME AS 1DNADR, BUT WITH THE 4 UNUSED BITS OF THE ECADR FORMAT
RO088 FILLED IN WITH 0001-0101. USED TO POINT TO A LIST OF N DOUBLE-
RO089 PRECISION WORDS, STORED CONSECUTIVELY, FOR DOWN TELEMETRY.

RO090 C. DNCHAN DOWNLIST CHANNEL ADDRESS.
RO091 SAME AS 1DNADR, BUT WITH PREFIX BITS 0111. USED TO POINT TO
RO092 A PAIR OF CHANNELS FOR DOWN TELEMETRY.

RO093 D. DNPTR DOWN TELEMETRY SUBLIST POINTER.
RO094 SAME AS CAP BUT TAGGED AS A CONSTANT. USED IN CONTROL LIST TO POINT TO A SUBLIST.

RO095 CAUTION--- A DNPTR CANNOT BE USED IN A SUBLIST.

RO096 7. THE WORD ORDER CODE IS SET TO ZERO AT THE BEGINNING OF EACH DOWNLIST (I.E. CONTROL LIST) AND WHEN
RO097 A '1DNADR TIME2' IS DETECTED IN THE CONTROL LIST (ONLY).

RO098 8. IN THE SNAPSHOT SUBLIST ONLY, THE DNADR'S CANNOT POINT TO THE FIRST WORD OF ANY EBANK.

RO106 DOWNLINK LIST RESTRICTIONS:

RO107 (THE FOLLOWING POINTS MAY BE LISTED ELSEWHERE BUT ARE LISTED HERE SO IT IS CLEAR THAT THESE THINGS CANNOT BE
RO108 DONE)

RO110 1. SNAPSHOT DOWNLIST:

RO111 (A) CANNOT CONTAIN THE FOLLOWING ECADRS (I.E. 1DNADR'S): 0, 400, 1000, 1400, 2000, 2400, 3000, 3400.
RO112 (B) CAN CONTAIN ONLY 1DNADR'S

RO113 2. ALL DOWNLINKED DATA (EXCEPT CHANNELS) IS PICKED UP BY A <DCACKS> DOWNLINK LISTS CANNOT CONTAIN THE
RO114 EQUIVALENT OF THE FOLLOWING ECADRS (I.E. 1DNADR'S): 377, 777, 1377, 1777, 2377, 2777, 3377, 3777.

RO115 (NOTE: THE TERM EQUIVALENT MEANT THAT THE 1DNADR TO 6DNADR WILL BE PROCESSED LIKE 1 TO 6 ECADRS)

RO116 3. CONTROL LISTS AND SUBLISTS CANNOT HAVE ENTRIES = OCTAL 00000 OR OCTAL 77777

L DOWN-TELEMETRY PROGRAM

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RO122 4. THE '1DNADR TIME2' WHICH WILL CAUSE THE DOWNLINK PROGRAM TO SET THE WORDER CODE TO 3 MUST APPEAR IN THE
 RO124 CONTROL SECTION OF THE DOWNLIST.

RO125 5. 'DNCHAN 0' CANNOT BE USED.

RO126 6. 'DNPTR 0' CANNOT BE USED.

RO127 7. DNPTR CANNOT APPEAR IN A SUBLIST.

RO128

RO129 EBANK SETTINGS

RO130 IN THE PROCESS OF SETTING THE EBANK (WHEN PICKING UP DOWNLINK DATA) THE DOWN TELEMETRY PROGRAM PUTS
 RO132 'GARBAGE' INTO BITS 15-12 OF EBANK. HUGH BLAIR-SMITH WARNS US THAT BITS 15-12 OF EBANK MAY BECOME
 RO134 SIGNIFICANT SOMEDAY IN THE FUTURE. IF/WHEN THAT HAPPENS, THE PROGRAM SHOULD INSURE (BY MASKING ETC.)
 RO136 THAT BITS 15-12 OF EBANK ARE ZERO.

RO137 INITIALIZATION REQUIRED- TO INTERRUPT CURRENT LIST AND START A NEW ONE..

RO138 1. ADRES OF DOWNLINK LIST INTO DNLSTADR

RO139 2. NEGONE INTO SUBLIST

RO140 3. NEGONE INTO DNECADR

0142 22,3711
 0143 REF 2 LAST 193 05.2000
 0144 05.3506

BANK 22
 SETLOC DOWNTELM
 BANK

0145 REF 17 LAST 204 0340

EBANK= DNTESUFF

0146 REF 1

COUNT= 11/DPROG

0147 REF 5 LAST 820 05.3506 54 016 1

DODOWNTM TS BANKRUPT

0148 05.3507 0 0006 1

EXTEND

0149 REF 5 LAST 820 05.3510 22 012 1

QXCH GRUPT

SAVE Q

0150 *REF 1 05.3511 1 3763 1

TCF WOTEST

0151 * 05.3512 0 0006 1

EXTEND

SET WORD ORDER BIT TO 1 ONLY IF IT
 ALREADY ISN'T.

0152 *REF 17 LAST 821 05.3513 05 013 0

WOK CHANIS

0153 REF 4 LAST 288 05.3514 0 0335 1

TC DNTMGOTO

GO TO APPROPRIATE PHASE OF PROGRAM

0154 REF 2 LAST 219 05.3515 3 7747 1

DNPHASE1 CA

INITIALIZE ALL CONTROL WORDS

0155 REF 1 05.3516 54 337 1

TS

SUBLIST

0156 REF 1 05.3517 54 336 0

TS

DNECADR

0157 REF 1 05.3520 3 3640 0

CA

SET DNTMGOTO = 0 ALL SUBSEQUENT DOWNRUPTS

0158 REF 5 LAST 991 05.3521 54 335 0

TS

DNTMGOTO

0159 REF 1 05.3522 1 3536 0

TCF

NEWLIST

0160 REF 2 LAST 991 05.3523 10 336 0

DNPHASE2 CCS

SENDING OF DATA IN PROGRESS

0161 REF 1 05.3524 0 3653 1

DODNADR TC

YES -- THEN FETCH THE NEXT 2 SP WORDS

0162 REF 29 LAST 928 05.3525 77753 0

MINTIME2-1DNADR

NEGATIVE OF TIME2 1DNADR

0163 05.3526 1 3527 0

TCF

(ECADP OF 3776 + 74001 = 77777)

0164 REF 2 LAST 991 05.3527 10 337 1

CCS

IS THE SUBLIST IN CONTROL

0165 REF 1 05.3530 1 3666 0

TCF

YES

L DOWN-TELEMETRY PROGRAM

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0166				05,3531	74001 0	DNADRBCF	001	74001	DNADR COUNT AND ECADR DECREMENT
0167	REF	1		05,3532	3 0334 0	CHKLIST	CA	CTLIST	
0168				05,3533	0 0006 1	EXTEND			
0169	REF	2	LAST	991	05,3534	6 3536 1	BZMF	NEWLIST	IT WILL BE NEGATIVE AT END OF LIST
0170	REF	1			05,3535	1 3543 1	TCF	NEXTINCL	
0171	REF	7	LAST	229	05,3536	50 332 0	NEWLIST	INDEX	
0172	REF	1			05,3537	3 2441 1	CA	ONTABLE	INITIALIZE CTLIST WITH
0173	REF	2	LAST	992	05,3540	54 334 1	TS	CTLIST	STARTING ADDRESS OF NEW LIST
0174	REF	8	LAST	992	05,3541	4 0332 1	CS	DNSTCOD	
0175	REF	1			05,3542	1 3756 1	TCF	SENDID +3	
0177	REF	3	LAST	992	05,3543	50 334 0	NEXTINCL	INDEX	
0178					05,3544	3 0000 1	CA	0	
0179	REF	298	LAST	983	05,3545	10 000 0	CCS	A	
0180	REF	4	LAST	992	05,3546	24 334 0	INCR	CTLIST	SET POINTER TO PICK UP NEXT CTLIST WORD
0181					05,3547	1 3563 0	TCF	++	ON NEXT ENTRY TO PROG. (A SHOULD NOT BE)
0182	REF	5	LAST	992	05,3550	56 334 0	XCH	CTLIST	SET CTLIST TO NEGATIVE AND PLAC(CODING)
0183					05,3551	4 0000 0	COM		UNCOMPLEMENTED DNADR INTO A. (FOR LA)
0184	REF	6	LAST	992	05,3552	56 334 0	XCH	CTLIST	(CT IN)
0185	REF	299	LAST	992	05,3553	24 000 1	INCR	A	(CTLIST)
0186	REF	3	LAST	991	05,3554	54 336 0	TS	DNECADR	SAVE DNADR
0187	REF	1			05,3555	6 3525 0	AD	HINTIME2	TEST FOR TIME2 (NEG. OF ECADR)
0188	REF	300	LAST	992	05,3556	10 000 0	CCS	A	
0189	REF	1			05,3557	1 3563 0	TCF	SETWO +1	DON'T SET WORD ORDER CODE
0190					05,3560	47777 0	HINB1314	001	MINUS BIT 13 AND 14 (CAN'T GET HERE)
0191	REF	2	LAST	992	05,3561	1 3563 0	TCF	SETWO +1	DON'T SET WORD ORDER CODE
0192	REF	1			05,3562	0 3605 1	SETWO	TC	GO SET WORD ORDER CODE TO ZERO.
0193	REF	4	LAST	992	05,3563	3 0336 1	+1	CA	RELOAD A WITH THE DNADR.
0194	REF	1			05,3564	6 3560 1	+2	AD	IS THIS A REGULAR DNADR?
0195					05,3565	0 0006 1	EXTEND		
0196	REF	2	LAST	991	05,3566	6 3653 1	BZMF	FETCH2WD	YES. (A MUST NEVER BE ZERO)
0197	REF	1			05,3567	6 7741 1	AD	HINB12	NO- IS IT A POINTER (ONPTR) OR A
0198					05,3570	0 0006 1	EXTEND		CHANNEL(DNCHAN)
0199	REF	1			05,3571	6 3611 1	BZMF	DODPTR	IT'S A POINTER. (A MUST NEVER BE ZERO)
0200					05,3572	0 0006 1	DODNCHAN	TC	(EXECUTED AS EXTEND) IT'S A CHANNEL
0201	REF	5	LAST	992	05,3573	50 336 1	INDEX	DNECADR	
0202					05,3574	44 000 1	INDEX	0 -4000	(EXECUTED AS READ)
0203	REF	166	LAST	961	05,3575	54 001 1	TS	L	
0204					05,3576	0 0006 1	TC	0	(EXECUTED AS EXTEND)
0205	REF	6	LAST	992	05,3577	50 336 1	INDEX	DNECADR	
0206					05,3600	43 777 1	INDEX	0 -4001	(EXECUTED AS READ)
0207	REF	7	LAST	992	05,3601	54 336 0	TS	DNECADR	SET DNECADR
0208	REF	3	LAST	991	05,3602	3 7747 1	CA	NEG.NE	TO MINUS
0209	REF	8	LAST	992	05,3603	56 336 1	XCH	DNECADR	WHILE-PRESERVING A.
0210	REF	1			05,3604	1 3761 0	TCF	DNIMEXIT	GO SEND CHANNELS
0211	REF	30	LAST	976	05,3605	4 4745 1	WOZERO	CS	BIT7
0212					05,3606	0 0006 1	EXTEND		
0213	REF	19	LAST	991	05,3607	03 013 0	WAND	CHAN13	SET WORD ORDER CODE TO ZERO

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0214	REF 228	LAST 924	05.3610	0 0002 0	TC		RETURN TO CALLER
0215	REF 9	LAST 992	05.3611	50 336 1	DODNPTK	INDEX	DNECADR
0216			05.3612	0 0000 1	O		
0217	REF 301	LAST 992	05.3613	10 000 0	CCS	A	
0218	REF 10	LAST 993	05.3614	3 0336 1	CA	DNECADR	
0219	REF 1		05.3615	1 3665 0	TCF	DOSUBLST	
0220	REF 11	LAST 993	05.3616	56 336 1	XCH	DNECADR	
0221	REF 3	LAST 991	05.3617	54 337 1	TS	SUBLIST	
0222	REF 185	LAST 976	05.3620	3 4755 1	CAF	ZERO	
0223	REF 3	LAST 99	05.3621	56 336 1	XCH	TMINDEX	

DNECADR CONTAINS ADRES OF SUBLIST
CLEAR AND ADD LIST ENTRY INTO A.
IS THIS A SNAPSHOT SUBLIST
NO. IT IS A REGULAR SUBLIST.
A MUST NOT BE ZERO.

YES, IT IS A SNAPSHOT SUBLIST.
C(DNECADR) INTO SUBLIST
A INTO A
(NOTE.. TMINDEX = DNECADR)

R0224 THE FOLLOWING CODING (FROM SNAPLOOP TO SNAPEND) IS FOR THE PURPOSE OF TAKING A SNAPSHOT OF 12 DP REGISTERS.
R0226 THIS IS DONE BY SAVING 11 DP REGISTERS IN DNTMBUFF AND SENDING THE FIRST DP WORD IMMEDIATELY.
R0228 THE SNAPSHOT PROCESSING IS THE MOST TIME CONSUMING AND THEREFORE THE CODING AND LIST STRUCTURE WERE DESIGNED
R0230 TO MINIMIZE TIME. THE TIME OPTIMIZATION RESULTS IN RULES UNIQUE TO THE SNAPSHOT PORTION OF THE DOWNLIST.
R0232 THESE RULES ARE.....
R0233 1. ONLY 1DNADR'S CAN APPEAR IN THE SNAPSHOT SUBLIST
R0234 2. THE 1DNADR'S CANNOT REFER TO THE FIRST LOCATION IN ANY BANK.

0236	REF 53	LAST 958	05.3622	54 003 0	SNAPLOOP	TS	EBANK	SET EBANK
0237	REF 5	LAST 795	05.3623	7 4357 0		MASK	LOW6	ISOLATE RELATIVE ADDRESS
0238			05.3624	0 0006 1		EXTEND		
0239	REF 302	LAST 993	05.3625	5 0000 1		INDEX	A	
0240			E3,1401			EBANK=	1401	
0241			05.3626	3 1402 0		DCA	1401	PICK UP 2 SNAPSHOT WORDS.
0242	REF 10	LAST 991		0340		EBANK=	DNTMBUFF	
0243	REF 4	LAST 993	05.3627	50 336 1		INDEX	TMINDEX	
0244	REF 19	LAST 993	05.3630	52 341 0		DXCH	DNTMBUFF	STORE 2 SNAPSHOT WORDS IN BUFFER
0245	REF 5	LAST 993	05.3631	24 336 1		INCR	TMINDEX	SET BUFFER INDEX FOR NEXT 2 WORDS.
0246	REF 6	LAST 993	05.3632	24 336 1		INCR	TMINDEX	
0247	REF 4	LAST 993	05.3633	24 337 0	SNAPACN	INCR	SUBLIST	SET POINTER TO NEXT 2 WORDS OF SNAPSHOT
0248	REF 5	LAST 993	05.3634	50 337 0		INDEX	SUBLIST	
0249			05.3635	0 0000 1		O		= CA 5555 (5555 = NEXT ENTRY IN SUBLIST)
0250	REF 303	LAST 993	05.3636	10 000 0		CCS	A	TEST FOR LAST TWO WORDS OF SNAPSHOT.
0251	REF 1		05.3637	1 3622 0		TCF	SNAPLOOP	NOT LAST TWO.
0252	REF 1		05.3640	03523 0	LONPHAS2	DENADR	DNPHASE2	
0253	REF 6	LAST 993	05.3641	54 337 1		TS	SUBLIST	YES, LAST. SAVE A.
0254	REF 4	LAST 992	05.3642	3 7747 1		CA	NEGONE	SET DNECADR AND
0255	REF 12	LAST 993	05.3643	54 336 0		TS	DNECADR	SUBLIST POINTERS
0256	REF 7	LAST 993	05.3644	56 337 0		XCH	SUBLIST	TO NEGATIVE VALUES.
0257	REF 54	LAST 993	05.3645	54 003 0		TS	EBANK	
0258	REF 6	LAST 993	05.3646	7 4357 0		MASK	LOW6	
0259			05.3647	0 0006 1		EXTEND		
0260	REF 304	LAST 993	05.3650	5 0000 1		INDEX	A	
0261			E3,1401			EBANK=	1401	
0262			05.3651	3 1402 0		DCA	1401	PICK UP FIRST 2 WORDS OF SNAPSHOT.

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0263	REF	20	LAST	993	0340		EBANK=	DNTMBUFF	
0264	REF	2	LAST	992	05,3652	1 3701 0	SNAPEND	TCF	DNTMEXIT
									NOW GO SEND THEM.
0265	REF	13	LAST	993	05,3653	3 0336 1	FETCH2WD	CA	DNECADR
0266	REF	55	LAST	993	05,3654	54 003 0		TS	EBANK
									SET EBANK
0267	REF	7	LAST	993	05,3655	7 4357 0		MASK	LOWB
									ISOLATE RELATIVE ADDRESS
0268	REF	167	LAST	992	05,3656	54 001 1		TS	L
0269	REF	1			05,3657	3 3531 0		CA	DNADROCH
									DECREMENT COUNT AND TCAIR
0270	REF	14	LAST	994	05,3660	26 336 0		ADS	DNECADR
0271					05,3661	0 0006 1		EXTEND	
0272	REF	168	LAST	994	05,3662	5 0001 0		INDEX	L
0273					E3,1400			EBANK=	1400
0274					05,3663	3 1401 0		OCA	1400
									PICK UP 2 DATA WORDS
0275	REF	21	LAST	994	0340			EBANK=	DNTMBUFF
0276	REF	3	LAST	994	05,3664	1 3701 0		TCF	DNTMEXIT
									NOW GO SEND THEM.
0277	REF	8	LAST	993	05,3665	54 337 1	DOSUBLST	TS	SUBLIST
									SET SUBLIST POINTER
0278	REF	9	LAST	994	05,3666	50 337 0	NEXTINSL	INDEX	SUBLIST
0279					05,3667	0 0000 1		O	C
									= CA SSSS (SSSS = NEXT ENTRY IN SUBLIST)
0280	REF	305	LAST	993	05,3670	10 000 0		LCS	A
									IS IT THE END OF THE SUBLIST
0281	REF	10	LAST	994	05,3671	24 337 0		INCR	SUBLIST
									NO-
0282					05,3672	1 3676 1		TCF	+4
0283	REF	11	LAST	994	05,3673	54 337 1		TS	SUBLIST
									SAVE A.
0284	REF	5	LAST	993	05,3674	3 7747 1		CA	NEGONE
									SET SUBLIST TO MINUS
0285	REF	12	LAST	994	05,3675	56 337 0		XCH	SUBLIST
									RETRIEVE A.
0286	REF	306	LAST	994	05,3676	24 000 1	+4	INCR	A
0287	REF	15	LAST	994	05,3677	54 336 0		TS	DNECADR
									SAVE DNADR
0288	REF	3	LAST	992	05,3700	1 3564 1		TCF	SETWD +2
									GO USE COMMON CODING (IF WE WOULD OCCUR IF THE PROGRAM ENCOUNTERED A DNPTR NOW)
A0289									
A0290									
0291					05,3701	0 0006 1	DNTMEXIT	EXTEND	
0292	REF	1			05,3702	01 034 1		WRITE	DNTM1
0293	REF	169	LAST	994	05,3703	3 0001 0		CA	L
									TO SEND A + L TO CHANNELS 34 + 35 RESPECTIVELY
0294					05,3704	0 0006 1	TMEXITL	EXTEND	
0295	REF	1			05,3705	01 035 0		WRITE	DNTM2
0296	REF	21	LAST	822	05,3706	1 5270 0	TMRESUME	TCF	RESUME
									EXIT TELEMETRY PROGRAM VIA RESUME.
0297	REF	2	LAST	528	7741		MINB12	EQUALS	-1/8
0298	REF	7	LAST	993	0336		DNECADR	EQUALS	THINDEX
0299	REF	2	LAST	99	0334		CTLIST	EQUALS	LDATALST
0300	REF	2	LAST	99	0337		SUBLIST	EQUALS	END

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R0301 SUBROUTINE NAME- DNDUMP
 R0302 FUNCTIONAL DESCRIPTION - TO SEND(DUMP) ALL ERASABLE STORAGE 'N' TIMES. (N = 1 TO 4). BANKS ARE SENT ONE AT A TIME
 R0304 EACH BANK IS PRECEDED BY AN ID WORD, SYNCH BITS, ECADR AND TIME1 FOLLOWED BY THE 2560 WORDS OF EACH
 R0306 EBANK. EBANKS ARE DUMPED IN ORDER (I.E. EBANK 0 FIRST, THEN EBANK1 ETC.)
 R0308 CALLING SEQUENCE- THE GROUND OR ASTRONAUT BY KEYING V74E CAN INITIALIZE THE DUMP.
 R0310 AFTER KEYING IN V74E THE CURRENT DOWNLIST WILL BE IMMEDIATELY TERMINATED AND THE DOWNLINK ERASABLE DUMP
 R0312 WILL BEGIN.
 R0313 ONCE INITIATED THE DOWNLINK ERASABLE DUMP CAN BE TERMINATED (AND INTERRUPTED DOWNLIST REINSTATED) ONLY
 R0315 BY THE FOLLOWING:
 R0316 1. A FRESH START
 R0317 2. COMPLETION OF ALL DOWNLINK DUMPS REQUESTED (ACCORDING TO BITS SET IN DUMPCNT). NOTE THAT DUMPCNT
 R0319 CAN BE ALTERED BY A V21N01.
 R0320 3. AND INVOLUNTARILY BY A RESTART.
 R0321 NORMAL EXIT MODE- TCF DNPHASE1
 R0322 ALARM OR ABORT MODE- NONE
 R0323 *SUBROUTINES CALLED- NONE.
 R0324 ERASABLE INITIALIZATION REQUIRED-
 R0325 DUMPCNT OCT 20000 IF 4 COMPLETE ERASABLE DUMPS ARE DESIRED
 R0326 DUMPCNT OCT 10000 IF 2 COMPLETE ERASABLE DUMPS ARE DESIRED
 R0327 DUMPCNT OCT 04000 IF 1 COMPLETE ERASABLE DUMP IS DESIRED
 R0328 DEBRIS- DUMPCNT, DUMPSW, DNTMGOTO, EBANK AND CENTRAL REGISTERS
 R0329 TIMING- $\text{TIME (IN SECS)} = ((\text{NO. DUMPS}) * (\text{NO. EBANKS}) * (\text{WDS PER EBANK} + \text{NO. IDWDS})) / \text{NO. WDS PER SEC}$
 R0331 $\text{TIME (IN SECS)} = (4) * (8) * (256 + 4) / 100$
 R0333 THUS TIME (IN SECS TO SEND DUMP OF ERASABLE 4 TIMES VIA DOWNLINK) = 83.2 SECONDS

R0335 STRUCTURE OF ONE EBANK AS IT IS SENT BY DOWNLINK PROGRAM-
 R0336 (REMINDER-THIS ONLY DESCRIBES ONE OF THE 8 EBANKS X 4 (DUMPS) = 32 EBANKS WHICH WILL BE SENT BY DNDUMP)

DOWNLIST	WORD	TAKEN FROM CONTENTS OF	EXAMPLE 0	COMMENTS
R0340	1	ERASID	0177X	0 DOWNLIST I.D. FOR DOWNLINK ERASABLE DUMP (X=7-CSM, 6-LM)
R0342	2	LOWIDCUD	77340	1 DOWNLINK SYNCH BITS. (SAME ONE USED IN ALL OTHER DOWNLISTS)
R0344	3	DUMPCNT	13400	1 (SEE NOTES ON DUMPCNT) 1= 3RD ERAS DUMP. 3400=ECADR OF 5TH WD
R0346	4	TIME1	14120	1 TIME IN CENTISECONDS
R0347	5	FIRST WORD OF EBANK X	03400	1 IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1400 (ECADR 3400)
R0349	6	2ND WORD OF EBANK X	00142	1 IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1401 (ECADR 3401)
R0351	7	3RD WORD OF EBANK X	00142	1 IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1402 (ECADR 3402)
R0353	.		1	
R0354	.		1	
R0355	.		1	
R0356	2600	256TH WORD OF EBANK X	03777	1 IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1777 (ECADR 3777)

R0358 NOTE- DUMPCNT CONTAINS THE COUNTER AND ECADR FOR EACH WORD BEING SENT.
 R0359 THE BIT STRUCTURE OF DUMPCNT IS FOLLOWS---

R0360 X = NOT-USED
 R0361 X ABC EEE RRRRRRRR ABC = ERASABLE DUMP COUNTER (I.E. ABC = 0, 1, 2 OR 3 WHICH MEANS THAT
 R0363 COMPLETE ERASABLE DUMP NUMBER 1, 2, 3 OR 4 RESPECTIVELY IS IN PROGRESS)
 R0365 EEE = EBANK-BITS
 R0366 RRRRRRRR = RELATIVE ADDRESS WITHIN AN EBANK.

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0368	REF 186	LAST 993	05,3707	3 4755 1	DNDUMPI	CA	ZERO	INITIALIZE DOWNLINK
0369	REF 1		05,3710	54 336 0		TS	DUMPLOC	ERASABLE DUMP
0370	REF 2	LAST 992	05,3711	0 3753 0	+2	TC	SENDID	GO SEND ID AND SYNCH BITS
0371	REF 1		05,3712	3 3721 0		CA	LDNTHMP1	SET DNTAGOTO
0372	REF 6	LAST 991	05,3713	54 335 0		TS	DNTMOUTL	TO LOCATION FOR NEXT PASS
0373	REF 16	LAST 952	05,3714	3 0025 0		CA	TIME1	PLACE TIME1
0374	REF 170	LAST 994	05,3715	56 001 0		XCH	1	INTO L
0375	REF 2	LAST 996	05,3716	3 0336 1		CA	DUMPLOC	AND ECADR OF THIS EBANK INTO A
0376	REF 4	LAST 994	05,3717	1 3701 0		TCF	DNTHEXIT	SEND DUMPLOC AND TIME1
0377	REF 1		05,3720	03722 0	LDNDUMP	ADRES	DNDUMP	
0378	REF 1		05,3721	03735 0	LDNDUMP1	ADRES	DNDUMP1	
0379	REF 63	LAST 918	05,3722	3 4752 0	DNDUMP	CA	TWO	INCREMENT ECADR IN DUMPLOC
0380	REF 3	LAST 996	05,3723	26 336 0		ADS	DUMPLOC	TO NEXT DP WORD TO BE
0381	REF 8	LAST 994	05,3724	7 4357 0		MASK	LOW	DUMPED AND SAVE IT.
0382	REF 307	LAST 994	05,3725	10 000 0		CCS	A	IS THIS THE BEGINNING OF A NEW EBANK
0383	REF 1		05,3726	1 3737 0		TCF	DNDUMP2	NO- THEN CONTINUE DUMPING
0384	REF 4	LAST 996	05,3727	3 0336 1		LA	DUMPLOC	YES- IS THIS THE END OF THE
0385	REF 2	LAST 211	05,3730	7 0333 0		MASK	DUMPCNT	N THEN = 1 TO 4) COMPLETE ERASABLE
0386	REF 1		05,3731	7 7722 0		MASK	PHI34	DUMP(BIT14 FOR 4, BIT13 FOR 2 OR BIT12
0387	REF 308	LAST 996	05,3732	10 000 0		CCS	A	FOR 1 COMPLETE ERASABLE DUMP(S)).
0388	REF 2	LAST 222	05,3733	1 3515 1		TCF	DMPHASE1	YES- START SENDING INTERRUPTED DOWNLIST
A0389								AGAIN
0390	REF 2	LAST 288	05,3734	1 3711 1		TCF	DNDUMP1 +2	NO- GO BACK AND INITIALIZE NEXT BANK
0391	REF 1		05,3735	3 3720 1	DNDUMP1	CA	LDNDUMP	SET DNTAGOTO
0392	REF 7	LAST 996	05,3736	54 335 0		TS	DNTAGOTO	FOR WORDS 3 TO 2560 OF CURRENT EBANK
0393	REF 5	LAST 996	05,3737	3 0336 1	DNDUMP2	CA	DUMPLOC	
0394	REF 56	LAST 994	05,3740	54 003 0		TS	EBANK	SET EBANK
0395	REF 9	LAST 996	05,3741	7 4357 0		MASK	LOW	ISOLATE RELATIVE ADDRESS.
0396	REF 229	LAST 993	05,3742	54 002 1		TS	0	(NOTE: MASK INSTRUCTION IS USED TO PICK
0397	REF 26	LAST 928	05,3743	3 4754 0		CA	REGU	UP ERASABLE REGISTERS SO THAT FOLLOING
0398	REF 171	LAST 996	05,3744	54 001 1		TS	1	REGISTERS 20-23 WILL NOT BE ALTERED.)
0399	REF 230	LAST 996	05,3745	50 002 0		INDEX	0	
0400			E3,1400			EBANK=	1400	PICK UP LOW ORDER REGISTER OF PAIR
0401			05,3746	7 1401 1		MASK	1401	OF ERASABLE REGISTERS.
0402	REF 172	LAST 996	05,3747	56 001 0		XCH	L	
0403	REF 231	LAST 996	05,3750	50 002 0		INDEX	0	PICK UP HIGH ORDER REGISTER OF PAIR
0404			05,3751	7 1400 0		MASK	1400	OF ERASABLE REGISTERS.
0405	REF 22	LAST 994	0340			EBANK=	DNTMBUFF	
0406	REF 5	LAST 996	05,3752	1 3701 0		TCF	DNTHEXIT	GO SEND THEM
0407			05,3753	0 0006 1	SENDID	EXTEND		**ENTRANCE USED BY ERASABLE DUMP PROG.**
0408	REF 8	LAST 996	05,3754	22 335 1		XCH	DNTAGOTO	SET DNTAGOTO SO NEXT TIME PROG WILL GO
0409	REF 1		05,3755	3 5011 1		CAF	2FASID	TO LOCATION FOLLOWING :TC SENDID:
0410	REF 173	LAST 996	05,3756	54 001 1		TS	1	**ENTRANCE USED BY REGULAR DOWNLINK PG**

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0411	REF	2	LAST	992	05,3757	0 3605 1	TC	WOZERO	GO SET WORD ORDER CODE TO ZERO
0412	REF	1			05,3760	3 2065 0	CAF	LOWIDCDD	PLACE SPECIAL ID CODE INTO L
0413	REF	174	LAST	996	05,3761	56 001 0	XCH	I	AND ID BACK INTO A
0414	REF	6	LAST	996	05,3762	1 3701 0	TCF	DMTHFXTT	SEND DOWNLIST ID CODE(S).

P5000 *

5010	*REF	37	LAST	992	05,3763	3 4745 0	WOTEST	CA	BIT7	AT THE BEGINNING OF THE LIST THE WORD
5020	*				05,3764	0 0006 1		EXTEND		ORDER BIT WILL BE SET BACK TO ZERO
5030	*REF	19	LAST	992	05,3765	02 013 1		RAND	CHAP-13	
5040	*REF	309	LAST	996	05,3766	10 000 0		CLS	A	
5050	*REF	9	LAST	996	05,3767	0 0335 1		TC	ENTMGDTJ	
5060	*REF	38	LAST	997	05,3770	3 4745 0		CA	BIT7	
5070	*REF	1			05,3771	1 3512 0		TCF	WDI	

L INTER-BANK COMMUNICATION

USER'S PAGE NO. 1

R0001 THE FOLLOWING ROUTINE CAN BE USED TO CALL A SUBROUTINE IN ANOTHER BANK. IN THE BANKCALL VERSION, THE
 R0003 CADR OF THE SUBROUTINE IMMEDIATELY FOLLOWS THE TC BANKCALL INSTRUCTION, WITH C(A) AND C(L) PRESERVED.

0005				4616		BLOCK 62	
00055	REF 1					COUNT* 33/BANK	
0006	REF 7	LAST 878		4616	52 134 0	BANKCALL	DXCH BUF2
0007	REF 232	LAST 996		4617	50 002 0		INDEX 0
0008				4620	3 0000 1		CA 0
0009	REF 233	LAST 998		4621	24 002 0		INCR 2

SAVE INCOMING A,L.
 PICK UP CADR.
 SO WE RETURN TO THE LOC. AFTER THE CADR.

R0010 SWCALL IS IDENTICAL TO BANKCALL, EXCEPT THAT THE CADR ARRIVES IN A.

0012	REF 175	LAST 997		4622	54 001 1	SWCALL	TS L
0013	REF 3	LAST 464		4623	22 004 0		LXCH FBANK
0014	REF 8	LAST 751		4624	7 5012 0		MASK LOW10
0015	REF 234	LAST 998		4625	56 002 0		XCH 0
0016	REF 8	LAST 998		4626	52 134 0		DXCH BUF2
0017	REF 235	LAST 998		4627	50 002 0		INDEX 0
0018				4630	0 2000 0		TC 10000

SWITCH BANKS. SAVING RETURN.
 GET SUB-ADDRESS OF CADR.
 A,L NOW CONTAINS DP RETURN.
 RESTORING INPUTS IF THIS IS A BANKCALL.
 SETTING A TO SWRETURN.

0019	REF 9	LAST 998		4631	56 134 1	SWRETURN	XCH BUF2 +1
0020	REF 4	LAST 998		4632	56 004 0		XCH FBANK
0021	REF 10	LAST 998		4633	56 134 1		XCH BUF2 +1
0022	REF 11	LAST 998		4634	0 0133 0		TC BUF2

COMES HERE TO RETURN TO CALLER. C(A,L)
 ARE PRESERVED FOR RETURN.

R0023 THE FOLLOWING ROUTINE CAN BE USED AS A UNILATERAL JUMP WITH C(A,L) PRESERVED AND THE CADR IMMEDIATELY
 R0025 FOLLOWING THE TC POSTJUMP INSTRUCTION.

0026	REF 236	LAST 998		4635	56 002 0	POSTJUMP	XCH 0
0027	REF 310	LAST 997		4636	50 000 1		INDEX A
0028				4637	3 0000 1		CA 0

SAVE INCOMING C(A).
 GET CADR.

R0029 BANKJUMP IS THE SAME AS POSTJUMP, EXCEPT THAT THE CADR ARRIVES IN A.

0031	REF 5	LAST 998		4640	54 004 1	BANKJUMP	TS FBANK
0032	REF 9	LAST 998		4641	7 5012 0		MASK LOW10
0033	REF 237	LAST 998		4642	56 002 0		XCH 0
0034	REF 238	LAST 998		4643	50 002 0	Q+10000	INDEX 0
0035				4644	1 2000 1	PR1012	TCF 10000

RESTORING INPUT C(A) IF THIS WAS A
 POSTJUMP.
 PR1012 = TCF 10000 = 12000

L INTER-BANK COMMUNICATION

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P0036 THE FOLLOWING ROUTINE GETS THE RETURN ADDR SAVED BY SWCALL OR BANKCALL AND LEAVES IT IN A.

0038	REF	10	LAST	998	4645	3 5012 1	MAKECADR	CAF	LDW10	
0039	REF	12	LAST	998	4646	7 0133 1		MASK	BUF2	
0040	REF	13	LAST	999	4647	8 0134 1		AD	BUF2 +2	
0041	REF	239	LAST	998	4650	0 0002 0		TC	0	
00465	REF	5	LAST	885	4651	54 135 1	SUPDACAL	TS	MPTEMP	
0047	REF	6	LAST	998	4652	55 004 0		XCH	FBANK	SET FBANK FOR DATA.
00475					4653	0 0006 1		EXTEND		
0048	REF	11	LAST	555	4654	04 007 1		ROR	SUPERBANK	SAVE FBANK IN BITS 15-11, AND
00485	REF	6	LAST	999	4655	56 135 0		XCH	MPTEMP	SUPERBANK IN BITS 7-5.
0049	REF	11	LAST	999	4656	7 5012 0		MASK	LDW10	
00495	REF	176	LAST	998	4657	56 001 0		XCH	1	SAVE REL. ADDR. IN BANK, FETCH SUPERBITS.
0050					4660	0 0004 0		INHINT		BECAUSE PUPRT DOES NOT SAVE SUPERBANK.
00505					4661	0 0006 1		EXTEND		
0051	REF	12	LAST	999	4662	01 007 1		WRITE	SUPERBANK	SET-SUPERBANK-FOR-DATA.
0052	REF	177	LAST	999	4663	50 001 0		INDEX	L	
00525					4664	3 2000 0		CA	10000	PINBALL (FIX MEM DISPI) PREVENTS DCA HERE
0053	REF	7	LAST	999	4665	56 135 0		XCH	MPTEMP	SAVE 1ST-WORD, FETCH-OLD-FBANK AND-SBANK.
00534					4666	0 0006 1		EXTEND		
00535	REF	13	LAST	999	4667	01 007 1		WRITE	SUPERBANK	RESTORE SUPERBANK.
0054					4670	0 0003 1		RELINT		
00545	REF	7	LAST	999	4671	54 004 1		TS	FBANK	RESTORE FBANK.
0055	REF	8	LAST	999	4672	3 0135 0		CA	MPTEMP	RECOVER FIRST WORD OF DATA.
00555					4673	0 0002 0		RETURN		24-WDS.-DATACALL-516-MU, SUPDACAL-432-MU

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PO056 THE FOLLOWING ROUTINES ARE IDENTICAL TO BANKCALL AND SMCALL EXCEPT THAT THEY ARE USED IN INTERRUPT.

0058	REF 9	LAST 907	4674	52 073 1	IBNKCALL	DXCH	RUPTRREG3	USES RUPTRREG3,4 FOR DP RETURN ADDRESS.
0059	REF 240	LAST 999	4675	50 002 0		INDEX	0	
0060			4676	3 0000 1		CAF	0	
0061	REF 241	LAST 1000	4677	24 002 0		INCR	0	
0062	REF 178	LAST 999	4700	54 001 1	ISWCALL	TS	L	
0063	REF 8	LAST 999	4701	22 004 0		LXCH	FBANK	
0064	REF 12	LAST 999	4702	7 5012 0		MASK	LOW10	
0065	REF 242	LAST 1000	4703	56 002 0		XCH	0	
0066	REF 10	LAST 1000	4704	52 073 1		DXCH	RUPTRREG3	
0067	REF 243	LAST 1000	4705	50 002 0		INDEX	0	
0068			4706	0 2000 0		TC	10000	
0069	REF 3	LAST 95	4707	56 073 0	ISWRETEN	XCH	RUPTRREG4	
0070	REF 9	LAST 1000	4710	56 004 0		XCH	FBANK	
0071	REF 4	LAST 1000	4711	56 073 0		XCH	RUPTRREG4	
0072	REF 11	LAST 1000	4712	0 0072 1		TC	RUPTRREG3	

RO090 2. USPRCADR ACCESSES INTERPRETIVE CODING IN OTHER THAN THE USER'S FBANK. THE CALLING SEQUENCE IS AS FOLLOWS:

				L	TC	USPRCADR	
				L+1	CADR	INTERPTX	INTERPTX IS THE INTERPRETIVE CODING RETURN IS TO L+2
A0092							
A0093							
A0094							
0103	REF 5	LAST 458	4713	54 164 0	USPRCADR	TS	LOC
0104	REF 33	LAST 955	4714	3 4744 1		CA	BIT0
0105	REF 7	LAST 453	4715	54 023 1		TS	EDDP
0106	REF 23	LAST 825	4716	3 0006 1		CA	BBANK
0107	REF 1		4717	54 165 1		TS	BANKSET
0108	REF 244	LAST 1000	4720	50 002 0		INDEX	0
0109			4721	3 0000 1		CA	0
0110	REF 10	LAST 1000	4722	54 004 1		TS	FBANK
0111	REF 13	LAST 1000	4723	7 5012 0		MASK	LOW10
0112	REF 245	LAST 1000	4724	56 002 0		XCH	Q
0113	REF 6	LAST 1000	4725	56 164 1		XCH	LOC
0114	REF 1		4726	1 4643 0		TCF	0+10000

SAVE A
EXIT INSTRUCTION TO EDDP
USER'S BBANK TO BANKSET
INTERPRETIVE BANK TO FBANK
YIELDS INTERPRETIVE RELATIVE ADDRESS
INTERPRETIVE ADDRESS TO Q, FETCHING L+1
L+1 TO LOC, RETRIEVING ORIGINAL A

L INTER-BANK COMMUNICATION

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R0117 THERE ARE FOUR POSSIBLE SETTINGS FOR CHANNEL 07. (CHANNEL 07 CONTAINS THE SUPERBANK SETTING.)

R0119 PSEUDO-FIXED DETAIL PSEUDO

R0120 SUPERBANK SETTING S-REG. VALUE BANK NUMBERS ADDRESSES

R0121 -----

R0122 SUPERBANK 3 0XX 2000 - 3777 30 - 37 70000 - 107777 (WHERE XX CAN BE ANYTHING AND
R0124 WILL USUALLY BE SEEN AS 11)R0126 SUPERBANK 4 100 2000 - 3777 40 - 47 110000 - 127777 (AS FAR AS IT CAN BE SEEN,
R0128 ONLY BANKS 40-43 WILL EVER BE

R0130 AND ARE PRESENTLY AVAILABLE)

R0132 SUPERBANK 5 101 2000 - 3777 50 - 57 130000 - 147777 (PRESENTLY NOT AVAILABLE TO
R0134 THE USER)R0136 SUPERBANK 6 110 2000 - 3777 60 - 67 150000 - 167777 (PRESENTLY NOT AVAILABLE TO
R0138 THE USER)

R0142 *** THIS ROUTINE MAYBE CALLED BY ANY PROGRAM LOCATED IN BANKS 00 - 27. I.E., NO PROGRAM LIVING IN ANY

R0144 SUPERBANK SHOULD USE SUPERSW. ***

R0145 SUPERSW MAYBE CALLED IN THIS FASHION:

R0146 CAF ABBCON WHERE -- ABBCON BBCCN SOMETHING --

R0147 TCR SUPERSW (THE SUPERBANK BITS ARE IN THE BBCCN)

R0148 ...

R0149 .

R0150 .

R0151 OR IN THIS FASHION :

R0152 CAF SUPERSET WHERE SUPERSET IS ONE OF THE FOUR AVAILABLE

R0154 TCR SUPERSW SUPERBANK BIT CONSTANTS:

R0155 ... SUPER011 OCTAL 60

R0157 . SUPER100 OCTAL 100

R0159 . SUPER101 OCTAL 120

R0161 . SUPER110 OCTAL 140

0163 4727 0 0006 1 SUPERSW EXTEND

0164 REF 14 LAST 999 4730 01 007 1 WHITE SUPERBANK

A0165 WITH BITS 7-0-5 OF THE ACCUMULATOR INTO

0166 REF 246 LAST 1000 4731 0 0002 0 TC TO INSTRUCTION FOLLOWING

A0167 TC SUPERSW

L INTERPRETER

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R0001 SECTION 1 DISPATCHER

R0002 ENTRY TO THE INTERPRETER. INTERPRET SETS LOC TO THE FIRST INSTRUCTION, BANKSET TO THE BBANK OF THE
 R0004 OBJECT INTERPRETIVE PROGRAM, AND INBIT15 TO THE BIT15 CONTENTS OF FBANK. INTERPRETIVE PROGRAMS MAY BE IN
 R0006 VIRTUALLY ALL BANKS PRESENT UNDER ANY SUPER-BANK SETTING, WITH THE RESTRICTION THAT PROGRAMS IN HIGH BANKS
 R0008 (BIT15 OF FBANK = 1) DO NOT REFER TO LOWBANKS, AND VICE-VERSA. THE INTERPRETER DOES NOT SWITCH SUPERBANKS.
 R0010 E-BANK SWITCHING OCCURS WHENEVER GENERAL ERASABLE (LOC - 5777) IS ADDRESSED.

0012				6037		BLUCK 03	
0013	REF	1				COUNT* 55/INTER	
00135				6037	0 0003 1	INTERPRET	
0014				6040	0 0006 1	EXTEND	SET LOC TO THE WORD FOLLOWING THE TC.
0015	REF	7	LAST 1000	6041	22 164 1	QXCH LOC	
0016	REF	24	LAST 1000	6042	3 0006 1	CA BBANK	INTERPRETIVE BRANCHES FINISH HERE.
0017	REF	2	LAST 1000	6043	54 165 1	TS BANKSET	
0018	REF	34	LAST 900	6044	7 4735 0	MASK BIT15	GET 15TH BIT FOR INDEXABLE ADDRESSES.
0019	REF	5	LAST 96	6045	54 115 0	TS INBIT15	
0020	REF	8	LAST 1000	6046	54 023 1	TS EOLP	MAKE SURE NO INSTRUCTIONS LEFT OVER
0021	REF	1		6047	1 6070 1	TCF NEWOPS	PICK UP OP CODE PAIR AND BEGIN.
0022	REF	25	LAST 1002	6050	22 006 1	INTRSM LXCH BBANK	RESUME SUSPENDED INTERPRETIVE JOB
0023	REF	222	LAST 982	6051	1 6042 0	TCF INTERPRET +3	
R0024			DLOAD LOADS MPAC, MPAC +1, LEAVING ZERO IN MPAC +2.				
0025				6052	0 0006 1	DLOAD EXTEND	
0026	REF	4	LAST 921	6053	5 0116 1	INDEX ADDRESS	
0027				6054	3 0001 0	DCA 0	LOAD DP-C(C(ADDRWD)) INTO MPAC.MPAC +1
0028	REF	367	LAST 962	6055	52 155 1	SLOADZ QXCH MPAC	
0029	REF	187	LAST 996	6056	3 4755 1	CAP ZERO	ZERO MPAC +2

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P0030 AT THE END OF MOST INSTRUCTIONS, CONTROL IS GIVEN TO DANZIG TO DISPATCH THE NEXT OPERATION.

0032	REF 368	LAST 1002	6057 54 156 1	TS	MPAC +2	AND DECLARE DP MODE
0033	REF 15	LAST 886	6060 54 163 1	NEWMODE	TS	MODE
0034	REF 3	LAST 1002	6061 3 0165 0	DANZIG	CA	BANKSET
0035	REF 26	LAST 1002	6062 54 006 0	TS	BBANK	PROLOGUE FOR MODE-CHANGING INSTRUCTIONS. SET BBANK BEFORE TESTING NEWJOB SO THAT IT MAY BE SAVED DIRECTLY BY CHANJOB.
0036	REF 9	LAST 1002	6063 10 023 1	NO16BKSW	CCS	EDDP
0037	REF 1		6064 1 6077 0	TCF	DPJUMP	SEE IF AN ORDER CODE IS LEFT OVER FROM THE LAST PAIR-RETRIEVED. IF SO, EXECUTE. EDDP IS SET TO ZERO ON ITS RE-EDITING.
A0038						
0039	REF 5	LAST 717	6065 10 067 1	CCS	NEWJOB	SEE IF A JOB OF HIGHER PRIORITY IS PRESENT, AND IF SO, CHANGE JOBS.
0040	REF 1		6066 1 5126 0	TCF	CHANGE	
0041	REF 8	LAST 1002	6067 24 164 1	INCR	LOC	ADVANCE THE LOCATION COUNTER.
R0042						
0043	REF 9	LAST 1003	6070 50 164 1	NEWOPS	INDEX	LOC
0044			6071 3 0000 1	CA	0	ENTRY TO BEGIN BY PICKING OP CODE PAIR. MAY BE AN OPCODE PAIR OR A STORE CODE.
0045	REF 311	LAST 996	6072 10 000 0	CCS	A	TEST SIGN AND GET DABS(A).
0046	REF 1		6073 1 6362 1	TCF	DOSTORE	PROCESS STORE CODE.
0047			6074 00177 0	LOW7	OCT	177
0048	REF 10	LAST 1003	6075 54 023 1	TS	EDDP	OP CODE PAIR. LEAVE THE OTHER IN EDDP
0049	REF 6	LAST 453	6076 7 6074 0	MASK	LOW7	WHERE CCS EDDP WILL HONOR IT NEXT.
0050	REF 13	LAST 460	6077 54 020 1	OPJUMP	TS	LYP
0051	REF 14	LAST 1003	6100 10 020 1	CCS	LYP	LOW7D ENTERS HERE IF A RIGHT-HAND OP CODE IS TO BE PROCESSED. TEST PREFIXED.
0052	REF 1		6101 1 6247 1	TCF	OPJUMP2	TEST SECOND PREFIX BIT.
0053	REF 1		6102 1 6743 0	TCF	EXIT	*0 OP CODE IS EXIT.

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P0054 PROCESS ADDRESSES WHICH MAY BE DIRECT, INDEXED, OR REFERENCE THE PUSHDOWN LIST.

0056	REF 49	LAST 980	6103	7 4753 0	ADDRESS	MASK	BIT1	SEE IF ADDRESS IS INDEXED. (YR CONTAINED
0057	REF 312	LAST 1003	6104	10 000 0		CLS	A	400XX, SO HIT 1 IS NOW AS IT WAS IN CYR.
0058	REF 1		6105	1 6146 0		TCF	INDEX	FROM INDEXED ADDRESS.
0059	REF 10	LAST 1003	6106	50 164 1	DIRADRES	INDEX	LDC	LOOK AHEAD TO NEXT WORD TO SEE IF
0060			6107	4 0001 1	OCT40001	CS	1	ADDRESS IS GIVEN.
0061	REF 313	LAST 1004	6110	10 000 0		CCS	A	
0062	REF 1		6111	1 6215 0		TCF	PUSHUP	IF NOT.
0063			6112	77773 1	NEG4	DEC	-4	
0064	REF 11	LAST 1004	6113	24 164 1		INCR	LDC	IF SO, TO SHOW WE PICKED UP A WORD.
0065	REF 5	LAST 1002	6114	54 116 0		TS	ACCORD	

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P0066 FINAL DIGESTION OF DIRECT ADDRESSES OF OP CODES WITH 01 PREFIX IS DONE HERE. IN EACH CASE, THE
 R0068 REQUIRED 12-BIT SUB-ADDRESS IS LEFT IN ADDRWD. WITH ANY REQUIRED E OR F BANK SWITCHING DONE. ADDRESSES LESS
 R0070 THAN 450 ARE TAKEN TO BE RELATIVE TO THE WORK AREA. THE OP CODE IS NOW IN BITS 1-5 OF CYR WITH BIT 14 = 1.

0072	REF	1		6115	6 6251 1		AD	-ENDVAC	SEE IF ADDRESS RELATIVE TO WORK AREA.
0073	REF	314	LAST 1004	6116	10 000 0		CCS	A	
0074	REF	1		6117	6 7742 0		AD	-ENDERAS	IF NOT, SEE IF IN GENERAL ERASABLE.
0075	REF	1		6120	1 6125 0		TCF	IERASTST	
0076	REF	38	LAST 961	6121	3 0120 1	NETZERO	CA	FIXED	IF SO, LEAVE THE MODIFIED ADDRESS IN
0077	REF	6	LAST 1004	6122	26 116 0		ADS	ADDRWD	ADDRWD-AND-DISPATCH.
0078	REF	15	LAST 1003	6123	50 020 0	ITR15	INDEX	CYR	THIS INDEX MAKES THE NEXT INSTRUCTION
0079	REF	1		6124	7 6273 0		7	INDJUMP -1	TCF-INDJUMP + OP-EDITING-CYR.
0080				6125	0 0006 1	IERASTST	EXTEND		
0081	REF	1		6126	6 6136 0		BZMF	GEADDR	GO PROCESS GENERAL-ERASABLE ADDRESS.
0082	REF	14	LAST 1000	6127	7 5012 0		MASK	LOW10	FIXED BANK ADDRESS. RESTORE AND ADD 515.
0083	REF	15	LAST 1005	6130	6 5012 1		AD	LOW10	SWITCH BANKS AND LEAVE SUBADDRESS IN
0084	REF	7	LAST 1005	6131	56 116 1		XCH	ADDRWD	ADDRWD-FOR-OPERAND-RETRIEVAL. (THIS
0085	REF	6	LAST 1002	6132	6 0115 1		AD	INTBIT5	METHOD PRECLUDES USE OF THE LAST
0086	REF	11	LAST 1000	6133	54 004 1		TS	FLANK	LOCATION IN EACH FLANK.)
0087	REF	16	LAST 1005	6134	50 020 0	ITR12	INDEX	CYR	
0088	REF	2	LAST 1005	6135	7 6273 0		7	INDJUMP -1	
0089	REF	10	LAST 996	6136	7 4257 0	GEADDR	MASK	LOW10	
0090	REF	3	LAST 460	6137	6 5007 0		AD	UCT1400	
0091	REF	8	LAST 1005	6140	56 116 1		XCH	ADDRWD	
0092	REF	57	LAST 996	6141	54 003 0		TS	EBANK	
0093	REF	17	LAST 1005	6142	50 020 0	ITR10	INDEX	CYR	
0094	REF	3	LAST 1005	6143	7 6273 0		7	INDJUMP -1	

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P0095 THE FOLLOWING ROUTINE PROCESSES INTERPRETIVE INDEXED ADDRESSES. AN INTERPRETER INDEX REGISTER MAY
 R0097 CONTAIN THE ADDRESS OF ANY ERASABLE REGISTER (0-42 BEING RELATIVE TO THE VAL AREA) OF ANY INTERPRETIVE PROGRAM
 R0099 BANK. OR ANY INTEGER IN THAT RANGE.

0100	REF	1		6144	3 7733 1	LOAD* CAP	LOAD*	STOOL* COMES HERE TO PROCESS LOAD AD.
0101	REF	18	LAST 1005	6145	54 020 1	TS	CYR	(STOVL* ENTERS HERE).
0102	REF	39	LAST 1005	6146	3 0120 1	INDEX	CA	SET UP INDEX LOCATION.
0103	REF	1		6147	54 130 1	TS	INDEXLOC	
0104	REF	12	LAST 1004	6150	24 164 1	INCR	LOC	(ADDRESS ALWAYS GIVEN).
0105	REF	13	LAST 1006	6151	50 164 1	INDEX	LOC	
0106				6152	4 0000 0	CS	0	
0107	REF	315	LAST 1005	6153	10 000 0	CCS	*	INDEX 2 IF ADDRESS STORED COMPLEMENTED.
0108	REF	2	LAST 1006	6154	24 130 0	INCR	INDEXLOC	
0109				6155	16 156 1	NDIP		
0110	REF	9	LAST 1005	6156	54 116 0	TS	ADD-AD	14 BIT ADDRESS TO ADDRWD.
0111	REF	1		6157	7 7742 0	MASK	HIGH4	IF ADDRESS GREATER THAN 2K. ADD INTBIT15
0112				6160	0 0006 1	EXTEND		
0113	REF	1		6161	1 6164 0	BZF	INDEX2	
0114	REF	7	LAST 1005	6162	3 0115 1	CA	INTBIT15	
0115	REF	10	LAST 1006	6163	26 116 0	ADS	ADD-AD	
0116	REF	3	LAST 1006	6164	50 130 0	INDEX2	INDEX	
0117	REF	28	LAST 961	6165	4 0046 1	CS	X1	
0118	REF	11	LAST 1006	6166	26 116 0	ADS	ADD-AD	DO ADJMENT. IGNORING AND CORRECTING OVF.
0119	REF	8	LAST 961	6167	7 7744 0	MASK	HIGH4	SEE IF ADDRESS IS IN WORK AREA.
0120				6170	0 0006 1	EXTEND		
0121	REF	1		6171	1 6204 0	BZF	INDWORK	
0122	REF	2	LAST 1006	6172	7 7742 0	MASK	HIGH4	SEE IF IN FIXED BANK.
0123				6173	0 0006 1	EXTEND		
0124	REF	1		6174	1 6206 1	BZF	INDEXBASE	
0125	REF	12	LAST 1006	6175	3 0116 1	CA	ADD-AD	IN FIXED - SWITCH BANKS AND CREATE
0126	REF	12	LAST 1005	6176	54 004 1	TS	FBANK	SUB-ADDRESS.
0127	REF	16	LAST 1005	6177	7 5012 0	MASK	LOW10	
0128	REF	1		6200	6 4741 1	AD	2K	
0129	REF	13	LAST 1006	6201	54 116 0	TS	ADDRWD	
0130	REF	19	LAST 1006	6202	50 020 0	ITR11	INDEX	
0131	REF	4	LAST 1005	6203	3 6273 1	3	INDJMP -1	
0132	REF	40	LAST 1006	6204	3 0120 1	INDWORK	CA	MAKE ADDRWD RELATIVE TO WORK AREA.
0133	REF	1		6205	1 6212 1	TCF	ITR13 -1	
0134	REF	4	LAST 1005	6206	3 5007 0	INDEXBASE	CA	ACT1400
0135	REF	14	LAST 1006	6207	56 116 1	XCH	ADDRWD	
0136	REF	58	LAST 1005	6210	54 003 0	TS	EBANK	
0137	REF	11	LAST 1005	6211	7 4357 0	MASK	LOW8	
0138	REF	15	LAST 1006	6212	26 116 0	-1	ADS	ADDRWD

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0139	REF	20	LAST	1006	6213	50	020	0	ITR13	INDEX	CYR
0140	REF	5	LAST	1006	6214	3	6273	1		3	INDJUMP -1

L INTERPRETER

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P0141 PUSH-UP ROUTINES. WHEN NO OPERAND ADDRESS IS GIVEN, THE APPROPRIATE OPERAND IS TAKEN FROM THE PUSH-UP
 R0143 LIST. IN MOST CASES THE MODE OF THE RESULT (VECTOR OR SCALAR) OF THE LAST ARITHMETIC OPERATION PERFORMED
 R0145 IS THE SAME AS THE TYPE OF OPERAND DESIRED (ALL ADD/SUBTRACT ETC.). EXCEPTIONS TO THIS GENERAL RULE ARE LISTED
 R0147 BELOW (NOTE THAT IN EVERY CASE THE MODE REGISTER IS LEFT INTACT):

R0148 1. VXSC AND V/SC WANT THE OPPOSITE TYPE OF OPERAND. E.G., IF THE LAST OPERATION YIELDED A VECTOR
 R0150 RESULT, VXSC WANTS A SCALAR.

R0151 2. THE LOAD CODES SHOULD LOAD THE ACCUMULATOR INDEPENDENT OF THE RESULT OF THE LAST OPERATION. THIS
 R0153 INCLUDES VLOAD, OLOAD, TLOAD, PDEL, AND POVL (NO PUSHUP WITH SLOAD).

R0154 3. SOME ARITHMETIC OPERATIONS REQUIRE A STANDARD TYPE OF OPERAND REGARDLESS OF THE PREVIOUS OPERATION.
 R0156 THIS INCLUDES SIGN-WANTING-OP AND TAD-REQUIRING-TP.

0157	REF	2	LAST	747	6215	3	4360	0	PUSHUP	CAF	UCT13	IF THE LOW 5 BITS OF CYR ARE LESS THAN
0158	REF	21	LAST	1007	6216	7	0020	1		MSK	CYR	20, THIS OP REQUIRES SPECIAL ATTENTION.
0159	REF	1			6217	6	6222	0		AD	-OCT10	(NO -0).
0160	REF	316	LAST	1006	6220	10	000	0		CCS	A	
0161	REF	1			6221	1	6233	1		TCF	REGUP	FOR ALL CODES GREATER THAN OCT 7.
0162					6222	77767	1	-OCT10		OCT	-10	
0163	REF	1			6223	6	6112	0		AD	NEG4	WE NOW HAVE 7 - OP CODE(MOD4). SEE IF
0164	REF	317	LAST	1008	6224	10	000	0		CCS	A	THE DP-CODE (MOD4) IS THREE (REVERSE).
0165	REF	318	LAST	1008	6225	50	000	1		INDEX	A	NO - THE MODE IS DEFINITE. PICK UP THE
0166	REF	1			6226	4	6244	1		CS	NO.WDS	
0167	REF	2	LAST	1008	6227	1	6235	1		TCF	REGUP +2	
0168	REF	16	LAST	1003	6230	50	163	0		INDEX	MODE	FOR VXSC AND V/SC WE WANT THE REQUIRED
0169	REF	4	LAST	961	6231	4	6242	1		CS	REVCNT	PUSHLOC DECREMENT WITHOUT CHANGING THE
0170	REF	3	LAST	1008	6232	1	6235	1		TCF	REGUP +2	MODE AT THIS TIME.
0171	REF	17	LAST	1008	6233	50	163	0	REGUP	INDEX	NOOP	MOST ALL OP CODES PUSHUP HERE.
0172	REF	2	LAST	1008	6234	4	6244	1		CS	NO.WDS	
0173	REF	11	LAST	886	6235	26	166	1	+2	ADS	PUSHLOC	
0174	REF	16	LAST	1006	6236	54	116	0		TS	ADDRWD	
0175	REF	22	LAST	1008	6237	50	020	0	ITK14	INDEX	CYR	
0176	REF	6	LAST	1007	6240	7	6273	0		7	INDJUMP -1	(THE INDEX MAKES THIS A TCF.)
0177					6241	00002	0			OCT	2	REVERSE PUSHUP DECREMENT. VECTOR TAKES 2
0178					6242	00006	1	REVCNT		OCT	6	WORDS. SCALAR TAKES 6.
0179					6243	00006	1			OCT	6	
0180					6244	00002	0	NO.WDS		OCT	2	CONVENTIONAL DECREMENT IS 6 WORDS VECTOR
0181					6245	00003	1	OCTAL3		OCT	3	2-IN-DP, AND 3-IN-TP.
0182					6246	00006	1			OCT	6	

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P0183 TEST THE SECOND PREFIX BIT TO SEE IF THIS IS A MISCELLANEOUS OR A UNARY/SHORT SHIFT OPERATION.

0185	REF 23	LAST 1008	6247	10 020 1	OPJUMP2	CCS	CYR	TEST SECOND PREFIX BIT.
0186	REF 1		6250	1 6263 1		TCF	OPJUMP3	TEST THIRD BIT TO SEE IF UNARY OR SHIFT.

0187			6251	77722 0	ENDVAC	DEC	-45	
------	--	--	------	---------	--------	-----	-----	--

R0188 THE FOLLOWING ROUTINE PROCESSES ADDRESSES OF SUFFIX CLASS 10. THEY ARE BASICALLY WORK AREA ADDRESSES.
 R0190 IN THE RANGE 0 - 52. ERASABLE ECADR CONSTANTS FROM 100 - 3777. AND FCADRS ABOVE THAT. ALL 15 BITS ARE AVAILABLE
 R0192 IN CONTRAST TO SUFFIX 1, IN WHICH ONLY THE LOW ORDER 14 ARE AVAILABLE.

0193	REF 14	LAST 1006	6252	24 164 1	15BITADR	INCR	LOC	(ENTRY HERE FROM STCALL).
0194	REF 15	LAST 1009	6253	50 164 1		INDEX	LOC	PICK-UP ADDRESS WORD.
0195			6254	3 0000 1		CA	0	
0196	REF 6	LAST 98	6255	54 117 1		TS	POLISH	WE MAY NEED A SUBADDRESS LATER.

0197	REF 1		6256	3 5013 0		CAF	LOW7+2K	THESE INSTRUCTIONS ARE IN BANK 1.
0198	REF 13	LAST 1006	6257	54 004 1		TS	FBANK	
0199	REF 24	LAST 1009	6260	7 0020 1		MASK	CYR	
0200	REF 319	LAST 1008	6261	50 000 1	ITR7	INDEX	A	
0201	REF 1		6262	1 6334 1		TCF	MISCJUMP	

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P0202 COMPLETE THE DISPATCHING OF UNARY AND SHORT SHIFT OPERATIONS.

0203	REF	14	LAST 1009	6263	54 004 1	OPJUMP3	TS	FBANK	CALL IN BANK 0 (BITS 11-15 OF A ARE 0.)
R0204			ITRACE (6) REFERS TO "OPJUMP3".						
0205	REF	25	LAST 1009	6264	10 020 1		CCS	CYR	TEST THIRD PREFIX BIT.
0206	REF	320	LAST 1009	6265	50 000 1		INDEX	A	THE DECREMENTED UNARY CODE IS 1-1-1-1.
0207	REF	1		6266	1 2000 1		TCF	UNAJUMP	1-4 OF A (ZERO, EXIT, HAS BEEN DETECTED)
0208	REF	18	LAST 1008	6267	10 163 1		CCS	MODE	ITS A SHORT SHIFT CODE. SEE IF PRESENT
0209	REF	1		6270	1 2017 1		TCF	SHORTT	SCALAR OR VECTOR.
0210	REF	2	LAST 1010	6271	1 2017 1		TCF	SHORTT	
0211	REF	1		6272	1 2121 0		TCF	SHORTV	CALLS THE APPROPRIATE ROUTINE.

0212	REF	1		4350		FBANKMSK	EQUALS	BANKMASK
0213	REF	34	LAST 603	6273	00122 0	LVBUF	ADRES	VBUF

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P0214 THE FOLLOWING IS THE JUMP TABLE FOR OP CODES WHICH MAY HAVE INDEXABLE ADDRESSES OR MAY PUSH UP.

0216	REF	1	6274	1 6505 0	INDJUMP	TCF	VLOAD	00 - LOAD MPAC WITH A VECTOR.
0217	REF	1	6275	1 7071 1		TCF	TAD	01 - TRIPLE PRECISION ADD TO MPAC.
0218	REF	1	6276	1 7655 1		TCF	SIGN	02 - COMPLEMENT MPAC (V OR SC) IF X NEG.
0219	REF	1	6277	1 7401 1		TCF	VXSC	03 - VECTOR TIMES SCALAR.
0220	REF	1	6300	1 6703 1		TCF	CGOTO	04 - COMPUTED-GO-TO.
0221	REF	2	6301	1 6470 0		TCF	TLOAD	05 - LOAD MPAC WITH TRIPLE PRECISION.
0222	REF	1	6302	1 6052 1		TCF	DLOAD	06 - LOAD MPAC WITH A DP SCALAR.
0223	REF	1	6303	1 7624 1		TCF	V/SC	07 - VECTOR DIVIDED BY SCALAR.
0224	REF	1	6304	1 6501 1		TCF	SLOAD	10 - LOAD MPAC IN SINGLE PRECISION.
0225	REF	1	6305	1 6620 1		TCF	SSP	11 - SET SINGLE PRECISION INTO X.
0226	REF	1	6306	1 6523 1		TCF	PDDL	12 - PUSH DOWN MPAC AND RE-LOAD IN X.
0227	REF	1	6307	1 7334 0		TCF	MXV	13 - MATRIX-POST-MULTIPLIED-BY-VECTOR.
0228	REF	1	6310	1 6557 1		TCF	PDVL	14 - PUSH DOWN AND VECTOR LOAD.
0229	REF	1	6311	1 6626 1		TCF	CCALL	15 - COMPUTED CALL.
0230	REF	1	6312	1 7337 0		TCF	VXM	16 - MATRIX PRE-MULTIPLIED BY VECTOR.
0231	REF	1	6313	1 7616 0		TCF	TSLO	17 - NORMALIZE MPAC (SCALAR-ONLY).
0232	REF	1	6314	1 7574 1		TCF	DMPR	20 - DP MULTIPLY AND ROUND.
0233	REF	1	6315	1 7577 1		TCF	DDV	21 - DP DIVIDE BY.
0234	REF	1	6316	1 7603 1		TCF	DDDV	22 - DP DIVIDE INTO.
0235	REF	1	6317	1 7621 1		TCF	GSHIFT	23 - GENERAL SHIFT INSTRUCTION.
0236	REF	1	6320	1 6751 0		TCF	VAD	24 - VECTOR ADD.
0237	REF	1	6321	1 6747 1		TCF	VSD	25 - VECTOR SUBTRACT.
0238	REF	1	6322	1 7036 1		TCF	BVSU	26 - VECTOR SUBTRACT FROM.
0239	REF	1	6323	1 7331 0		TCF	DOT	27 - VECTOR DOT PRODUCT.
0240	REF	1	6324	1 7460 0		TCF	VXV	30 - VECTOR CROSS PRODUCT.
0241	REF	1	6325	1 7425 1		TCF	VPROJ	31 - VECTOR PROJECTION.
0242	REF	1	6326	1 7005 1		TCF	DSU	32 - DP SUBTRACT.
0243	REF	1	6327	1 7062 0		TCF	BDSU	33 - DP SUBTRACT FROM.
0244	REF	1	6330	1 6775 0		TCF	DAD	34 - DP ADD.
0245	REF	1	6331	1 6331 1		TCF		35 - AVAILABLE
0246	REF	1	6332	1 7572 1		TCF	DMP1	36 - DP MULTIPLY.
0247	REF	1	6333	1 7613 0		TCF	SETPD	37 - SET PUSH DOWN POINTER (DIRECT ONLY)

P0248 CODES 10 AND 14 MUST NOT PUSH UP. CODE 04 MAY BE USED FOR VECTOR DECLARE BEFORE PUSHUP IF DESIRED.

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P0250

THE FOLLOWING JUMP TABLE APPLIES TO INDEX, BRANCH, AND MISCELLANEOUS INSTRUCTIONS.

0252	REF	1	6334	1	2344	1	MISCJUMP	TCF	AXT	00 - ADDRESS TO INDEX TRUE.
0253	REF	1	6335	1	2351	0		TCF	AXC	01 - ADDRESS TO INDEX COMPLEMENTED.
0254	REF	1	6336	1	2354	0		TCF	LXA	02 - LOAD INDEX FROM ERASABLE.
0255	REF	1	6337	1	2360	1		TCF	LXC	03 - LOAD INDEX FROM COMPLEMENT OF ERAS.
0256	REF	1	6340	1	2364	0		TCF	SXA	04 - STORE INDEX IN ERASABLE.
0257	REF	1	6341	1	2372	1		TCF	XCHX	05 - EXCHANGE INDEX WITH ERASABLE.
0258	REF	1	6342	1	2406	0		TCF	INCR	06 - INCREMENT INDEX REGISTER.
0259	REF	1	6343	1	2415	1		TCF	TIX	07 - TRANSFER ON INDEX.
0260	REF	1	6344	1	2400	0		TCF	XAD	10 - INDEX REGISTER ADD FROM ERASABLE.
0261	REF	1	6345	1	2411	0		TCF	XSU	11 - INDEX SUBTRACT FROM ERASABLE.
0262	REF	1	6346	1	2467	1		TCF	BZE/GDT	12 - BRANCH ZERO AND GOTO.
0263	REF	1	6347	1	2474	0		TCF	BPL/BMN	13 - BRANCH PLUS AND BRANCH MINUS.
0264	REF	1	6350	1	2447	0		TCF	RTB/BHIZ	14 - RETURN TO BASIC AND BRANCH HI ZERO.
0265	REF	1	6351	1	2507	0		TCF	CALL/ITA	15 - CALL AND STORE QPRET.
0266	REF	1	6352	1	2516	0		TCF	SW/	16 - SWITCH INSTRUCTIONS AND AVAILABLE.
0267	REF	1	6353	1	2457	1		TCF	BOV(B)	17 - BRANCH ON OVERFLOW TO BASIC OR INT.

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P0268 THE FOLLOWING JUMP TABLE APPLIES TO UNARY INSTRUCTIONS.

			2 LAST 1002 TO 1013:	205	205*	COUNT* 11/INTER		
0269	REF					BANK	0	00 - EXIT - DETECTED EARLIER.
0270			00.2000			TCF	SQRT	01 - SQUARE ROOT.
0271	REF	1	00.2000	1 3207 0	UNAJUMP	TCF	SINE	02 - SIN.
0272	REF	1	00.2001	1 3530 0		TCF	COSINE	03 - COS.
0273	REF	1	00.2002	1 3517 0		TCF	ARCSIN	04 - ARC SIN.
0274	REF	1	00.2003	1 3610 1		TCF	ARCCOS	05 - ARC COS.
0275	REF	1	00.2004	1 3612 0		TCF	DSQ	06 - DP SQUARE.
0276	REF	1	00.2005	1 3174 1		TCF	ROUND	07 - ROUND TO DP.
0277	REF	1	00.2006	1 2116 1				
0278	REF	1	00.2007	1 7670 0		TCF	COMP	10 - COMPLEMENT VECTOR OR SCALAR.
0279	REF	1	00.2010	1 3232 0		TCF	VDEF	11 - VECTOR DEFINE.
0280	REF	2	LAST 601	00.2011	1 3023 1	TCF	UNIT	12 - UNIT VECTOR.
0281	REF	1	00.2012	1 3176 0		TCF	ABVALABS	13 - LENGTH OF VECTOR OR MAG OF SCALAR.
0282	REF	1	00.2013	1 3245 0		TCF	VSD	14 - SQUARE OF LENGTH OF VECTOR.
0283	REF	1	00.2014	1 6354 1		TCF	STADR	15 - PUSH UP ON STORE CODE.
0284	REF	1	00.2015	1 3274 1		TCF	RVW	16 - RETURN VIA QPRET.
0285	REF	1	00.2016	1 3247 1		TCF	PUSH	17 - PUSH MPAC DOWN.

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P0286 SECTION 2 LOAD AND STORE PACKAGE.

R0287 A SET OF EIGHT STORE CODES IS PROVIDED AS THE PRIMARY METHOD OF STORING THE MULTI-PURPOSE
 R0289 ACCUMULATOR (MPAC). IF IN THE DANZIG SECTION LOC REFERS TO AN ALGEBRAICALLY POSITIVE WORD, IT IS TAKEN AS A
 R0291 STORE CODE WITH A CORRESPONDING ERASABLE ADDRESS. MOST OF THESE CODES ARE TWO ADDRESS, SPECIFYING THAT THE WORD
 R0293 FOLLOWING THE STORE CODE IS TO BE USED AS AN ADDRESS FROM WHICH TO RE-LOAD MPAC. FOUR OPTIONS ARE AVAILABLE:

R0295 1. STORE STORE MPAC. THE E ADDRESS MAY BE INDEXED.
 R0297 2. STODL STORE MPAC AND RE-LOAD IT IN MP WITH THE NEXT ADDRESS (THE LOAD MAY BE INDEXED).
 R0299 3. STOVL STORE MPAC AND RE-LOAD A VECTOR (AS ABOVE).
 R0301 4. STCALL STORE AND DO A CALL (BOTH ADDRESSES MUST BE DIRECT HERE).

R0303 STODL AND STOVL WILL TAKE FROM THE PUSH-DOWN LIST IF NO LOAD ADDRESS IS GIVEN.

0305

6354

BLOCK 3

0306	REF	3	LAST 1013 TO 1014:	15	220*		COUNT*	55/INTER	
0307	REF	4	LAST 1003	6354	3 0165 0	STADR	CA	BANKSET	THE STADR CODE (PUSHUP UP IN ST. BY
0308	REF	15	LAST 1010	6355	54 004 1		TS	FRANK	ADDRESS) ENTERS HERE.
0309	REF	16	LAST 1009	6356	24 164 1		INCR	LOC	
0310	REF	17	LAST 1014	6357	50 164 1	ITR1	INDEX	1/4	THE STORECODE WAS STORED COMPLEMENTED TO
0311				6360	4 0000 0		CS	0	MAKE IT LOOK LIKE AN OPCODE PAIR.
0312	REF	6	LAST 994	6361	6 7747 1		AD	NEGONE	(YOU CANT REMOVE 1 BECAUSE OF EARLY CON)
0313	REF	17	LAST 1008	6362	54 116 0	DOSTORE	TS	ADDR=0	
0314	REF	7	LAST 461	6363	7 4356 1		MASK	1011	ENTRY FROM DISPATCHER. SAVE THE ERASABLE
0315	REF	18	LAST 1014	6364	56 116 1		XLH	ADDR=0	ADDRESS AND JUMP ON THE STORE CODE 40.
0316	REF	1		6365	7 7722 0		MASK	012114	
0317				6366	0 0006 1		EXTEND		
0318	REF	36	LAST 821	6367	7 4747 0		MP	BIT	EACH TRANSFER VECTOR ENTRY IS TWO WORDS.
0319	REF	321	LAST 1010	6370	50 000 1	ITR0	INDEX	0	
0320	REF	1		6371	1 6372 0		TCE	STOPJUMP	

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P0321 STORE CODE JUMP TABLE. CALLS THE APPROPRIATE STORING ROUTINE AND EXITS TO DANZIG OR TO ADDRESS WITH
 R0323 A SUPPLIED OPERATION CODE.

R03231 STORE STORE,1 AND STORE,2 RETURN TO DANZIG, THUS RESETTING THE BANK TO ITS STATE AT INTPRET.

0324	REF	1		6372	0	6422	0	STORJUMP	TC	STORE	STORE.
0325	REF	2	LAST 948	6373	1	6061	1		TCF	DANZIG	PICK UP NEW OP CODE(S).
0326	REF	1		6374	0	6414	0		TC	STORE,1	
0327	REF	3	LAST 1015	6375	1	6061	1		TCF	DANZIG	
0328	REF	1		6376	0	6417	0		TC	STORE,2	
0329	REF	4	LAST 1015	6377	1	6061	1		TCF	DANZIG	
0330	REF	2	LAST 1015	6400	0	6422	0		TC	STORE	STOVL.
0331	REF	1		6401	1	6460	1		TCF	DOVLAD	
0332	REF	3	LAST 1015	6402	0	6422	0		TC	STORE	STOVL WITH INDEXED LOAD ADDRESS.
0333	REF	1		6403	1	6144	1		TCF	DOVLAD*	
0334	REF	4	LAST 1015	6404	0	6422	0		TC	STORE	STOVL.
0335	REF	1		6405	1	6463	1		TCF	DOVLAD	
0336	REF	5	LAST 1015	6406	0	6422	0		TC	STORE	STOVL WITH INDEXED LOAD ADDRESS.
0337	REF	1		6407	1	6466	1		TCF	DOVLAD*	
0338	REF	6	LAST 1015	6410	0	6422	0		TC	STORE	STOTC.
0339	REF	2	LAST 279	6411	3	4766	1		CAF	CALLCODE	
0340	REF	26	LAST 1010	6412	54	020	1		TS	LYR	
0341	REF	1		6413	1	6252	0		TCF	15BITADP	GET A 15 BIT ADDRESS.

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P0342 STORE CODE ADDRESS PROCESSOR.

0343	REF	41	LAST	1006	6414	50 120 1	STORE.1	INDEX	FIXLOC
0344	REF	29	LAST	1006	6415	4 0046 1		CS	X1
0345	REF	1			6416	1 6421 1		TCF	PRESTORE

0346	REF	42	LAST	1016	6417	50 120 1	STORE.2	INDEX	FIXLOC
0347	REF	18	LAST	986	6420	4 0047 0		CS	X2
0348	REF	19	LAST	1014	6421	26 116 0	PRESTORE	ADS	ADDRWD

RESULTANT ADDRESS IS IN FRASABLE.

0349	REF	20	LAST	1016	6422	4 0116 0	STORE	CS	ADDRWD
0350	REF	1			6423	6 4772 1		AD	DEC45
0351	REF	322	LAST	1014	6424	10 000 0		CCS	X
0352	REF	43	LAST	1016	6425	3 0120 1		CA	FIXLOC
0353	REF	1			6426	1 6433 1		TCF	AHEAD5
0354	REF	5	LAST	1006	6427	5 5007 0		CA	ECT:400
0355	REF	21	LAST	1016	6430	56 116 1		XCH	ADDRWD
0356	REF	59	LAST	1006	6431	54 003 0		TS	EBANK
0357	REF	12	LAST	1006	6432	7 4357 0		MASK	1 LWS
0358	REF	22	LAST	1016	6433	26 116 0	AHEAD5	ADS	ADDRWD

DOES THE ADDRESS POINT TO THE WORK AREA?

YES.

NO. SET EBANK & MAKE UP SUBADDRESS.

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P0359 STORING ROUTINES. STORE DP, TP, OR VECTOR AS INDICATED BY MODE.

MPAC.+1 MUST BE STORED IN ANY EVENT.

0360			6434	0 0006 1	STARTSTO EXTEND		
R0361					ITRACE (5) REFERS TO *STARTSTO*.		
0362	REF 369	LAST 1003	6435	3 0155 0	DCA	MPAC	
0363	REF 23	LAST 1016	6436	50 116 1	INDEX	ADDWD	
0364			6437	52 001 1	DXCH	0	
0365	REF 19	LAST 1010	6440	10 163 1	CCS	MODE	
0366	REF 1		6441	1 6454 0	TCF	TSTORE	
0367	REF 247	LAST 1001	6442	0 0002 0	TC	0	
0368			6443	0 0006 1	VSTORE	EXTEND	
0369	REF 370	LAST 1017	6444	3 0160 0	DCA	MPAC +3	
0370	REF 24	LAST 1017	6445	50 116 1	INDEX	ADDWD	
0371			6446	52 003 0	DXCH	2	
0372			6447	0 0006 1	EXTEND		
0373	REF 371	LAST 1017	6450	3 0162 1	DCA	MPAC +5	
0374	REF 25	LAST 1017	6451	50 116 1	INDEX	ADDWD	
0375			6452	52 005 0	DXCH	4	
0376	REF 248	LAST 1017	6453	0 0002 0	TC	0	
0377	REF 372	LAST 1017	6454	3 0156 0	TSTORE	CA	MPAC +2
0378	REF 26	LAST 1017	6455	50 116 1	INDEX	ADDWD	
0379			6456	54 002 1	TS	2	
0380	REF 249	LAST 1017	6457	0 0002 0	TC	0	

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P0381 ROUTINES TO BEGIN PROCESSING OF THE SECOND ADDRESS ASSOCIATED WITH ALL STORE-TYPE CODES EXCEPT (T)R
R0383 ITSELF.

0384	REF	1	6460	3 7732 0	DUDLOAD	CAF	DLOADCED	
0385	REF	27	6461	54 020 1		TS	CYF	
0386	REF	1	6462	1 6106 1		TCF	DIRADRES	GO GET A DIRECT ADDRESS.

0387	REF	1	6463	3 4735 1	DOVLOAD	CAF	VLOADCED	
0388	REF	28	6464	54 020 1		TS	CYF	
0389	REF	2	6465	1 6106 1		TCF	DIRADRES	

0390	REF	1	6466	3 6107 1	DOVLOAD*	CAF	VLOAD*	
0391	REF	2	6467	1 6145 0		TCF	DOVLOAD* +1	PROLOGUE TO INDEX ROUTINE.

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P0392 THE FOLLOWING LOAD INSTRUCTIONS ARE PROVIDED FOR LOADING THE MULTI-PURPOSE ACCUMULATOR MPAC.

0394	REF 27	LAST 1017	6470	50 116 1	TLOAD	INDEX	ADDRWD	
0395			6471	3 0002 0		CA	2	
0396	REF 373	LAST 1017	6472	54 156 1		TS	MPAC +2	LOAD A TRIPLE PRECISION ARGUMENT INTO
0397			6473	0 0006 1		EXTEND		THE FIRST THREE MPAC REGISTERS, WITH THE
0398	REF 28	LAST 1019	6474	5 0116 1		INDEX	ADDRWD	CONTENTS OF THE OTHER FOUR IRRELEVANT.
0399			6475	3 0001 0		DCA	0	
0400	REF 374	LAST 1019	6476	52 155 1		DXCH	MPAC	
0401	REF 106	LAST 924	6477	3 4753 1	TMODE	CAF	ONE	
0402	REF 1		6500	1 6060 0		TCF	NEWMODE	DECLARE TRIPLE PRECISION MODE.
0403			6501	22 007 0	SLOAD	ZL		LOAD A SINGLE PRECISION NUMBER INTO
0404	REF 29	LAST 1019	6502	50 116 1		INDEX	ADDRWD	MPAC, SETTING MPAC+1, 2 TO ZERO. THE
0405			6503	3 0000 1		CA	0	CONTENTS OF THE REMAINING MPAC REGISTERS
0406	REF 1		6504	1 6055 0		TCF	SLOAD2	ARE IRRELEVANT.
0407			6505	0 0006 1	VLOAD	EXTEND		LOAD A DOUBLE PRECISION VECTOR INTO
0408	REF 30	LAST 1019	6506	5 0116 1		INDEX	ADDRWD	MPAC, +1, MPAC+3, 4, AND MPAC+5, 6. THE
0409			6507	3 0001 0		DCA	0	CONTENTS OF MPAC +2 ARE IRRELEVANT.
0410	REF 375	LAST 1019	6510	52 155 1		DXCH	MPAC	
0411			6511	0 0006 1	ENDVLOAD	EXTEND		PDVL COMES HERE TO FINISH UP FOR MP. 11.
0412	REF 31	LAST 1019	6512	5 0116 1		INDEX	ADDRWD	
0413			6513	3 0003 1		DCA	2	
0414	REF 376	LAST 1019	6514	52 160 1		DXCH	MPAC +3	
0415			6515	0 0006 1	+4	EXTEND		PDVL FINISHES HERE.
0416	REF 32	LAST 1019	6516	5 0116 1		INDEX	ADDRWD	
0417			6517	3 0005 1		DCA	4	
0418	REF 377	LAST 1019	6520	52 162 0		DXCH	MPAC +5	
0419	REF 107	LAST 1019	6521	4 4753 0	VMODE	CS	ONE	DECLARE VECTOR MODE.
0420	REF 2	LAST 1019	6522	1 6060 0		TCF	NEWMODE	

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P0421 THE FOLLOWING INSTRUCTIONS ARE PROVIDED FOR STORING OPERANDS IN THE PUSHDOWN LIST:

R0423 1. PUSH PUSHDOWN AND NO LOAD.
 R0424 2. PDOL PUSHDOWN AND DOUBLE PRECISION LOAD.
 R0425 3. PDVL PUSHDOWN AND VECTOR LOAD.

0426				6523	0 0006 1	PDOL	EXTEND		
0427	REF 33	LAST 1019		6524	5 0116 1		INDEX	ADDWD	LOAD MPAC, +1, PUSHING THE MPAC
0428				6525	3 0001 0		DCA	0	CONTENTS DOWN.
0429	REF 378	LAST 1019		6526	52 155 1		DXCH	MPAC	
0430	REF 12	LAST 1008		6527	50 166 0		INDEX	PUSHLOC	
0431				6530	52 001 1		DXCH	0	
0432	REF 20	LAST 1017		6531	50 163 0		INDEX	MODE	ADVANCE THE PUSHDOWN POINTER APPROPRIATELY.
0433	REF 3	LAST 1008		6532	3 6244 0		CAF	ENDWD	
0434	REF 13	LAST 1020		6533	26 166 1		ADS	PUSHLOC	
0435	REF 21	LAST 1020		6534	10 163 1		CCS	MODE	
0436	REF 1			6535	1 6552 1		TCF	ENDTPUSH	
0437	REF 1			6536	1 6550 0		TCF	ENDDPUSH	
0438	REF 22	LAST 1020		6537	54 163 1		TS	MODE	NOW BP.
0439	REF 379	LAST 1020		6540	54 156 1	ENDVPUSH	TS	MPAC +2	
0440	REF 380	LAST 1020		6541	52 160 1		DXCH	MPAC +3	PUSH DOWN THE REST OF THE VECTOR REF.
0441	REF 14	LAST 1020		6542	50 166 0		INDEX	PUSHLOC	
0442				6543	51 775 0		DXCH	0 -4	
0443	REF 381	LAST 1020		6544	52 162 0		DXCH	MPAC +5	
0444	REF 15	LAST 1020		6545	50 166 0		INDEX	PUSHLOC	
0445				6546	51 777 1		DXCH	0 -2	
0446	REF 5	LAST 1015		6547	1 6061 1		TCF	DANZIG	
0447	REF 382	LAST 1020		6550	54 156 1	ENDDPUSH	TS	MPAC +2	SET MPAC +2 TO ZERO AND EXIT ON BP.
0448	REF 6	LAST 1020		6551	1 6061 1		TCF	DANZIG	
0449	REF 23	LAST 1020		6552	54 163 1	ENDTPUSH	TS	MODE	
0450	REF 383	LAST 1020		6553	56 156 0		DXCH	MPAC +2	ON TRIPLE, SET MPAC +2 TO ZERO, PUSHING
0451	REF 16	LAST 1020		6554	50 166 0	+2	INDEX	PUSHLOC	DOWN THE OLD CONTENTS.
0452				6555	53 777 0		TS	0 -1	
0453	REF 7	LAST 1020		6556	1 6061 1		TCF	DANZIG	

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PG454 PDVL - PUSHDOWN AND VECTOR LOAD.

0455				6557	0 0006 1	PDVL	EXTEND		RELOAD MPAC AND PUSH DOWN ITS CONTENTS.
0456	REF	34	LAST 1020	6560	5 0116 1		INDEX	ADDRWD	
0457				6561	3 0001 0		DCA	6	
0458	REF	384	LAST 1020	6562	52 155 1		DXCH	MPAC	
0459	REF	17	LAST 1020	6563	50 166 0		INDEX	PUSHLOC	
0460				6564	52 001 1		DXCH	6	
0461	REF	24	LAST 1020	6565	50 163 0		INDEX	MODE	ADVANCE THE PUSHDOWN POINTER.
0462	REF	4	LAST 1020	6566	3 6244 0		CAF	NO.WDS	
0463	REF	18	LAST 1021	6567	26 166 1		ADS	PUSHLOC	
0464	REF	25	LAST 1021	6570	10 163 1		CCS	MODE	TEST PAST MODE.
0465	REF	1		6571	1 6610 1		TCF	TPDVL	
0466	REF	1		6572	1 6511 0		TCF	ENDVLOAD	JUST LOAD LAST FOUR REGISTERS UP.
0467				6573	0 0006 1	VPOVL	EXTEND		PUSHDOWN AND RE-LOAD LAST TWO COMPONENTS
0468	REF	35	LAST 1021	6574	5 0116 1		INDEX	ADDRWD	
0469				6575	3 0003 1		DCA	2	
0470	REF	385	LAST 1021	6576	52 160 1		DXCH	MPAC +3	
0471	REF	19	LAST 1021	6577	50 166 0		INDEX	PUSHLOC	
0472				6600	51 775 0		DXCH	0 -4	
0473				6601	0 0006 1		EXTEND		
0474	REF	36	LAST 1021	6602	5 0116 1		INDEX	ADDRWD	
0475				6603	3 0005 1		DCA	4	
0476	REF	386	LAST 1021	6604	52 162 0		DXCH	MPAC +5	
0477	REF	20	LAST 1021	6605	50 166 0		INDEX	PUSHLOC	
0478				6606	51 777 1		DXCH	0 -2	
0479	REF	8	LAST 1020	6607	1 6061 1		TCF	DALZIG	
0480				6610	0 0006 1	TPDVL	EXTEND		ON TP, WE MUST LOAD THE Y COMPONENT
0481	REF	37	LAST 1021	6611	5 0116 1		INDEX	ADDRWD	BEFORE STORING MPAC +2 IN CASE THIS IS A
0482				6612	3 0003 1		DCA	2	PUSHUP.
0483	REF	387	LAST 1021	6613	52 160 1		DXCH	MPAC +5	
0484	REF	388	LAST 1021	6614	3 0156 0		CA	MPAC +2	
0485	REF	21	LAST 1021	6615	50 166 0		INDEX	PUSHLOC	IN DP.
0486				6616	53 777 0		TS	0 -1	
0487	REF	2	LAST 1021	6617	1 6515 1		TCF	ENDVLOAD +4	

PG488 SSP (STORE SINGLE PRECISION) IS EXECUTED HERE.

0489	REF	18	LAST 1014	6620	24 164 1	SSP	INCR	LDC	PICK UP THE WORD FOLLOWING THE GIVEN
0490	REF	19	LAST 1021	6621	50 164 1		INDEX	LDC	ADDRESS AND STORE IT AT X.
0491				6622	3 0000 1		CA	0	
0492	REF	38	LAST 1021	6623	50 116 1	STORE1	INDEX	ADDRWD	SOME INDEX AND MISCELLANEOUS OPS END
0493				6624	54 000 0		TS	0	HERE.

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0494 REF 9 LAST 1021 6625 1 6061 1 TCF DANZIG

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P0495 SEQUENCE CHANGING AND SUBROUTINE CALLING OPTIONS.

R0496 THE FOLLOWING OPERATIONS ARE AVAILABLE FOR SEQUENCING CHANGING, BRANCHING, AND CALLING SUBROUTINES:

R0498	1.	GOTO	GO TO.
R0499	2.	CALL	CALL SUBROUTINE SETTING QPRET.
R0500	3.	CGOTO	COMPUTED GO TO.
R0501	4.	CCALL	COMPUTED CALL.
R0502	7.	BPL	BRANCH IF MPAC POSITIVE OR ZERO.
R0503	8.	BZE	BRANCH IF MPAC ZERO.
R0504	9.	BMN	BRANCH IF MPAC NEGATIVE NON-ZERO.

0505	REF	20	LAST	1021	6626	24	164	1	CCALL	INCR	LOC	MAINTAIN LOC FOR QPRET COMPUTATION.
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0506	REF	21	LAST	1023	6627	50	164	1		INDEX	LOC	
0507					6630	3	0000	1		CAF	0	GET BASE ADDRESS OF CADR LIST.

0508	REF	39	LAST	1021	6631	50	116	1		INDEX	ADDRND	
0509					6632	6	0000	1		AD	0	ADD INCREMENT.
0510	REF	16	LAST	1014	6633	54	004	1		TS	FRANK	SELECT DESIRED CADR.

0511	REF	17	LAST	1006	6634	7	5012	0		MASK	LOW10	
0512	REF	323	LAST	1016	6635	50	000	1		INDEX	4	
0513					6636	3	2000	0		CAF	10000	
0514	REF	7	LAST	1009	6637	54	117	1		TS	POLISH	

0515	REF	5	LAST	1014	6640	3	0165	0	CALL	CA	BANKSET	FOR ANY OF THE CALL OPTIONS, MAKE UP THE
0516	REF	2	LAST	1010	6641	7	4350	1		MASK	BANKMASK	ADDRESS OF THE NEXT UP-CODE PAIR/STORE
0517	REF	3	LAST	1023	6642	6	4350	0		AD	BANKMASK	CODE AND LEAVE IT IN QPRET. NOTE THAT
0518	REF	22	LAST	1023	6643	6	0164	1		AD	LOC	BANKMASK = -(2000 - 1).
0519	REF	44	LAST	1016	6644	50	120	1		INDEX	FIXLOC	
0520	REF	10	LAST	939	6645	54	052	1		TS	QPRET	

0521	REF	8	LAST	1023	6646	3	0117	0	GOTO	CA	POLISH	BASIC BRANCHING SEQUENCE.
0522	REF	3	LAST	1006	6647	7	7742	0	+1	MASK	HIGH4	

0523					6650	0	0006	1		EXTEND		
0524	REF	1			6651	1	6662	1		BZF	GOTGERS	SEE IF ADDRESS POINTS TO FIXED OR FRAS.
0525	REF	6	LAST	1023	6652	3	0165	0	+4	CA	BANKSET	SET FRANK PART OF BANK. NEXT, SET UP
0526	REF	27	LAST	1003	6653	54	006	0		TS	BBANK	FRANK. THE COMBINATION IS PICKED UP &
0527	REF	9	LAST	1023	6654	3	0117	0		CA	POLISH	PUT INTO BANKSET AT INTERPRET +2.

0528	REF	17	LAST	1023	6655	54	004	1		TS	FRANK	
0529	REF	18	LAST	1023	6656	7	5012	0		MASK	LOW10	
0530	REF	2	LAST	1006	6657	6	4741	1		AD	0	
0531	REF	23	LAST	1023	6660	54	164	0		TS	LOC	
0532	REF	223	LAST	1002	6661	1	6042	0		TCF	INTERPRET +3	

0533					ED,1400					EBANK= 1400		SO YOU DOESN'T OUSS THE "CA 1400" BELOW.
------	--	--	--	--	---------	--	--	--	--	-------------	--	--

0534	REF	10	LAST	1023	6662	3	0117	0	GOTGERS	CA	POLISH	THE GIVEN ADDRESS IS IN ERASABLE - SEE
0535	REF	2	LAST	1005	6663	6	6251	1		AD	-ENDVAL	IF RELATIVE TO THE WORK AREA.
0536	REF	324	LAST	1023	6664	10	000	0		CCS	A	
0537	REF	11	LAST	1023	6665	3	0117	0		CA	POLISH	GENERAL ERASABLE.
0538	REF	1			6666	1	6675	1		TCF	GOTGERS	

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0539	REF 45	LAST 1023	6667	3 0120 1	CA	FIXLOC	WORK AREA.
0540	REF 12	LAST 1023	6670	6 0117 0	AD	POLISH	
0541	REF 325	LAST 1023	6671	50 000 1	INDEX	A	USE THE GIVEN ADDRESS AS THE ADDRESS OF
0542			6672	3 0000 1	CA		THE BRANCH ADDRESS.
0543	REF 13	LAST 1024	6673	54 117 1	TS	POLISH	
0544	REF 1		6674	1 6647 0	TCF	GOTO +1	ALLOWS ARBITRARY INDIRECTNESS LEVELS.
0545	REF 60	LAST 1016	6675	54 003 0	TS	EBANK	
0546	REF 13	LAST 1016	6676	7 4357 0	MASK	LOW8	
0547	REF 326	LAST 1024	6677	50 000 1	INDEX	A	USE THE GIVEN ADDRESS AS THE ADDRESS OF
0548			6700	3 1400 1	CA	1400	THE BRANCH ADDRESS.
0549	REF 14	LAST 1024	6701	54 117 1	TS	POLISH	
0550	REF 2	LAST 1024	6702	1 6647 0	TCF	GOTO +1	
0551	REF 24	LAST 1023	6703	50 164 1	INDEX	LOC	COMPUTED GO TO. PICK UP ADDRESS OF CADR
0552			6704	3 0001 0	CA	1	LIST.
0553	REF 40	LAST 1023	6705	50 116 1	INDEX	ADDRWD	ADD MODIFIER.
0554			6706	6 0000 1	AD	0	
0555	REF 18	LAST 1023	6707	54 004 1	TS	FBANK	SELECT GOTO ADDRESS.
0556	REF 19	LAST 1023	6710	7 5012 0	MASK	LOW10	
0557	REF 327	LAST 1024	6711	50 000 1	INDEX	A	
0558			6712	3 2000 0	CA	10000	
0559	REF 15	LAST 1024	6713	54 117 1	TS	POLISH	
0560	REF 3	LAST 1024	6714	1 6647 0	TCF	GOTO +1	WITH ADDRESS IN A.
0561	REF 7	LAST 1023	6715	3 0165 0	CA	BANKSET	SWITCH INSTRUCTIONS WHICH ELECT TO
0562	REF 19	LAST 1024	6716	54 004 1	TS	FBANK	BRANCH COME HERE TO DO SO.
0563	REF 25	LAST 1024	6717	50 164 1	INDEX	LOC	
0564			6720	3 0001 0	CA	1	
0565	REF 16	LAST 1024	6721	54 117 1	TS	POLISH	
0566	REF 4	LAST 1024	6722	1 6647 0	TCF	GOTO +1	

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P0567 TRIPLE PRECISION BRANCHING ROUTINE. IF CALLING TC IS AT L, RETURN IS AS FOLLOWS:

R0569 L+1 IF MPAC IS GREATER THAN ZERO.
 R0570 L+2 IF MPAC IS EQUAL TO +0 OR -0.
 R0571 L+3 IF MPAC IS LESS THAN ZERO.

0572	REF 389	LAST 1021	6723	10 154 0	BRANCH	CCS	MPAC	
0573	REF 250	LAST 1017	6724	0 0002 0		TC	0	
0574			6725	1 6727 1		TCF	+2	ON ZERO.
0575	REF 1		6726	1 6741 1		TCF	NEG	
0576	REF 390	LAST 1025	6727	10 155 1		CCS	MPAC +1	
0577	REF 251	LAST 1025	6730	0 0002 0		TC	0	
0578			6731	1 6733 1		TCF	+2	
0579	REF 2	LAST 1025	6732	1 6741 1		TCF	NEG	
0580	REF 391	LAST 1025	6733	10 156 1		CCS	MPAC +2	
0581	REF 252	LAST 1025	6734	0 0002 0		TC	0	
0582			6735	1 6737 0		TCF	+2	
0583	REF 3	LAST 1025	6736	1 6741 1		TCF	NEG	
0584	REF 253	LAST 1025	6737	50 002 0	Q+1	INDEX	0	
0585			6740	0 0001 0		TC	1	
0586	REF 254	LAST 1025	6741	50 002 0	NEG	INDEX	0	IF FIRST NON-ZERO REGISTER WAS NEGATIVE.
0587			6742	0 0002 0		TC	2	
0588	REF 4	LAST 1025	6741		Q+2	=	NEG	
R0589		ITRACE (3) REFERS TO "EXIT".						
0590	REF 8	LAST 1024	6743	3 0165 0	EXIT	CA	BANK SET	RESTORE USER'S BANK SETTING, AND LEAVE
0591	REF 28	LAST 1023	6744	54 006 0		TS	BBANK	INTERPRETIVE MODE.
0592	REF 26	LAST 1024	6745	50 164 1		INDEX	LDC	
0593			6746	0 0001 0		TC	1	

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P0594 SECTION 3 - ADD/SUBTRACT PACKAGE.

R0595 THE FOLLOWING OPERATIONS ARE PROVIDED FOR ADDING TO AND SUBTRACTING FROM THE MULTI-PURPOSE ACCUMULATOR
 R0597 MPAC:

R0598 1. DAD DOUBLE PRECISION ADD.
 R0599 2. DSU DOUBLE PRECISION SUBTRACT.
 R0600 3. BDSU DOUBLE PRECISION SUBTRACT FROM.

R0601 4. TAD TRIPLE PRECISION ADD.

R0602 5. VAD VECTOR ADD.
 R0603 6. VSU VECTOR SUBTRACT.
 R0604 7. BVSU VECTOR SUBTRACT FROM.

R0605 THE INTERPRETIVE OVERFLOW INDICATOR OVFLND IS SET NON-ZERO IF OVERFLOW OCCURS IN ANY OF THE ABOVE.

0607	REF 35	LAST 1002	6747 3 4735 1	VSU	CAF	BIT15	CHANGES 0 TO DCS.
0608			6750 1 6752 0		TCF	+2	
0609	REF 9	LAST 831	6751 3 4355 0	VAD	CAF	PR1030	CHANGES 0 TO DCA.
0610	REF 41	LAST 1024	6752 26 116 0		ADS	ADDRWD	
0611			6753 0 0006 1		EXTEND		
0612	REF 42	LAST 1026	6754 5 0116 1		INDEX	ADDRWD	
0613	REF 2	LAST 381	6755 00 003 1		READ	FISCALAP	DCA 2 OR DCS 2
0614	REF 392	LAST 1025	6756 20 160 1		DAS	MPAC +3	
0615			6757 0 0006 1		EXTEND		CHECK OVERFLOW.
0616			6760 1 6762 0		BZF	+2	
0617	REF 1		6761 0 7014 0		TC	OVERFLW	
0618			6762 0 0006 1		EXTEND		
0619	REF 43	LAST 1026	6763 5 0116 1		INDEX	ADDRWD	
0620	REF 2	LAST 212	6764 00 005 1		READ	CHANS	DCA 4 OR DCS 4
0621	REF 393	LAST 1026	6765 20 162 0		DAS	MPAC +5	
0622			6766 0 0006 1		EXTEND		
0623			6767 1 6771 1		BZF	+2	
0624	REF 1		6770 0 7011 0		TL	OVERFLWZ	
0625			6771 0 0006 1		EXTEND		
0626	REF 44	LAST 1026	6772 5 0116 1		INDEX	ADDRWD	
0627	REF 15	LAST 743	6773 00 001 0		READ	LCHAN	DCA 0 OR DCS 0
0628	REF 1		6774 1 7000 1		TCF	ENDVXV	
0629			6775 0 0006 1	DAD	EXTEND		
0630	REF 45	LAST 1026	6776 5 0116 1		INDEX	ADDRWD	
0631			6777 3 0001 0		DCA	0	
0632	REF 394	LAST 1026	7000 20 155 1	ENDVXV	DAS	MPAC	VXV FINISHES HERE.
0633			7001 0 0006 1		EXTEND		
0634	REF 10	LAST 1022	7002 1 6061 1		BZF	DANZIG	

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0635	REF	1		7003	0	7017	0	SETOVF	TC	OVERFLOW
0636	REF	11	LAST 1026	7004	1	6061	1		TCF	DANZIG

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0637				7005	0 0006 1	DSU	EXTEND		
0638	REF 46	LAST 1026		7006	5 0116 1		INDEX	ADDRWD	
0639				7007	4 0001 1		DCS	0	
0640	REF 2	LAST 1026		7010	1 7006 1		TCF	ENTRY	
0641	REF 179	LAST 1000		7011	54 001 1	OVERFLWZ	TS	L	ENTRY FOR THIRD COMPONENT.
0642	REF 19	LAST 858		7012	3 4756 1		CAF	FIVE	
0643				7013	1 7016 0		TCF	+3	
0644	REF 180	LAST 1028		7014	54 001 1	OVERFLWY	TS	L	ENTRY FOR SECOND COMPONENT.
0645	REF 30	LAST 980		7015	3 6245 1		CAF	THREE	
0646	REF 181	LAST 1028		7016	56 001 0		XCH	L	
0647	REF 328	LAST 1024		7017	50 000 1	OVERFLOW	INDEX	A	ENTRY FOR 1ST COMP OR OP (L=1).
0648	REF 2	LAST 923		7020	4 4734 1		CS	LIMITS	PICK-UP-POS MAX-OR-NEG MAX.
0649	REF 82	LAST 890		7021	54 130 1		TS	BUF	
0650				7022	0 0006 1		EXTEND		
0651	REF 329	LAST 1028		7023	24 000 1		AUG	A	FORCE OVERFLOW.
0652	REF 192	LAST 1028		7024	50 001 0		INDEX	L	
0653	REF 395	LAST 1026		7025	26 155 1		ADS	MPAC +1	
0654				7026	54 007 1		TS	7	
0655	REF 188	LAST 1002		7027	3 4755 1		CAF	ZERO	
0656	REF 83	LAST 1028		7030	6 0130 0		AD	BUF	
0657	REF 183	LAST 1028		7031	50 001 0		INDEX	L	
0658	REF 396	LAST 1028		7032	26 154 0		ADS	MPAC	
0659				7033	54 007 1		TS	7	
0660	REF 255	LAST 1025		7034	0 0002 0		TC	0	NO OVERFLOW EXIT.
0661	REF 1			7035	1 7152 1		TCF	SET-VER	SET OVERFLOW AND EXIT.
0662				7036	0 0006 1	BVSU	EXTEND		
0663	REF 47	LAST 1028		7037	5 0116 1		INDEX	ADDRWD	
0664				7040	3 0003 1		DCA	2	
0665	REF 397	LAST 1028		7041	52 160 1		DXCH	MPAC +3	
0666				7042	0 0006 1		EXTEND		
0667				7043	4 0001 1		DCOM		
0668	REF 398	LAST 1028		7044	20 160 1		DAS	MPAC +3	
0669				7045	0 0006 1		EXTEND		
0670				7046	1 7050 1		BZF	+2	
0671	REF 2	LAST 1026		7047	0 7014 0		TC	OVERFLWY	
0672				7050	0 0006 1		EXTEND		
0673	REF 48	LAST 1028		7051	5 0116 1		INDEX	ADDRWD	
0674				7052	3 0005 1		DCA	4	
0675	REF 399	LAST 1028		7053	52 162 0		DXCH	MPAC +5	
0676				7054	0 0006 1		EXTEND		
0677				7055	4 0001 1		DCOM		
0678	REF 400	LAST 1028		7056	20 162 0		DAS	MPAC +5	
0679				7057	0 0006 1		EXTEND		
0680				7060	1 7062 0		BZF	+2	
0681	REF 2	LAST 1026		7061	0 7011 0		TC	OVERFLWZ	

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0682		7062	0 0000 1	BDSU	EXTEND
0683	REF 49 LAST 1028	7063	5 0116 1		INDEX ADDRWD
0684		7064	3 0001 0		DCA G
0685	REF 401 LAST 1028	7065	52 155 1		DXCH MPAC
0686		7066	0 0006 1		EXTEND
0687		7067	4 0001 1		DCOM
0688	REF 3 LAST 1028	7070	1 7000 1		TCF ENDVAV

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PG689 TRIPLE PRECISION ADD ROUTINE.

0690				7071	0 0006 1	TAD	EXTEND	
0691	REF	50	LAST 1029	7072	5 0116 1		INDEX	ADD-AD
0692				7073	3 0002 0		DLA	1
0693	REF	402	LAST 1029	7074	20 156 1		DAS	-PAC +1
0694	REF	51	LAST 1030	7075	50 116 1		INDEX	ADDRWD
0695				7076	6 0000 1		AD	0
0696	REF	403	LAST 1030	7077	6 0154 1		AD	MPAC
0697	REF	404	LAST 1030	7100	54 154 0		TS	-PAC
0698	REF	12	LAST 1027	7101	1 6061 1		TCF	DALZIG
0699	REF	1		7102	1 7003 1		TCF	SETGVF

ADD MINOR PARTS FIRST.

SET OVFLND IF SUCH OCCURS.

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P0700 ARITHMETIC SUBROUTINES REQUIRED IN FIXED-FIXED.

R0701 1. DMPSUB DOUBLE PRECISION MULTIPLY. MULTIPLY THE CONTENTS OF MPAC,+1 BY THE OP WORD WHOSE ADDRESS IS IN ADDRWD AND LEAVE A TRIPLE PRECISION RESULT IN MPAC.
 R0702
 R0705 2. ROUNDSUB ROUND THE TRIPLE PRECISION CONTENTS OF MPAC TO DOUBLE PRECISION.
 R0707 3. DOTSUB TAKE THE DOT PRODUCT OF THE VECTOR IN MPAC AND THE VECTOR WHOSE ADDRESS IS IN ADDRWD AND LEAVE THE TRIPLE PRECISION RESULT IN MPAC.
 R0709
 R0710 4. POLY USING THE CONTENTS OF MPAC AS A OP ARGUMENT. EVALUATE THE POLYNOMIAL WHOSE DEGREE AND COEFFICIENTS IMMEDIATELY FOLLOW THE TC POLY INSTRUCTION (SEE ROUTINE FOR DETAILS.)
 R0712

0714	REF 256	LAST 1028	7103	50 002 0	DMP	INDEX	Q	BASIC SUBROUTINE FOR USE BY PINBALL, ETC.
0715			7104	3 0000 1		CAF	F	ADRES OF ARGUMENT FOLLOWS TC DMP.
0716	REF 257	LAST 1031	7105	24 002 0		INCR	Q	
0717	REF 52	LAST 1030	7106	54 116 0	-1	TS	ADDRWD	(PROLOGUE FOR SETTING ADDRWD.)
0718	REF 53	LAST 1031	7107	50 116 1	DMPSUB	INDEX	ADDRWD	GET MINOR PART OF OPERAND AT C(ADDRWD).
0719			7110	3 0001 0		CA	1	
0720	REF 405	LAST 1030	7111	54 156 1		TS	MPAC +2	THIS WORKS FOR SQUARING MPAC AS WELL.
0721	REF 189	LAST 1028	7112	3 4755 1		CAF	ZERO	SET MPAC +1 TO ZERO SO WE CAN ACCUMULATE
0722	REF 406	LAST 1031	7113	56 155 0		XCH	MPAC +1	THE PARTIAL PRODUCTS WITH DAS
0723	REF 9	LAST 999	7114	54 135 1		TS	MPTEMP	INSTRUCTIONS.
0724			7115	0 0006 1		EXTEND		
0725	REF 407	LAST 1031	7116	7 0156 1		MP	MPAC +2	MINOR OF MPAC X MINOR OF C(ADDRWD).
0726	REF 408	LAST 1031	7117	56 156 0		XCH	MPAC +2	DISCARD MINOR PART OF ABOVE RESULT AND
0727			7120	0 0006 1		EXTEND		FORM MAJOR OF MPAC X MINOR OF C(ADDRWD).
0728	REF 409	LAST 1031	7121	7 0154 0		MP	MPAC	
0729	REF 410	LAST 1031	7122	20 156 1		DAS	MPAC +1	GUARANTEED NO OVERFLOW.
0730	REF 54	LAST 1031	7123	50 116 1		INDEX	ADDRWD	GET MAJOR PART OF ARGUMENT AT C(ADDRWD).
0731			7124	3 0000 1		CA	0	
0732	REF 10	LAST 1031	7125	56 135 0		XCH	MPTEMP	SAVE AND BRING OUT MINOR OF MPAC.
0733			7126	0 0006 1	DMPSUB2	EXTEND		
0734	REF 11	LAST 1031	7127	7 0135 1		MP	MPTEMP	MAJOR OF C(ADDRWD) X MINOR OF MPAC.
0735	REF 411	LAST 1031	7130	20 156 1		DAS	MPAC +1	ACCUMULATE, SETTING A TO NET OVERFLOW.
0736	REF 412	LAST 1031	7131	56 154 1		XCH	MPAC	SETTING MPAC TO 0 OR +-1.
0737			7132	0 0006 1		EXTEND		
0738	REF 12	LAST 1031	7133	7 0135 1		MP	MPTEMP	MAJOR OF MPAC X MAJOR OF C(ADDRWD).
0739	REF 413	LAST 1031	7134	20 155 1		DAS	MPAC	GUARANTEED NO OVERFLOW.
0740	REF 258	LAST 1031	7135	0 0002 0		TC	Q	49 MCT = .573 MS. INCLUDING RETURN.

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P0741 ROUND MPAC TO DOUBLE PRECISION. SETTING OVFLND ON THE RARE EVENT OF OVERFLOW.

0743	REF 190	LAST 1031	7136	3 4755 1	ROUNDSUB	CAF	ZERO	SET MPAC +2 = 0 FOR SCALARS AND CHANGE
0744	REF 26	LAST 1021	7137	54 163 1	+1	TS	MODE	MODE TO DP.
0745	REF 414	LAST 1031	7140	56 156 0	VROUND	XCH	MPAC +2	BUT WE NEEDNT TAKE THE TIME FOR VECTORS.
0746			7141	6 0000 1		DOUBLE		
0747	REF 184	LAST 1028	7142	54 001 1		TS	L	
0748	REF 259	LAST 1031	7143	0 0002 0		TC	Q	
0749	REF 415	LAST 1032	7144	6 0155 0		AD	MPAC +1	ADD ROUNDING BIT IF MPAC +2 WAS GREATER
0750	REF 416	LAST 1032	7145	54 155 1		TS	MPAC +1	THAN .5 IN MAGNITUDE.
0751	REF 260	LAST 1032	7146	0 0002 0		TC	Q	
0752	REF 417	LAST 1032	7147	6 0154 1		AD	MPAC	PROPAGATE INTERFLOW.
0753	REF 418	LAST 1032	7150	54 154 0		TS	MPAC	
0754	REF 261	LAST 1032	7151	0 0002 0		TC	Q	
0755	REF 2	LAST 813	7152	54 121 1	SETDVF2	TS	OVFLND	(RARE).
0756	REF 262	LAST 1032	7153	0 0002 0		TC	Q	

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P0757 THE DOT PRODUCT SUBROUTINE USUALLY FORMS THE DOT PRODUCT OF THE VECTOR IN MPAC WITH A TANDARD SIX
 R0759 REGISTER VECTOR WHOSE ADDRESS IS IN ADDRWD. IN THIS CASE (CONTINUED) ARE SET TO 2. VXM, HOWEVER, SETS (CONTINUED) TO
 R0761 6 SO THAT DOTSUB DOTS MPAC WITH A COLUMN VECTOR OF THE MATRIX IN QUESTION IN THIS CASE.

0763	REF	64	LAST	996	7154	3 4752 0	PREDUT	CAF	TRD	PROLOGUE TO SET DOTINC TO 1.
0764	REF	4	LAST	97	7155	54 136 1		TS	DOTINC	
0765					7156	0 0006 1	DOTSUB	EXTEND		
0766	REF	5	LAST	97	7157	22 137 1		QXCH	DOTRET	SAVE RETURN.
0767	REF	1			7160	0 7107 0		TC	DMPSUB	DOT X COMPONENTS.
0768	REF	419	LAST	1032	7161	52 160 1		DXCH	MPAC +2	POSITION Y COMPONENT OF MPAC FOR
0769	REF	420	LAST	1033	7162	52 155 1		DXCH	MPAC	MULTIPLICATION WHILE SAVING RESULT IN
0770	REF	84	LAST	1028	7163	52 131 0		DXCH	BUF	THREE WORD BUFFER. BUF.
0771	REF	421	LAST	1033	7164	3 0156 0		CA	MPAC +2	
0772	REF	85	LAST	1033	7165	54 132 0		TS	BUF +2	
0773	REF	5	LAST	1033	7166	3 0136 0		CA	DOTINC	ADVANCE ADDRWD TO Y COMPONENT OF
0774	REF	55	LAST	1031	7167	26 116 0		ADS	ADDRWD	OTHER ARGUMENT.
0775	REF	2	LAST	1033	7170	0 7107 0		TC	DMPSUB	
0776	REF	422	LAST	1033	7171	52 156 1		DXCH	MPAC +1	ACCUMULATE PARTIAL PRODUCTS.
0777	REF	86	LAST	1033	7172	20 132 0		DAS	BUF +1	
0778	REF	423	LAST	1033	7173	6 0154 1		AD	MPAC	
0779	REF	87	LAST	1033	7174	6 0130 0		AD	BUF	
0780	REF	88	LAST	1033	7175	54 130 1		TS	BUF	
0781					7176	1 7200 0		TCF	+2	
0782	REF	3	LAST	1032	7177	54 121 1		TS	OVFLW	IF OVERFLOW OCCURS.
0783	REF	424	LAST	1033	7200	52 162 0		DXCH	MPAC +5	MULTIPLY 2 COMPONENTS.
0784	REF	425	LAST	1033	7201	52 155 1		DXCH	MPAC	
0785	REF	6	LAST	1033	7202	3 0136 0		CA	DOTINC	
0786	REF	56	LAST	1033	7203	26 116 0		ADS	ADDRWD	
0787	REF	3	LAST	1033	7204	0 7107 0		TC	DMPSUB	
0788	REF	89	LAST	1033	7205	52 132 0	ENDDOT	DXCH	BUF +1	LEAVE FINAL ACCUMULATION IN MPAC.
0789	REF	426	LAST	1033	7206	20 156 1		DAS	MPAC +1	
0790	REF	427	LAST	1033	7207	6 0154 1		AD	MPAC	
0791	REF	90	LAST	1033	7210	6 0130 0		AD	BUF	
0792	REF	428	LAST	1033	7211	54 154 0		TS	MPAC	
0793	REF	6	LAST	1033	7212	0 0137 1		TC	DOTRET	
0794	REF	2	LAST	1027	7213	0 7017 0		TC	OVERFLOW	ON OVERFLOW HERE.
0795	REF	7	LAST	1033	7214	0 0137 1		TC	DOTRET	

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P0796 DOUBLE PRECISION POLYNOMIAL EVALUATOR

R0797 THIS ROUTINE EVALUATES $A X^N + A X^{N-1} + \dots + A X + A$ LEAVING THE DP RESULT IN HPAC ON EXIT.
 R0798 N $N-1$ 1 0
 R0800

P0801 THE ROUTINE HAS TWO ENTRIES

R0802 1. ENTRY THRU POWRSERS. THE COEFFICIENTS MAY BE EITHER IN FIXED OR ERASABLE, THE CALL IS BY
 R0804 TC POWRSERS, AND THE RETURN IS TO LOC(TC POWRSERS)+1. THE ENTERING DATA MUST BE AS FOLLOWS

A0806	A	SP	LOC-3	ADDRESS FOR REFERENCING COEF TABLE
A0807	L	SP	N-1	N IS THE DEGREE OF THE POWER SERIES
A0808	HPAC	DP	X	ARGUMENT

A0809	LOC-2N	DP	A(0)
A0810	...		
A0811	LOC	DP	A(N)

R0812 2. ENTRY THRU POLY. THE CALL TO POLY AND THE ENTERING DATA MUST BE AS FOLLOWS

A0814	HPAC	DP	X	ARGUMENT
A0815	LOC	TC	POLY	
A0816	LOC+1	SP	N-1	
A0817	LOC+2	DP	A(0)	
A0818	...			
A0819	LOC+2N+2	DP	A(N)	RETURN IS TO LOC+2N+4

0820		7215	0 0006 1	POWRSERS	EXTEND	
0821	REF 1	7216	22 141 0	OXCH	POLYRET	RETURN ADDRESS
0822	REF 17 LAST 1024	7217	54 117 1	TS	POLISH	POWER SERIES ADDRESS
0823	REF 1	7220	22 140 1	LXCH	POLYCNT	N-1 TO COUNTER
0824	REF 1	7221	1 7232 1	TCF	POLYCOM	SKIP SET UP BY POLY
0825	REF 263 LAST 1032	7222	50 002 0	POLY	INDEX	0
0826		7223	3 0000 1	CAF	0	
0827	REF 2 LAST 1034	7224	54 140 0	TS	POLYCNT	N-1 TO COUNTER
0828		7225	6 0000 1	DOUBLE		
0829	REF 264 LAST 1034	7226	6 0002 0	AD		
0830	REF 18 LAST 1034	7227	54 117 1	TS	POLISH	L(A(N))-1 TO POLISH
0831	REF 20 LAST 1028	7230	6 4756 1	AD	FIV	
0832	REF 2 LAST 1034	7231	54 141 1	TS	POLYRET	STORE RETURN ADDRESS
0833	REF 1	7232	3 6273 1	POLYCOM	CAF	INCOMING X WILL BE MOVED TO VBUF, SO
0834	REF 57 LAST 1033	7233	54 116 0	TS	ADDPWD	SET ADDED SO DMPDOR WILL MPY BY VBUF.
0835		7234	0 0006 1	EXTEND		
0836	REF 19 LAST 1034	7235	5 0117 0	INDEX	POLISH	
0837		7236	3 0004 0	DCA	0	

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0838	REF 429	LAST 1033	7237	52 155 1	DXCH	MPAC	LOAD A(N) INTO MPAC,	
0839	REF 35	LAST 1010	7240	52 123 0	DXCH	VBUF	SAVING X IN VBUF	
0840	REF 1		7241	1 7245 1	TCF	POLY2		
0841	REF 3	LAST 1034	7242	54 140 0	POLYLOOP	TS	POLYCHT	SAVE DECREMENTED LOOP COUNTER
0842	REF 65	LAST 1033	7243	4 4752 1		CS	TWO	
0843	REF 20	LAST 1034	7244	26 117 1		ADS	POLISH	REGRESS COEFFICIENT POINTER
0844	REF 4	LAST 1033	7245	0 7107 0	POLY2	TC	DMPSUB	MULTIPLY BY X
0845			7246	0 0006 1		EXTEND		
0846	REF 21	LAST 1035	7247	5 0117 0		INDEX	POLISH	
0847			7250	3 0002 0		DCA	1	ADD IN NEXT COEFFICIENT
0848	REF 430	LAST 1035	7251	20 155 1		DAS	MPAC	USERS RESPONSIBILITY TO ASSURE NO OVFLOW
0849	REF 4	LAST 1035	7252	10 140 0		CCS	POLYCHT	
0850	REF 1		7253	1 7242 0		TCF	POLYLOOP	
0851	REF 3	LAST 1034	7254	0 0141 0		TC	POLYRET	RETURN-CALLER

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P0852 MISCELLANEOUS MULTI-PRECISION ROUTINES REQUIRED IN FIXED-FIXED BUT NOT USED BY THE INTERPRETER.

085398	REF 191	LAST 1032	7255	3 4755 1	DPACREE	CAF	ZERO	DOUBLE PRECISION ENTRY -
085399	REF 431	LAST 1035	7256	54 156 1		TS	MPAC +2	ZERO LOW-ORDER WORD
0854	REF 265	LAST 1034	7257	22 002 0	TPACREE	LXCH	Q	FORCE SIGN AGREEMENT AMONG THE THREE
0855	REF 4	LAST 887	7260	0 6723 1		TC	BRANCH	PRECISION CONTENTS OF MPAC. RETURNING
0856	REF 1		7261	1 7265 0		TCF	ARG+	WITH SIGNUM OF THE INPUT IN A.
0857	REF 1		7262	1 7305 1		TCF	ARGZERO	
0858	REF 23	LAST 920	7263	4 4733 0		CS	POS MAX	IF NEGATIVE.
0859			7264	1 7266 0		TCF	+2	
0860	REF 24	LAST 1036	7265	3 4733 1	ARG+	CAF	POS MAX	
0861	REF 266	LAST 1036	7266	54 002 1		TS	Q	
0862			7267	0 0006 1		EXTEND		
0863	REF 330	LAST 1028	7270	24 000 1		AUG	A	FORMS +-1.0.
0864	REF 432	LAST 1036	7271	6 0156 0		AD	MPAC +2	
0865	REF 433	LAST 1036	7272	54 156 1		TS	MPAC +2	
0866	REF 192	LAST 1036	7273	3 4755 1		CAF	ZERO	
0867	REF 267	LAST 1036	7274	6 0002 0		AD	Q	
0868	REF 434	LAST 1036	7275	6 0155 0		AD	-PAC +1	
0869	REF 435	LAST 1036	7276	54 155 1		TS	-PAC +1	
0870	REF 193	LAST 1036	7277	3 4755 1		CAF	ZERO	
0871	REF 268	LAST 1036	7300	6 0002 0		AD	Q	Q STILL HAS POS MAX OR NEG MAX IN IT.
0872	REF 436	LAST 1036	7301	6 0154 1		AD	-PAC	
0873	REF 437	LAST 1036	7302	54 154 0	ARGZERO2	TS	MPAC	ALWAYS SKIPPING UNLESS ARGZERO.
0874	REF 438	LAST 1036	7303	54 155 1		TS	MPAC +1	
0875	REF 185	LAST 1032	7304	0 0001 0		TC	1	RETURN VIA L.
0876	REF 439	LAST 1036	7305	54 156 1	ARGZERO	TS	MPAC +2	SET ALL THREE MPAC REGISTERS TO ZERO.
0877	REF 1		7306	1 7302 0		TCF	ARGZERO2	

R0878 SHORTMP MULTIPLIES THE TP CONTENTS OF MPAC BY THE SINGLE PRECISION NUMBER ARRIVING IN A.

0880	REF 13	LAST 1031	7307	54 135 1	SHORTMP	TS	MPTEMP	
0881			7310	0 0006 1		EXTEND		
0882	REF 440	LAST 1036	7311	7 0156 1		MP	MPAC +2	
0883	REF 441	LAST 1036	7312	54 156 1		TS	MPAC +2	
0884	REF 194	LAST 1036	7313	3 4755 1	SHORTMP	CAF	ZERO	SO SUBSEQUENT DAS WILL WORK.
0885	REF 442	LAST 1036	7314	56 155 0		XCH	MPAC +1	
0886	REF 1		7315	1 7126 1		TCF	OMPSUR2	

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P0887 DMPNSUB MULTIPLIES THE DP FRACTION ARRIVING IN MPAC BY THE SP
 R0888 INTEGER ARRIVING IN A. THE DP PRODUCT DEPARTS BOTH IN MPAC AND IN
 R0889 A AND L. NOTE THAT DMPNSUB NORMALLY INCREASES THE MAGNITUDE OF THE
 R0890 CONTENTS OF MPAC. THE CUSTOMER MUST INSURE THAT $B(A) \times B(MPAC, MPAC+1)$
 R0891 AND $B(A) \times B(MPAC)$ ARE LESS THAN 1 IN MAGNITUDE, WHERE B. AS IS OBVIOUS.
 R0892 INDICATES THE ARRIVING CONTENTS.

0893	REF 1	7316	54 135 1	DMPNSUB	TS	DMPNTEMP	
0894		7317	0 0006 1		EXTEND		
0895	REF 443 LAST 1036	7320	7 0155 1		MP	MPAC +1	
0896	REF 444 LAST 1037	7321	52 155 1		DXCH	MPAC	LOW PRODUCT TO MPAC, HIGH FACTOR TO A
0897		7322	0 0006 1		EXTEND		
0898	REF 2 LAST 1037	7323	7 0135 1		MP	DMPNTEMP	
0899	REF 186 LAST 1036	7324	3 0001 0		CA	L	
0900	REF 445 LAST 1037	7325	26 154 0		ADS	MPAC	COMPLETING THE PRODUCT IN MPAC
0901		7326	0 0006 1		EXTEND		
0902	REF 446 LAST 1037	7327	3 0155 0		DCA	MPAC	BRINGING THE PRODUCT INTO A AND L
0903	REF 269 LAST 1036	7330	0 0002 0		TL	0	

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P0904 MISCELLANEOUS VECTOR OPERATIONS. INCLUDED HERE ARE THE FOLLOWING:

R0905	1. DOT	DP VECTOR DOT PRODUCT.
R0906	2. VXV	DP VECTOR CROSS PRODUCT.
R0907	3. VXSC	DP VECTOR TIMES SCALAR.
R0908	4. V/SC	DP VECTOR DIVIDED BY SCALAR.
R0909	5. VPROJ	DP VECTOR PROJECTION. ((MPAC.X)MPAC).
R0910	6. VXM	DP VECTOR POST-MULTIPLIED BY MATRIX.
R0911	7. MXV	DP VECTOR PRE-MULTIPLIED BY MATRIX.

0912	REF 1	7331 0 7154 0	DOT	TC	PPEDOT	DO THE DOT PRODUCT AND EXIT, CHANGING
0913	REF 195	LAST 1036	7332 3 4755 1	DMODE	CAF	ZERO
0914	REF 3	LAST 1019	7333 1 6060 0		TCF	NEWMODE
0915	REF 66	LAST 1035	7334 3 4752 0	MXV	CAF	TWO
0916	REF 6	LAST 98	7335 54 140 0		TS	MATING
0917	REF 1		7336 1 7342 1		TCF	VXM/MXV
0918	REF 7	LAST 801	7337 4 4363 1	VXM	CS	TEN
0919	REF 7	LAST 1038	7340 54 140 0		TS	MATING
0920	REF 19	LAST 889	7341 3 6242 0		CAF	SIX

DO THE DOT PRODUCT AND EXIT, CHANGING
THE MODE TO DP SCALAR.

SET UP MATING AND DOTING FOR ROW
VECTORS.
GO TO COMMON PORTION.

SET MATING AND DOTING TO REFER TO MATRIX
AS THREE COLUMN VECTORS.

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P0921 COMMON PORTION OF MXV AND VXH.

0922	REF	7	LAST 1033	7342	54 136 1	VXM/MXV	TS	DOT INC	
0923			ITRACE (2) REFERS TO "VXM/MXV".						
0924	REF	2	LAST 601	7343	0 7532 1		TC	MPACVBUF	SAVE VECTOR IN MPAC FOR FURTHER USE.
0925	REF	1		7344	0 7156 1		TC	DOTSUB	GO DOT TO GET X COMPONENT OF ANSWER.
0926				7345	0 0006 1		EXTEND		
0927	REF	36	LAST 1035	7346	3 0123 1		DCA	VBUF	MOVE MPAC VECTOR BACK INTO MPAC, SAVING
0928	REF	447	LAST 1037	7347	52 155 1		DXCH	MPAC	NEW X COMPONENT IN BUF2.
0929	REF	14	LAST 999	7350	52 134 0		DXCH	BUF2	
0930				7351	0 0006 1		EXTEND		
0931	REF	37	LAST 1039	7352	3 0125 1		DCA	VBUF +2	
0932	REF	448	LAST 1039	7353	52 160 1		DXCH	MPAC +3	
0933				7354	0 0006 1		EXTEND		
0934	REF	38	LAST 1039	7355	3 0127 0		DCA	VBUF +4	
0935	REF	449	LAST 1039	7356	52 162 0		DXCH	MPAC +5	
0936	REF	8	LAST 1038	7357	3 0140 1		CA	MAT INC	INITIALIZE ADDRESS FOR NEXT DOT PRODUCT.
0937	REF	58	LAST 1034	7360	26 116 0		ADS	ADDRESS	FORMS BASE ADDRESS OF NEXT COLUMN (ROW).
0938	REF	2	LAST 1039	7361	0 7156 1		TC	DOTSUB	
0939	REF	39	LAST 1039	7362	52 123 0		DXCH	VBUF	MOVE GIVEN VECTOR BACK TO MPAC, SAVING Y
0940	REF	450	LAST 1039	7363	52 155 1		DXCH	MPAC	COMPONENT OF ANSWER IN VBUF +2.
0941	REF	40	LAST 1039	7364	52 125 0		DXCH	VBUF +2	
0942	REF	451	LAST 1039	7365	52 160 1		DXCH	MPAC +3	
0943	REF	41	LAST 1039	7366	52 127 1		DXCH	VBUF +4	
0944	REF	452	LAST 1039	7367	52 162 0		DXCH	MPAC +5	
0945	REF	9	LAST 1039	7370	3 0140 1		CA	MAT INC	FORM ADDRESS OF LAST COLUMN OR ROW.
0946	REF	59	LAST 1039	7371	26 116 0		ADS	ADDRESS	
0947	REF	3	LAST 1039	7372	0 7156 1		TC	DOTSUB	
0948	REF	15	LAST 1039	7373	52 134 0		DXCH	BUF2	ANSWER NOW COMPLETE. PUT COMPONENTS INTO
0949	REF	453	LAST 1039	7374	52 155 1		DXCH	MPAC	PROPER MPAC REGISTERS.
0950	REF	454	LAST 1039	7375	52 162 0		DXCH	MPAC +5	
0951	REF	42	LAST 1039	7376	52 125 0		DXCH	VBUF +2	
0952	REF	455	LAST 1039	7377	52 160 1		DXCH	MPAC +3	
0953	REF	13	LAST 1030	7400	1 6061 1		TCF	DANZIC	EXIT.

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P0954 VXSC - VECTOR TIMES SCALAR.

0955	REF 27	LAST 1032	7401 10 163 1	VXSC	CCS	MODE	TEST PRESENT MODE.
0956	REF 1		7402 1 7430 0		TCF	OVASC	SEPARATE ROUTINE WHEN SCALAR IS IN MPAC.
0957	REF 2	LAST 1040	7403 1 7430 0		TCF	OVXSC	
0958	REF 5	LAST 1035	7404 0 7107 0	VVXSC	TC	DMPSUB	COMPUTE X COMPONENT
0959	REF 1		7405 0 7140 0		TC	VROUND	AND ROUND IT.
0960	REF 456	LAST 1039	7406 52 160 1		DXCH	MPAC +3	PUT Y COMPONENT INTO MPAC SAVING MPAC 15
0961	REF 457	LAST 1040	7407 52 155 1		DXCH	MPAC	MPAC +5.
0962	REF 458	LAST 1040	7410 52 160 1		DXCH	MPAC +3	
0963	REF 6	LAST 1040	7411 0 7107 0		TC	DMPSUB	DO SAME FOR Y AND Z COMPONENTS.
0964	REF 2	LAST 1040	7412 0 7140 0		TC	VROUND	
0965	REF 459	LAST 1040	7413 52 162 0		DXCH	MPAC +5	
0966	REF 460	LAST 1040	7414 52 155 1		DXCH	MPAC	
0967	REF 461	LAST 1040	7415 52 162 0		DXCH	MPAC +5	
0968	REF 7	LAST 1040	7416 0 7107 0		TC	DMPSUB	
0969	REF 3	LAST 1040	7417 0 7140 0		TC	VROUND	
0970	REF 462	LAST 1040	7420 52 155 1	VROTATEX	DXCH	MPAC	EXIT USED TO RESTORE MPAC AFTER THIS
0971	REF 463	LAST 1040	7421 52 162 0		DXCH	MPAC +5	TYPE OF ROTATION. CALLED BY VECTOR SHIFT
0972	REF 464	LAST 1040	7422 52 160 1		DXCH	MPAC +3	RIGHT, V/SC, ETC.
0973	REF 465	LAST 1040	7423 52 155 1		DXCH	MPAC	
0974	REF 14	LAST 1039	7424 1 6061 1		TCF	DANZIG	

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P0975 OP VECTOR PROJECTION ROUTINE.

0976	REF	2	LAST	1038	7425	0	7154	0	VPRDJ	TC	PREDET	(MPAC.X)MPAC IS COMPUTED AND LEFT IN
0977	REF	21	LAST	920	7426	4	4751	1		CS	FEUP	MPAC. DO NOT FALL INTO DVXSC.
0978	REF	60	LAST	1039	7427	26	116	0		ADS	ADDRWD	

R0979 VXSC WHEN SCALAR ARRIVES IN MPAC AND VECTOR IS AT X.

0980					7430	0	0006	1	DVXSC	EXTEND		SAVE SCALAR IN MPAC +1 AND GET X
0981	REF	466	LAST	1040	7431	3	0155	0		DCA	MPAC	COMPONENT OF ANSWER.
0982	REF	467	LAST	1041	7432	52	160	1		DXCH	MPAC +1	
0983	REF	8	LAST	1040	7433	0	7107	0		TC	DMP SUB	
0984	REF	4	LAST	1040	7434	0	7140	0		TC	VRound	

0985	REF	67	LAST	1038	7435	3	4752	0		CAF	TWO	ADVANCE ADDRWD TO Y COMPONENT OF X.
0986	REF	61	LAST	1041	7436	26	116	0		ADS	ADDRWD	

0987					7437	0	0006	1		EXTEND		
0988	REF	468	LAST	1041	7440	3	0160	0		DCA	MPAC +3	PUT SCALAR BACK INTO MPAC AND SAVE
0989	REF	469	LAST	1041	7441	52	155	1		DXCH	MPAC	X-RESULT-IN-MPAC+5.
0990	REF	470	LAST	1041	7442	52	162	0		DXCH	MPAC +5	
0991	REF	9	LAST	1041	7443	0	7107	0		TC	DMP SUB	
0992	REF	5	LAST	1041	7444	0	7140	0		TC	VRound	

0993	REF	68	LAST	1041	7445	3	4752	0		CAF	TWO	
0994	REF	62	LAST	1041	7446	26	116	0		ADS	ADDRWD	TO Z COMPONENT.
0995	REF	471	LAST	1041	7447	52	160	1		DXCH	MPAC +3	BRING SCALAR BACK, PUTTING Y RESULT IN
0996	REF	472	LAST	1041	7450	52	155	1		DXCH	MPAC	THE PROPER PLACE.
0997	REF	473	LAST	1041	7451	52	160	1		DXCH	MPAC +3	
0998	REF	10	LAST	1041	7452	0	7107	0		TC	DMP SUB	
0999	REF	6	LAST	1041	7453	0	7140	0		TC	VRound	

1000	REF	474	LAST	1041	7454	52	155	1		DXCH	MPAC	PUT Z COMPONENT IN PROPER PLACE. ALSO
1001	REF	475	LAST	1041	7455	52	162	0		DXCH	MPAC +5	POSITIONING X.
1002	REF	476	LAST	1041	7456	52	155	1		DXCH	MPAC	

1003	REF	1			7457	1	6521	0		TCF	VRound	MODE HAS CHANGED TO VECTOR.
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P1004 THE VECTOR CROSS PRODUCT ROUTINE CALCULATES $(X_1 M - X_2 M, X_2 M - X_3 M, X_3 M - X_1 M)$ WHERE M IS THE VECTOR IN
 R1006 3 2 2 3 1 3 3 1 2 1 1 2
 R1008 MPAC AND X THE VECTOR AT THE GIVEN ADDRESS.

1009				7460	0 0006 1	VXV	EXTEND		
1010	REF 477	LAST 1041		7461	3 0162 1		DCA	MPAC +5	FORM UP X3X1, LEAVING M1 IN VBUF.
1011	REF 478	LAST 1042		7462	52 155 1		DXCH	MPAC	
1012	REF 43	LAST 1039		7463	52 123 0		DXCH	VBUF	
1013	REF 11	LAST 1041		7464	0 7107 0		TC	DMPSUB	BY X1.
1014				7465	0 0006 1		EXTEND		
1015	REF 479	LAST 1042		7466	4 0160 1		DCS	MPAC +5	CALCULATE -X1X2, SAVING X1X3 IN VBUF +2.
1016	REF 480	LAST 1042		7467	52 155 1		DXCH	MPAC	
1017	REF 44	LAST 1042		7470	52 125 0		DXCH	VBUF +2	
1018	REF 12	LAST 1042		7471	0 7107 0		TC	DMPSUB	
1019	REF 69	LAST 1041		7472	3 4752 0		CAF	TWO	ADVANCE ADDRESS TO X2.
1020	REF 63	LAST 1041		7473	26 116 0		ADS	ADDRWD	
1021				7474	0 0006 1		EXTEND		
1022	REF 481	LAST 1042		7475	4 0162 0		DCS	MPAC +5	PREPARE TO GET -X2X3, SAVING -X1X2 IN
1023	REF 482	LAST 1042		7476	52 155 1		DXCH	MPAC	MPAC +5.
1024	REF 483	LAST 1042		7477	52 162 0		DXCH	MPAC +5	
1025	REF 13	LAST 1042		7500	0 7107 0		TC	DMPSUB	
1026				7501	0 0006 1		EXTEND		
1027	REF 45	LAST 1042		7502	3 0123 1		DCA	VBUF	GET X2X1, SAVING -X2X3 IN VBUF +4.
1028	REF 484	LAST 1042		7503	52 155 1		DXCH	MPAC	
1029	REF 46	LAST 1042		7504	52 127 1		DXCH	VBUF +4	
1030	REF 14	LAST 1042		7505	0 7107 0		TC	DMPSUB	
1031	REF 70	LAST 1042		7506	3 4752 0		CAF	THREE	ADVANCE ADDRESS TO X3.
1032	REF 64	LAST 1042		7507	26 116 0		ADS	ADDRWD	
1033				7510	0 0006 1		EXTEND		
1034	REF 47	LAST 1042		7511	4 0123 0		DCS	VBUF	GET -X3X1, ADDING X2X1 TO MPAC +5 TO
1035	REF 485	LAST 1042		7512	52 155 1		DXCH	MPAC	COMPLETE THE Z COMPONENT OF THE ANSWER.
1036	REF 486	LAST 1042		7513	20 162 0		DAS	MPAC +5	
1037				7514	0 0006 1		EXTEND		
1038				7515	1 7517 1		BZF	+2	
1039	REF 3	LAST 1028		7516	0 7011 0		TC	VBUF +2	
1040	REF 15	LAST 1042		7517	0 7107 0		TC	DMPSUB	
1041	REF 48	LAST 1042		7520	52 125 0		DXCH	VBUF +2	MOVE X1X3 TO MPAC +3 SETTING UP FOR X3X2
1042	REF 487	LAST 1042		7521	52 160 1		DXCH	MPAC +3	AND ADD -X3X1 TO MPAC +3 TO COMPLETE THE
1043	REF 488	LAST 1042		7522	52 155 1		DXCH	MPAC	Y COMPONENT OF THE RESULT.
1044	REF 489	LAST 1042		7523	20 160 1		DAS	MPAC +3	
1045				7524	0 0006 1		EXTEND		
1046				7525	1 7527 1		BZF	+2	

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1047	REF 3	LAST 1028	7526 0 7014 0	TC	OVERFLWY	
1048	REF 16	LAST 1042	7527 0 7107 0	TC	DMP SUB	
1049	REF 49	LAST 1042	7530 52 127 1	DXCH	VBUF +4	GO ADD -X2M3 TO X3M2 TO COMPLETE THE X
1050	REF 4	LAST 1029	7531 1 7060 1	TCF	ENDVXV	COMPONENT (TAIL END OF DAD).

R1051 THE MPACVBUF SUBROUTINE SAVES THE VECTOR IN MPAC IN VBUF WITHOUT CLOBBERING MPAC.

1053			7532 0 0006 1	MPACVBUF	EXTEND	CALLED BY MXV, VXM, AND UNIT.
1054	REF 490	LAST 1042	7533 3 0155 0	DCA	MPAC	
1055	REF 50	LAST 1043	7534 52 123 0	DXCH	VBUF	
1056			7535 0 0006 1	EXTEND		
1057	REF 491	LAST 1043	7536 3 0160 0	DCA	MPAC +3	
1058	REF 51	LAST 1043	7537 52 125 0	DXCH	VBUF +2	
1059			7540 0 0006 1	EXTEND		
1060	REF 492	LAST 1043	7541 3 0162 1	DCA	MPAC +5	
1061	REF 52	LAST 1043	7542 52 127 1	DXCH	VBUF +4	
1062	REF 270	LAST 1037	7543 0 0002 0	TC	Q	RETURN TO CALLER.

R1063 DOUBLE PRECISION SIGN AGREE ROUTINE. ARRIVE WITH INPUT IN A+L. OUTPUT IS IN A + L.

1065	REF 331	LAST 1036	7544 10 000 0	ALSIGNAG	CCS	A	TEST UPPER PART.
1066	REF 1		7545 1 7551 0	TCF	UPPOS		IT IS POSITIVE
1067	REF 271	LAST 1043	7546 0 0002 0	TC	Q		ZERO
1068	REF 1		7547 1 7561 0	TCF	UPNEG		NEGATIVE
1069	REF 272	LAST 1043	7550 0 0002 0	TC	Q		ZERO
1070	REF 187	LAST 1037	7551 56 001 0	UPPOS	XCH	L	SAVE DECREMENTED UPPER PART.
1071	REF 10	LAST 922	7552 6 4736 1	AD	HALF		
1072	REF 11	LAST 1043	7553 6 4736 1	AD	HALF		
1073	REF 332	LAST 1043	7554 54 000 0	TS	A		SKIPS ON OVERFLOW
1074			7555 1 7557 0	TCF	+2		
1075	REF 188	LAST 1043	7556 24 001 0	INCR	L		RESTORE UPPER TO ORIGINAL VALUE
1076	REF 189	LAST 1043	7557 56 001 0	XCH	L		SWAP A + L BACK.
1077	REF 273	LAST 1043	7560 0 0002 0	TC	Q		
1078	REF 190	LAST 1043	7561 56 001 0	UPNEG	XCH	L	SAVE COMPLEMENTED + DECREMENTED UPPER PT
1079	REF 6	LAST 922	7562 6 4735 1	AD	NEGMAX		
1080	REF 7	LAST 1014	7563 6 7747 1	AD	NEGONE		
1081	REF 333	LAST 1043	7564 54 000 0	TS	A		
1082			7565 1 7567 0	TCF	+2		DONT INCREMENT IF NO OVERFLOW.
1083	REF 191	LAST 1043	7566 24 001 0	INCR	L		
1084	REF 192	LAST 1043	7567 56 001 0	XCH	L		
1085			7570 4 0000 0	CDM			MAKE NEGATIVE AGAIN.
1086	REF 274	LAST 1043	7571 0 0002 0	TC	Q		

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P1087 INTERPRETIVE INSTRUCTIONS WHOSE EXECUTION CONSISTS OF PRINCIPALLY CALLING SUBROUTINES.

1089	REF 17	LAST 1043	7572	0	7107	0	DMP1	TC	DMP SUB	BNP INSTRUCTION.
1090	REF 15	LAST 1040	7573	1	6061	1		TCF	DANZIG	
1091	REF 18	LAST 1044	7574	0	7107	0	DMPK	TC	DMP SUB	
1092	REF 1		7575	0	7137	0		TC	ROUND SUB +1	(C(A) = +0).
1093	REF 16	LAST 1044	7576	1	6061	1		TCF	DANZIG	
1094			7577	0	0006	1	DDV	EXTEND		
1095	REF 65	LAST 1042	7600	5	0116	1		INDEX	ADDEND	MOVE DIVIDEND INTO BUF.
1096			7601	3	0001	0		DCA	0	
1097	REF 2	LAST 1011	7602	1	7607	0		TCF	DDV +4	
1098			7603	0	0006	1	BDDV	EXTEND		
1099	REF 66	LAST 1044	7604	5	0116	1		INDEX	ADDEND	MOVE DIVISOR INTO MPAC SAVING MPAC. THE DIVIDEND. IN BUF.
1100			7605	3	0001	0		DCA	0	
1101	REF 493	LAST 1043	7606	52	155	1		DXCH	MPAC	
1102	REF 91	LAST 1033	7607	52	131	0	+4	DXCH	BUF	
1103	REF 196	LAST 1038	7610	3	4755	1		CAF	ZERO	DIVIDE ROUTINES IN BANK 0.
1104	REF 20	LAST 1024	7611	54	004	1		TS	FBANK	
1105	REF 2	LAST 824	7612	1	2353	1		TCF	DDV/BDDV	
1106	REF 67	LAST 1044	7613	3	0116	1	SETPD	CA	ADDEND	MUST SET TO WORK AREA. OR FBANK TROUBLE.
1107	REF 22	LAST 1021	7614	54	166	1		TS	PUSHLOC	
1108	REF 1		7615	1	6063	0		TCF	NOFBANK	NO FBANK SWITCH REQUIRED.
1109	REF 197	LAST 1044	7616	3	4755	1	TSLC	CAF	ZERO	SHIFTING ROUTINES LOCATED IN BANK 00.
1110	REF 21	LAST 1044	7617	54	004	1		TS	FBANK	
1111	REF 1		7620	1	2172	0		TCF	TSLOC2	
1112	REF 7	LAST 1003	7621	3	6074	1	GSHIFT	CAF	LOW7	USED AS MASK AT GNSHIFT. THIS PROCESSES
1113	REF 22	LAST 1044	7622	54	004	1		TS	FBANK	ANY SHIFT INSTRUCTION (EXCEPT TSLOC) WITH
1114	REF 1		7623	1	2214	0		TCF	GNSHIFT	AN ADDRESS (ROUTINES IN BANK 0).

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P1115 THE FOLLOWING IS THE PROLOGUE TO V/SC. IF THE PRESENT MODE IS VECTOR, IT SAVES THE SCALAR AT X IN BUF
 R1117 AND CALLS THE V/SC ROUTINE IN BANK 0. IF THE PRESENT MODE IS SCALAR, IT MOVES THE VECTOR AT X INTO MPAC, SAVING
 R1119 THE SCALAR IN MPAC IN BUF BEFORE CALLING THE V/SC ROUTINE IN BANK 0.

1120	REF	28	LAST 1040	7624	10 163 1	V/SC	CCS	MODE	
1121	REF	1		7625	1 7636 1		TCF	DV/SC	MOVE VECTOR INTO MPAC.
1122	REF	2	LAST 1045	7626	1 7636 1		TCF	DV/SC	
1123				7627	0 0006 1	VV/SC	EXTEND		
1124	REF	68	LAST 1044	7630	5 0116 1		INDEX	ADDRWD	
1125				7631	3 0001 0		DCA	0	
1126	REF	92	LAST 1044	7632	52 131 0	V/SC1	DXCH	BUF	IN BOTH CASES, VECTOR IS NOW IN MPAC AND
1127	REF	198	LAST 1044	7633	3 4755 1		CAF	ZER	SCALAR IN BUF.
1128	REF	23	LAST 1044	7634	54 004 1		TS	FOVER	
1129	REF	1		7635	1 2654 0		TCF	V/SC2	
1130				7636	0 0006 1	DV/SC	EXTEND		
1131	REF	69	LAST 1045	7637	5 0116 1		INDEX	ADDRWD	
1132				7640	3 0003 1		DCA	2	
1133	REF	494	LAST 1044	7641	52 160 1		DXCH	MPAC +3	
1134				7642	0 0006 1		EXTEND		
1135	REF	70	LAST 1045	7643	5 0116 1		INDEX	ADDRWD	
1136				7644	3 0005 1		DCA	4	
1137	REF	495	LAST 1045	7645	52 162 0		DXCH	MPAC +5	
1138	REF	108	LAST 1019	7646	4 4753 0		CS	DNE	CHANGE MODE TO VECTOR.
1139	REF	29	LAST 1045	7647	54 163 1		TS	FOVE	
1140				7650	0 0006 1		EXTEND		
1141	REF	71	LAST 1045	7651	5 0116 1		INDEX	ADDRWD	
1142				7652	3 0001 0		DCA	0	
1143	REF	496	LAST 1045	7653	52 155 1		DXCH	MPAC	
1144	REF	1		7654	1 7632 0		TCF	V/SC1	FINISH PROLOGUE AT COMMON SECTION.

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P1145 SIGN AND COMPLEMENT INSTRUCTIONS.

1146	REF 72	LAST 1045	7655	50 116 1	SIGN	INDEX	ADDRWD	CALL COMP INSTRUCTION IF WORD AT X IS
1147			7656	10 000 0		CCS	0	NEGATIVE NON-ZERO.
1148	REF 17	LAST 1044	7657	1 6061 1		TCF	DANZIG	
1149			7660	1 7662 0		TCF	+2	
1150	REF 2	LAST 1013	7661	1 7670 0		TCF	COMP	DO THE COMPLEMENT.
1151	REF 73	LAST 1046	7662	50 116 1		INDEX	ADDRWD	
1152			7663	10 001 1	CCSL	CCS	1	
1153	REF 18	LAST 1046	7664	1 6061 1		TCF	DANZIG	
1154	REF 19	LAST 1046	7665	1 6061 1		TCF	DANZIG	
1155	REF 3	LAST 1046	7666	1 7670 0		TCF	COMP	
1156	REF 20	LAST 1046	7667	1 6061 1		TCF	DANZIG	
1157			7670	0 0006 1	COMP	EXTEND		COMPLEMENT DP MPAC IN EVERY CASE.
1158	REF 497	LAST 1045	7671	4 0155 1		DCS	MPAC	
1159	REF 498	LAST 1046	7672	52 155 1		DXCH	MPAC	
1160	REF 30	LAST 1045	7673	10 163 1		CCS	MPAC	EITHER COMPLEMENT MPAC +3 OR THE REST OF
1161	REF 1		7674	1 7705 0		TCF	DCOMP	THE VECTOR ACCUMULATOR.
1162	REF 2	LAST 1046	7675	1 7705 0		TCF	DCOMP	
1163			7676	0 0006 1		EXTEND		VECTOR COMPLEMENT.
1164	REF 499	LAST 1046	7677	4 0160 1		DCS	MPAC +3	
1165	REF 500	LAST 1046	7700	52 160 1		DXCH	MPAC +3	
1166			7701	0 0006 1		EXTEND		
1167	REF 501	LAST 1046	7702	4 0162 0		DCS	MPAC +5	
1168	REF 502	LAST 1046	7703	52 162 0		DXCH	MPAC +5	
1169	REF 21	LAST 1046	7704	1 6061 1		TCF	DANZIG	
1170	REF 503	LAST 1046	7705	4 0156 1	DCOMP	CS	MPAC +2	
1171	REF 504	LAST 1046	7706	54 156 1		TS	MPAC +2	
1172	REF 22	LAST 1046	7707	1 6061 1		TCF	DANZIG	

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P1173 THE FOLLOWING SHORT SHIFT CODES REQUIRE NO ADDRESS WORD:

R1174	1.	SR1 TO SR4	SCALAR SHIFT RIGHT.
R1175	2.	SR1R TO SR4R	SCALAR SHIFT RIGHT AND ROUND.
R1176	3.	SL1 TO SL4	SCALAR SHIFT LEFT.
R1177	4.	SL1R TO SL4R	SCALAR SHIFT LEFT AND ROUND.
R1178	5.	VSR1 TO VSR8	VECTOR SHIFT RIGHT (ALWAYS ROUNDS).
R1179	6.	VSL1 TO VSL8	VECTOR SHIFT LEFT (NEVER ROUNDS).

R1180 THE FOLLOWING CODES REQUIRE AN ADDRESS WHICH MAY BE INDEXED:*

R1181	1.	SR	SCALAR SHIFT RIGHT.
R1182	2.	SRR	SCALAR SHIFT RIGHT AND ROUND.
R1183	3.	SL	SCALAR SHIFT LEFT.
R1184	4.	SLR	SCALAR SHIFT LEFT AND ROUND.
R1185	5.	VSR	VECTOR SHIFT RIGHT.
R1186	6.	VSL	VECTOR SHIFT LEFT.

R1187 * IF THE ADDRESS IS INDEXED, AND THE INDEX MODIFICATION RESULTS IN A NEGATIVE SHIFT COUNT, A SHIFT OF THE
 R1189 ABSOLUTE VALUE OF THE COUNT IS DONE IN THE OPPOSITE DIRECTION.

1190			00,2017		BANK	00	
1191	REF	1			COUNT*	\$/INTER	
1192	REF	20	LAST 1038	00,2017	3 6242 0	SHORTT	CAF S1X
1193	REF	29	LAST 1018	00,2020	7 0020 1		MASK CYP
1194	REF	11	LAST 923	00,2021	54 021 0		TS SR
1195	REF	30	LAST 1047	00,2022	10 020 1		CCS LYI
1196	REF	1		00,2023	1 2101 1		TCF TSSL
1197				00,2024	00024 1	SPDSV	DEC 20
1198	REF	12	LAST 1047	00,2025	50 021 1	TSSR	INDEX SR
1199	REF	58	LAST 911	00,2026	3 4736 1		CAF BIT14
1200	REF	14	LAST 1036	00,2027	54 135 1		TS MPTMP
1201	REF	31	LAST 1047	00,2030	10 020 1		CCS CYP
1202	REF	1		00,2031	0 2050 0	RIGHTR	TC MPACSRND
1203	REF	4	LAST 1038	00,2032	1 6060 0		TCF NEWMODE
1204	REF	15	LAST 1047	00,2033	3 0135 0	MPACSHR	CA MPTMP
1205				00,2034	0 0006 1		EXTEND
1206	REF	505	LAST 1046	00,2035	7 0156 1		MP MPAC +2
1207	REF	506	LAST 1047	00,2036	54 156 1	+3	TS MPAC +2
1208	REF	16	LAST 1047	00,2037	3 0135 0		CA MPTMP
1209				00,2040	0 0006 1		EXTEND
1210	REF	507	LAST 1047	00,2041	7 0154 0		MP MPAC

SCALAR SHORT SHIFTS COME HERE. THE SHIFT COUNT-1 IS NOW IN BITS 2-3 OF CYP. THE ROUNDING BIT IS IN BIT1 AT THIS POINT.

SEE IF RIGHT OR LEFT SHIFT DESIRED. SHIFT LEFT.

MPTMP SETTING FOR SR BEFORE DDV.

GET SHIFTING BIT.

SEE IF A ROUND IS DESIRED. YES - SHIFT RIGHT AND ROUND. SET MODE TO DP-(C(A) = 0). DO A TRIPLE PRECISION SHIFT RIGHT.

(EXIT FROM SORT AND ABVAL).

SHIFT MAJOR PART INTO A,L AND PLACE IN

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1211	REF 508	LAST 1047	00,2042	52-155-1	DXCH	MPAC	MPAC,+1.
1212	REF 17	LAST 1047	00,2043	3 0135 0	CA	MPTMP	
1213			00,2044	0-0006-1	EXTEND		
1214	REF 193	LAST 1043	00,2045	7-0001-1	MP	L	ORIGINAL C(MPAC +1).
1215	REF 509	LAST 1048	00,2046	20 155 1	DAS	MPAC +1	GUARANTEED NO OVERFLOW.
1216	REF 23	LAST 1046	00,2047	1-6061-1	TCF	DANZIG	
1217							
MPAC SHIFT RIGHT AND ROUND SUBROUTINES.							
1218	REF 510	LAST 1048	00,2050	3 0156 0	MPACSRND	CA	MPAC +2
1219			00,2051	0 0006 1	EXTEND		
1220	REF 13	LAST 1048	00,2052	7-0135-1	MP	MPTMP	WE HAVE TO DO ALL THREE MULTIPLIES SINCE
1221	REF 511	LAST 1048	00,2053	56 155 0	XCH	MPAC +1	MPAC +1 AND MPAC +2 MIGHT HAVE SIGN
1222			00,2054	0-0006-1	EXTEND		DISAGREEMENT WITH A SHIFT RIGHT OF 1.
1223	REF 19	LAST 1048	00,2055	7-0135-1	MP	MPTMP	
1224	REF 512	LAST 1048	00,2056	56 155 0	XCH	MPAC +1	TRIAL MINOR PART.
1225	REF 194	LAST 1048	00,2057	6 0001 0	AD	L	
1226			00,2060	6-0000-1	VSHR2	DOUBLE	(FINISH VECTOR COMPONENT SHIFT RIGHT
1227	REF 513	LAST 1048	00,2061	54-156-1	TS	MPAC +2	AND ROUND.
1228			00,2062	1-2064-0	TCF	+2	
1229	REF 514	LAST 1048	00,2063	26 155 1	ADS	MPAC +1	GUARANTEED NO OVERFLOW.
1230	REF 199	LAST 1045	00,2064	3-4755-1	CAF	ZERO	
1231	REF 515	LAST 1048	00,2065	54-156-1	TS	MPAC +2	
1232	REF 516	LAST 1048	00,2066	56 154 1	XCH	MPAC	SETTING TO ZERO SO FOLLOWING DAS WORKS.
1233			00,2067	0 0006-1	EXTEND		
1234	REF 20	LAST 1048	00,2070	7 0135 1	MP	MPTMP	
1235	REF 517	LAST 1048	00,2071	20 155 1	DAS	MPAC	AGAIN NO OVERFLOW.
1236	REF 275	LAST 1043	00,2072	0-0002-0	TC	Q	
1237	REF 21	LAST 1048	00,2073	3-0135-0	VSHRRND	CA	MPTMP
1238			00,2074	0 0006 1	EXTEND		ENTRY TO SHIFT RIGHT AND ROUND MPAC WHEN
1239	REF 518	LAST 1048	00,2075	7-0155-1	MP	MPAC +1	MPAC CONTAINS A VECTOR COMPONENT.
1240	REF 519	LAST 1048	00,2076	54-155-1	TS	MPAC +1	
1241	REF 195	LAST 1048	00,2077	56-001-0	XCH	L	
1242	REF 1		00,2100	1-2060-1	TCF	VSHR2	GO ADD ONE IF NECESSARY AND FINISH.

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P1243 ROUTINE FOR SHORT SCALAR SHIFT LEFT (AND MAYBE ROUND).

1244	REF 13	LAST 1047	00,2101	3 0021 1	TSSL	CA	SR	GET SHIFT COUNT FOR SR.
1245	REF 22	LAST 1048	00,2102	54 135 1	+1	TS	MPTMP	
1246			00,2103	0 0006 1	+2	EXTEND		ENTRY HERE FROM SL FOR SCALARS.
1247	REF 520	LAST 1048	00,2104	3 0156 0		DCA	MPAC +1	SHIFTING LEFT ONE PLACE AT A TIME IS
1248	REF 521	LAST 1049	00,2105	20 156 1		DAS	MPAC +1	FASTER THAN DOING THE WHOLE SHIFT WITH
1249	REF 522	LAST 1049	00,2106	6 0154 1		AD	MPAC	MULTIPLIES ASSUMING THAT FREQUENCY OF
1250	REF 523	LAST 1049	00,2107	6 0154 1		AD	MPAC	SHIFT COUNTS GOES DOWN RAPIDLY AS A
1251	REF 524	LAST 1049	00,2110	54 154 0		TS	MPAC	FUNCTION OF THEIR MAGNITUDE.
1252			00,2111	1 2113 1		TCF	+2	
1253	REF 4	LAST 1033	00,2112	54 121 1		TS	OVFIND	OVERFLOW. (LEAVES OVERFLOW-CORRECTED
A1254								RESULT ANYWAY).
1255	REF 23	LAST 1049	00,2113	10 135 1		CCS	MPTMP	LOOP ON DECREMENTED SHIFT COUNT.
1256	REF 2	LAST 1047	00,2114	1 2102 1		TCF	TSSL +1	
1257	REF 32	LAST 1047	00,2115	10 020 1		CCS	CYR	SEE IF ROUND WANTED.
1258	REF 2	LAST 1044	00,2116	0 7136 1	ROUND	TC	ROUNDSUB	YES - ROUND AND EXIT.
1259	REF 24	LAST 1048	00,2117	1 6061 1		TCF	DANZIG	SL LEAVES A ZERO IN CYP FOR NO ROUND.
1260	REF 25	LAST 1049	00,2120	1 6061 1		TCF	DANZIG	NO - EXIT IMMEDIATELY

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P1261 VECTOR SHIFTING ROUTINES.

1262	REF	2	LAST	232	00,2121	3 4757 0	SHORTV	CAF	LOWB	SAVE 3-BIT SHIFT COUNT - 1 WITHOUT
1263	REF	33	LAST	1049	00,2122	7 0020 1		MASK	CYR	EDITING CYR.
1264	REF	24	LAST	1049	00,2123	54 135 1		TS	MPTMP	
1265	REF	34	LAST	1050	00,2124	10 020 1		CCS	CYR	SEE IF LEFT OR RIGHT SHIFT.
1266	REF	1			00,2125	1 2145 1		TCF	VSSL	VECTOR SHIFT LEFT.
1267					00,2126	00176 1	OCT176	OCT	176	USED IN PROCESSED SHIFTS WITH -- COUNT.
1268	REF	25	LAST	1050	00,2127	50 155 0	VSSR	INDEX	MPTMP	(ENTRY FROM SR). PICK UP SHIFTING BIT.
1269	REF	59	LAST	1047	00,2130	3 4736 1		CAF	BIT14	MPTMP CONTAINS THE SHIFT COUNT - 1.
1270	REF	26	LAST	1050	00,2131	54 135 1		TS	MPTMP	
1271	REF	1			00,2132	0 2073 1		TC	VSHRND	SHIFT X COMPONENT.
1272	REF	525	LAST	1049	00,2133	52 155 1		DXCH	MPAC	SWAP X AND Y COMPONENTS.
1273	REF	526	LAST	1050	00,2134	52 160 1		DXCH	MPAC +1	
1274	REF	527	LAST	1050	00,2135	52 155 1		DXCH	MPAC	
1275	REF	2	LAST	1050	00,2136	0 2073 1		TC	VSHRND	SHIFT Y COMPONENT.
1276	REF	528	LAST	1050	00,2137	52 155 1		DXCH	MPAC	SWAP Y AND Z COMPONENTS.
1277	REF	529	LAST	1050	00,2140	52 162 0		DXCH	MPAC +5	
1278	REF	530	LAST	1050	00,2141	52 155 1		DXCH	MPAC	
1279	REF	3	LAST	1050	00,2142	0 2073 1		TC	VSHRND	SHIFT Z COMPONENT.
1280	REF	1			00,2143	1 7420 1		TCF	VRJATEX	RESTORE COMPONENTS TO PROPER PLACES.

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P1281 VECTOR SHIFT LEFT -- DONE ONE PLACE AT A TIME.

1282	REF 27	LAST 1050	00,2144	54 135 1	-1	TS	MPTEMP	SHIFTING LOOP.
1283			00,2145	0 0006 1	VSSL	EXTEND		
1284	REF 531	LAST 1050	00,2146	3 0155 0		DCA	MPAC	
1285	REF 532	LAST 1051	00,2147	20 155 1		DAS	MPAC	
1286			00,2150	0 0006 1		EXTEND		
1287			00,2151	1 2153 0		BZF	+2	
1288	REF 3	LAST 1033	00,2152	0 7017 0		TC	OVERFLOW	
1289			00,2153	0 0006 1		EXTEND		
1290	REF 533	LAST 1051	00,2154	3 0160 0		DCA	MPAC +3	
1291	REF 534	LAST 1051	00,2155	20 160 1		DAS	MPAC +3	
1292			00,2156	0 0006 1		EXTEND		
1293			00,2157	1 2161 1		BZF	+2	
1294	REF 4	LAST 1045	00,2160	0 7014 0		TC	OVERFLWY	
1295			00,2161	0 0006 1		EXTEND		
1296	REF 535	LAST 1051	00,2162	3 0162 1		DCA	MPAC +5	
1297	REF 536	LAST 1051	00,2163	20 162 0		DAS	MPAC +5	
1298			00,2164	0 0006 1		EXTEND		
1299			00,2165	1 2167 1		BZF	+2	
1300	REF 4	LAST 1042	00,2166	0 7011 0		TC	OVERFLWZ	
1301	REF 28	LAST 1051	00,2167	10 135 1		CCS	MPTEMP	LOOP ON DECREMENTED SHIFT COUNTER.
1302	REF 2	LAST 1050	00,2170	1 2144 0		TCF	VSSL -1	
1303	REF 26	LAST 1049	00,2171	1 6061 1		TCF	DANZIG	EXIT.

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P1304 TSLC - TRIPLE SHIFT LEFT AND COUNT. SHIFTS MPAC LEFT UNTIL GREATER THAN .5 IN MAGNITUDE, LEAVING
 R1306 THE COMPLEMENT OF THE NUMBER OF SHIFTS REQUIRED IN X.

1307	REF	29	LAST 1051	00,2172	54 1-5 1	TSLC2	TS	MPTEMP	START BY ZEROING SHIFT COUNT (IN A 104).
1308	REF	5	LAST 1036	00,2173	0 6723 1		TC	BRANCH	EXIT WITH NO SHIFTING IF ARGUMENT ZERO.
1309				00,2174	1-2176-1		TCF	+2	
1310	REF	1		00,2175	1 2212 0		TCF	ENDTSLC	STORES ZERO SHIFT COUNT IN THIS CASE.
1311	REF	12	LAST 852	00,2176	0 7257 0		TC	TPAGREE	MAY CAUSE UPSHIFT OF ONE EXTRA PLACE.
1312	REF	537	LAST 1051	00,2177	3 0154 1		CA	MPAC	BEGIN NORMALIZATION LOOP.
1313	REF	-1		00,2200	1-2207-1		TCF	TSLCTEST	
1314	REF	30	LAST 1052	00,2201	24 135 0	TSLCLOOP	INCR	MPTEMP	INCREMENT SHIFT COUNTER.
1315				00,2202	0 0006 1			EXTEND	
1316	REF	538	LAST 1052	00,2203	3 0156 0		DCA	MPAC +1	
1317	REF	539	LAST 1052	00,2204	20 156 1		DAS	MPAC +1	
1318	REF	540	LAST 1052	00,2205	6 0154 1		AD	MPAC	
1319	REF	541	LAST 1052	00,2206	26 154 0		ADS	MPAC	
1320				00,2207	6 0000 1	TSLCTEST	DOUBLE		SEE IF (ANOTHER) SHIFT IS REQUIRED.
1321				00,2210	54 000 0		DVSK		
1322	REF	1		00,2211	1 2201 1		TCF	TSLCLOOP	YES - INCREMENT COUNT AND SHIFT AGAIN.
1323	REF	31	LAST 1052	00,2212	4 0135 1	ENDTSLC	CS	MPTEMP	
1324	REF	1		00,2213	1 6623 1		TCF	STORE1	STORE SHIFT COUNT AND RETURN TO DANZIG.

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P1325 THE FOLLOWING ROUTINES PROCESSES THE GENERAL SHIFT INSTRUCTIONS SR, SRR, SL, AND SLR.

R1327 THE GIVEN ADDRESS IS DECODED AS FOLLOWS:

R1328 BITS 1-7 SHIFT COUNT (SUBADDRESS) LESS THAN 125 DECIMAL.
 R1329 BIT 8 PSEUDO SIGN BIT (DETECTS CHANGE IN SIGN IN INDEXED SHIFTS).
 R1331 BIT 9 0 FOR LEFT SHIFT, AND 1 FOR RIGHT SHIFT.
 R1332 BIT 10 1 FOR TERMINAL ROUND ON SCALAR SHIFTS, 0 OTHERWISE.
 R1333 BITS 11-13 0.
 R1334 BIT 14 1.
 R1335 BIT 15 0.

R1336 THE ABOVE ENCODING IS DONE BY THE YUL SYSTEM.

1337	REF 74	LAST 1046	00,2214	7 0116 0	GENSHIFT MASK	ADDRWD	GET SHIFT COUNT, TESTING FOR ZERO.
1338	REF 334	LAST 1043	00,2215	10 000 0	CCS	A	(ARRIVES WITH C(A) = LOW7).
1339	REF 1		00,2216	1 2224 0	TCF	GENSHIFT2	IF NON-ZERO, PROCEED WITH DECREMENTED CT
1340	REF 33	LAST 911	00,2217	3 4742 1	CAF	BIT10	ZERO SHIFT COUNT. NO SHIFTS NEEDED BUT
1341	REF 75	LAST 1053	00,2220	7 0116 0	MASK	ADDRWD	WE MIGHT HAVE TO ROUND MPAC ON SL AND
1342	REF 335	LAST 1053	00,2221	10 000 0	CCS	A	SRR (SCALAR ONLY).
1343	REF 3	LAST 1049	00,2222	0 7136 1	TC	ROUNDSUB	
1344	REF 27	LAST 1051	00,2223	1 6061 1	TCF	DANZIG	
1345	REF 32	LAST 1052	00,2224	54 135 1	GENSHIFT2 TS	MPTEMP	DECREMENTED SHIFT COUNT TO MPTEMP.
1346	REF 34	LAST 1000	00,2225	3 4744 1	CAF	BIT8	TEST MEANING OF LOW SEVEN BIT COUNT IN
1347			00,2226	0 0006 1	EXTEND		MPTEMP-NOW.
1348	REF 76	LAST 1053	00,2227	7 0116 0	MP	ADDRWD	
1349	REF 1		00,2230	7 6245 0	MASK	LOW2	JUMPS ON SHIFT DIRECTION (BIT8) AND
1350	REF 336	LAST 1053	00,2231	50 000 1	INDEX	A	
1351			00,2232	1 2233 0	TCF	+1	ORIGINAL SHIFT DIRECTION (BIT 9).
1352	REF 1		00,2233	1 2332 0	TCF	RIGHT-	NEGATIVE SHIFT COUNT FOR SL OR SLR.
1353	REF 1		00,2234	1 2342 1	TCF	LEFT-	SL OR SLR.
1354	REF 1		00,2235	1 2336 1	TCF	LEFT-	NEGATIVE SHIFT COUNT WITH SR OR SRR.

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P1355 GENERAL SHIFT RIGHT.

1356	REF	31	LAST 1046	00,2236	10 165 1	RIGHT	CCS	MODE	SEE IF VECTOR OR SCALAR.
1357	REF	1		00,2237	1 2277 0		TCF	GENSCR	
1358	REF	2	LAST 1054	00,2240	1 2277 0		TCF	GENSCR	
1359	REF	32	LAST 1053	00,2241	3 0155 0		CA	MPTEMP	SEE IF SHIFT COUNT LESS THAN 140.
1360	REF	1		00,2242	6 3733 0	VRIGHT2	AD	NEG12	
1361				00,2243	0 0006 1		EXTEND		
1362	REF	1		00,2244	6 2127 1		BZMF	VSSR	IF SO, BRANCH AND SHIFT IMMEDIATELY.
1363	REF	8	LAST 1043	00,2245	6 7747 1		AD	NEGONE	IF NOT, REDUCE MPTEMP BY A TOTAL OF 14.
1364	REF	34	LAST 1054	00,2246	54 135 1		TS	MPTEMP	AND DO A SHIFT RIGHT AND ROUND BY 14.
1365	REF	200	LAST 1048	00,2247	3 4755 1		CAF	ZERO	THE ROUND AT THIS STAGE MAY INTRODUCE A
1366	REF	196	LAST 1048	00,2250	54 001 1		TS	L	ONE-BIT ERROR IN A SHIFT RIGHT 150.
1367	REF	542	LAST 1052	00,2251	56 154 1		XCH	MPAC	
1368	REF	543	LAST 1054	00,2252	56 155 0		XCH	MPAC +1	
1369	REF	1		00,2253	0 2272 1		TC	SETROUND	X COMPONENT NOW SHIFTED. SO MAKE UP THE
1370	REF	544	LAST 1054	00,2254	20 155 1		DAS	MPAC	ROUNDING QUANTITY (0 IN A AND 0 OR +1
A1371									IN L).
1372	REF	545	LAST 1054	00,2255	56 157 1		XCH	MPAC +3	REPEAT THE ABOVE PROCESS FOR Y AND Z.
1373	REF	546	LAST 1054	00,2256	56 160 0		XCH	MPAC +4	
1374	REF	2	LAST 1054	00,2257	0 2272 1		TC	SETROUND	
1375	REF	547	LAST 1054	00,2260	20 160 1		DAS	MPAC +3	NO-OVERFLOW-ON-THese-ADDS.
1376	REF	548	LAST 1054	00,2261	56 161 1		XCH	MPAC +5	
1377	REF	549	LAST 1054	00,2262	56 162 1		XCH	MPAC +6	
1378	REF	3	LAST 1054	00,2263	0 2272 1		TC	SETROUND	
1379	REF	550	LAST 1054	00,2264	20 162 0		DAS	MPAC +5	
1380	REF	35	LAST 1054	00,2265	10 135 1		CCS	MPTEMP	SEE IF DONE. DOING FINAL DECREMENT.
1381	REF	36	LAST 1054	00,2266	54 155 1		TS	MPTEMP	
1382	REF	1		00,2267	1 2242 0		TCF	VRIGHT2	
1383				00,2270	04604 1	BIASLO	DEC	.2974 8-1	SQRT CONSTANT
1384	REF	28	LAST 1053	00,2271	1 6061 1		TCF	DANZIG	
1385				00,2272	6 0000 1	SETROUND	DOUBLE		MAKES UP ROUNDING QUANTITY FROM ARRIVING
1386	REF	551	LAST 1054	00,2273	54 156 1		TS	MPAC +1	G(A). L IS ZERO INITIALLY.
1387	REF	201	LAST 1054	00,2274	3 4755 1		CAF	ZERO	
1388	REF	197	LAST 1054	00,2275	56 001 0		XCH	L	
1389	REF	276	LAST 1048	00,2276	0 0002 0		TC	Q	RETURN AND DO THE DAS, RESETTNG L TO 0.

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P1390 PROCESS SR AND SRP FOR SCALARS.

1391	REF	37	LAST 1054	00,2277	3 0135 0	GENSCR	CA	MPTEMP	SEE IF THE ORIGINAL SHIFT COUNT WAS LESS
1392	REF	2	LAST 1054	00,2300	6 3733 0	+1	AD	NEG12	THAN 140.
1393				00,2301	0 0006 1		EXTEND		
1394	REF	1		00,2302	6 2322 0		BZMF	DOSSHFT	DO THE SHIFT IMMEDIATELY IF SO.
1395	REF	9	LAST 1054	00,2303	6 7747 1	+4	AD	NEGONE	IF NOT, DECREMENT SHIFT COUNT BY 140 AND
1396	REF	38	LAST 1055	00,2304	54 135 1		TS	MPTEMP	SHIFT MPAC-RIGHT-14 PLACES.
1397	REF	202	LAST 1054	00,2305	3 4755 1		CAF	ZERO	
1398	REF	552	LAST 1054	00,2306	56 154 1		XCH	MPAC	
1399	REF	553	LAST 1055	00,2307	56 155 0		XCH	MPAC +1	
1400	REF	554	LAST 1055	00,2310	54 156 1		TS	MPAC +2	
1401	REF	39	LAST 1055	00,2311	10 135 1		CCS	MPTEMP	SEE IF FINISHED. DO FINAL DECREMENT.
1402	REF	40	LAST 1055	00,2312	54 135 1		TS	MPTEMP	
1403	REF	3	LAST 1054	00,2313	0 2300 0		TC	GENSCR +1	
1404				00,2314	22650 1	SLOPEHI	DEC	.5884	SQRT CONSTANT.
1405	REF	34	LAST 1053	00,2315	3 4742 1		CAF	BIT10	FINISHED WITH SHIFT. SEE IF ROUND
1406	REF	77	LAST 1053	00,2316	7 0116 0		MASK	ADDRWD	WANTED.
1407	REF	337	LAST 1053	00,2317	10 000 0		CCS	A	
1408	REF	4	LAST 1053	00,2320	0 7136 1		TC	ROUND SUB	
1409	REF	29	LAST 1054	00,2321	1 6061 1		TCF	DANZIG	DO SO AND/OR EXIT.
1410	REF	41	LAST 1055	00,2322	50 135 0	DOSSHFT	INDEX	MPTEMP	PICK UP SHIFTING BIT.
1411	REF	60	LAST 1050	00,2323	3 4736 1		CAF	BIT14	
1412	REF	42	LAST 1055	00,2324	54 135 1		TS	MPTEMP	
1413	REF	35	LAST 1055	00,2325	3 4742 1		CAF	BIT10	SEE IF TERMINAL ROUND DESIRED.
1414	REF	78	LAST 1055	00,2326	7 0116 0		MASK	ADDRWD	
1415	REF	338	LAST 1055	00,2327	10 000 0		CCS	A	
1416	REF	1		00,2330	1 2031 0		TCF	RIGHT?	YES.
1417	REF	1		00,2331	1 2033 1		TCF	MPACSHR	JUST SHIFT RIGHT.

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P1418 PROCESS THE RIGHT- (SL(R) WITH A NEGATIVE COUNT), LEFT-, AND LEFT OPTIONS.

1420	REF	43	LAST 1055	00,2332	4 0135 1	RIGHT-	CS	MPTEMP	GET ABSOLUTE VALUE - 1 OF SHIFT COUNT
1421	REF	1		00,2333	6 2126 0		AD	BCT176	UNDERSTANDING THAT BIT8 (PSEUDO-SIGN)
1422	REF	44	LAST 1056	00,2334	54 135 1		TS	MPTEMP	WAS 1 INITIALLY.
1423	REF	1		00,2335	1 2236 0		TCF	RIGHT	DO NORMAL SHIFT RIGHT.
1424	REF	2	LAST 1056	00,2336	4 2126 1	LEFT-	CS	BCT176	SAME PROLOGUE TO LEFT FOR INDEXED RIGHT
1425	REF	45	LAST 1056	00,2337	6 0135 0		AD	MPTEMP	SHIFTS WHOSE NET SHIFT COUNT IS NEGATIVE
1426				00,2340	4 0000 0		COM		
1427	REF	46	LAST 1056	00,2341	54 135 1		TS	MPTEMP	
1428	REF	32	LAST 1054	00,2342	10 163 1	LEFT	CCS	MODE	SINCE LEFT SHIFTING IS SOME ONE PLACE AT
1429	REF	1		00,2343	1 2346 0		TCF	GENSCL	A TIME, NO COMPARISON WITH 14 NEED BE
1430	REF	2	LAST 1056	00,2344	1 2346 0		TCF	GENSCL	DONE. FOR SCALARS, SEE IF TERMINAL ROUND
1431	REF	3	LAST 1051	00,2345	1 2145 1		TCF	VSSL	DESIRED. FOR VECTORS, SHIFT IMMEDIATELY.
1432	REF	79	LAST 1055	00,2346	4 0116 0	GENSCL	CS	ADDRWD	PUT ROUNDING BIT (BIT 10 OF ADDRWD) INTO
1433				00,2347	0 0006 1		EXTEND		BIT 15 OF CYR WHERE THE ROUNDING BIT OF
1434	REF	44	LAST 900	00,2350	7 4746 1		MP	BIT6	A SHORT SHIFT LEFT WOULD BE
1435	REF	35	LAST 1050	00,2351	54 020 1		TS	CYR	
1436	REF	3	LAST 1049	00,2352	1 2103 0		TCF	TSSL +2	DO THE SHIFT.

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P1437 SCALAR DIVISION INSTRUCTIONS, DDV AND BDDV, ARE EXECUTED HERE. AT THIS POINT, THE DIVIDEND IS IN MPAC
 R1439 AND THE DIVISOR IN BUF.

1440	REF 109	LAST 1045	00,2353	4 4753 0	DDV/BDDV	CS	ONE	INITIALIZATION.
1441	REF 1		00,2354	54 136 1	TS	DV SIGN		+1 FOR POSITIVE QUOTIENT - -0 FOR NEG.
1442	REF 1		00,2355	54 137 0	TS	DVNORMCT		DIVIDEND-NORMALIZATION COUNT.
1443	REF 1		00,2356	54 140 0	TS	MAXDVSW		NEAR-ONE DIVIDE FLAG.
1444	REF 93	LAST 1045	00,2357	10 130 1	CCS	BUF		FORCE BUF POSITIVE WITH THE MAJOR PART
1445	REF 1		00,2360	1 2516 0	TCF	BUFP85		NON-ZERO.
1446			00,2361	1 2363 1	TCF	+2		
1447	REF 1		00,2362	1 2531 0	TCF	BUFNEG		
1448	REF 555	LAST 1055	00,2363	54 156 1	BUFZERO	TS	MPAC +2	ZERO THIS.
1449	REF 13	LAST 1052	00,2364	0 7257 0	TC	1PAGREE		FORCE SIGN AGREEMENT BEFORE OVERFLOW
1450	REF 556	LAST 1057	00,2365	10 154 0	CCS	MPAC		TEST TO SEE IF MPAC NON-ZERO. --(TOO-BIG)
1451	REF 1		00,2366	1 2414 0	TCF	OVF+		MAJOR PART OF DIVIDEND IS POSITIVE NON-0
1452			00,2367	1 2371 1	TCF	+2		
1453	REF 2	LAST 1057	00,2370	1 2413 1	TCF	OVF+ -1		MAJOR PART OF DIVIDEND IS NEG. NON-ZERO
1454	REF 94	LAST 1057	00,2371	56 131 1	XCH	BUF +1		SHIFT DIVIDEND AND DIVISOR LEFT 14.
1455	REF 95	LAST 1057	00,2372	56 130 0	XCH	BUF		
1456	REF 557	LAST 1057	00,2373	56 155 0	XCH	MPAC +1		
1457	REF 558	LAST 1057	00,2374	56 154 1	XCH	MPAC		
1458	REF 96	LAST 1057	00,2375	10 130 1	CCS	BUF		TRY AGAIN ON FORMER MINOR PART.
1459	REF 1		00,2376	1 2422 0	TCF	BUF+		
1460			00,2377	1 2401 1	TCF	+2		OVERFLOW ON ZERO DIVISOR.
1461	REF 1		00,2400	1 2416 1	TCF	BUF-		
1462	REF 559	LAST 1057	00,2401	4 0154 0	CS	MPAC		SIGN OF MPAC DETERMINES SIGN OF RESULT.
1463			00,2402	0 0006 1	SGNDVOVF	EXTEND		
1464			00,2403	6 2405 1	BZMF	+2		
1465	REF 2	LAST 1057	00,2404	24 136 0	INCP	DV SIGN		NEGMAX IN MPAC PERHAPS.
1466	REF 25	LAST 1036	00,2405	3 4733 1	DVOVF	CAF	POSMAX	ON DIVISION OVERFLOW OF ANY SORT, SET
1467	REF 560	LAST 1057	00,2406	54 154 0	TS	MPAC		SET DP MPAC TO +-POSMAX.
1468	REF 1		00,2407	0 2630 0	TC	FINALDV +3		
1469	REF 110	LAST 1057	00,2410	3 4753 1	CAF	ONE		SET OVERFLOW INDICATOR AND EXIT.
1470	REF 5	LAST 1049	00,2411	54 121 1	TS	OV FIND		
1471	REF 30	LAST 1055	00,2412	0 6061 0	TC	DANZIG		
1472	REF 3	LAST 1057	00,2413	24 136 0	-1	INCR	DV SIGN	
1473	REF 97	LAST 1057	00,2414	4 0131 0	OVF+	CS	BUF +1	LOAD LOWER ORDER PART OF DIVISOR.
1474	REF 1		00,2415	1 2402 1		TCF	SGNDVOVF	GET SIGN OF RESULT.
1475			00,2416	0 0006 1	BUF-	EXTEND		IF BUF IS NEGATIVE, COMPLEMENT IT AND
1476	REF 98	LAST 1057	00,2417	4 0131 0		DCS	BUF	MAINTAIN DV SIGN FOR FINAL QUOTIENT SIGN.
1477	REF 99	LAST 1057	00,2420	52 131 0		DXCH	BUF	
1478	REF 4	LAST 1057	00,2421	24 136 0		INCR	DV SIGN	NOW -0.

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1479	REF 561	LAST 1057	00,2422	10 154 0	BUF+	CCS	MPAC	FORCE MPAC POSITIVE, CHECKING FOR ZERO
1480	REF 1		00,2423	1 2437 1		TCF	MPAC+	DIVIDEND IN THE PROCESS.
1481			00,2424	1 2426 1		TCF	+2	
1482	REF 1		00,2425	1 2433 0		TCF	MPAC-	
1483	REF 562	LAST 1058	00,2426	10 155 1		CCS	MPAC +1	
1484	REF 2	LAST 1058	00,2427	1 2437 1		TCF	MPAC+	
1485	REF 31	LAST 1057	00,2430	1 6061 1		TCF	DANZIG	EXIT IMMEDIATELY ON ZERO DIVIDEND.
1486	REF 2	LAST 1058	00,2431	1 2433 0		TCF	MPAC-	
1487	REF 32	LAST 1058	00,2432	1 6061 1		TCF	DANZIG	
1488			00,2433	0 0006 1	MPAC-	EXTEND		FORCE MPAC POSITIVE AS BUF IN BUF-.
1489	REF 563	LAST 1058	00,2434	4 0155 1		DCS	MPAC	
1490	REF 564	LAST 1058	00,2435	52 155 1		DXCH	MPAC	
1491	REF 5	LAST 1057	00,2436	24 136 0		INCR	DVSIGN	NOW +1 OR -0.

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1492	REF 565	LAST 1058	00,2437	4 0154 0	MPAC+	CS	MPAC	CHECK FOR DIVISION OVERFLOW. IF THE MAJOR PART OF THE DIVIDEND IS LESS THAN THE MAJOR PART OF THE DIVISOR BY AT LEAST TWO, WE CAN PROCEED IMMEDIATELY WITHOUT NORMALIZATION PRODUCING A DVMAX. USED IN SQRTSUB.
1493	REF 10	LAST 1055	00,2440	6 7747 1		AD	NEGONE	
1494	REF 100	LAST 1057	00,2441	6 0130 0		AD	BUF	
1495	REF 539	LAST 1055	00,2442	10 000 0		CCS	A	
1496	REF 1		00,2443	1 2505 1		TCF	DVNORM	
1497			00,2444	60001 0	-1/2+2	DCT	6000	
1498			00,2445	1 2446 1		TCF	+1	IF THE ABOVE DOES NOT HOLD, FORCE SIGN AGREEMENT IN NUMERATOR AND DENOMINATOR TO FACILITATE OVERFLOW AND NEAR-LINE CHECKING.
1499	REF 12	LAST 1043	00,2446	3 4736 1		CAF	HALF	
1500			00,2447	6 0000 1		DOUBLE		
1501	REF 566	LAST 1059	00,2450	6 0155 0		AD	MPAC +1	
1502	REF 567	LAST 1059	00,2451	54 155 1		TS	MPAC +1	
1503	REF 203	LAST 1055	00,2452	3 4755 1		CAF	ZERO	
1504	REF 26	LAST 1057	00,2453	6 4733 1		AD	POS MAX	
1505	REF 568	LAST 1059	00,2454	26 154 0		ADS	MPAC	
1506	REF 13	LAST 1059	00,2455	3 4736 1		CAF	HALF	SAME FOR BUF.
1507			00,2456	6 0000 1		DOUBLE		
1508	REF 101	LAST 1059	00,2457	6 0131 1		AD	BUF +1	
1509	REF 102	LAST 1059	00,2460	54 131 0		TS	BUF +1	
1510	REF 204	LAST 1059	00,2461	3 4755 1		CAF	ZERO	
1511	REF 27	LAST 1059	00,2462	6 4733 1		AD	POS MAX	
1512	REF 103	LAST 1059	00,2463	26 130 1		ADS	BUF	
1513	REF 569	LAST 1059	00,2464	4 0154 0		CS	MPAC	CHECK MAGNITUDE OF SIGN-CORRECTED OPERANDS.
1514	REF 104	LAST 1059	00,2465	6 0130 0		AD	BUF	
1515	REF 340	LAST 1059	00,2466	10 000 0		CCS	A	
1516	REF 2	LAST 1059	00,2467	1 2505 1		TCF	DVNORM	DIVIDE OK - WILL NOT BECOME MAXDV CASE.
1517	REF 16	LAST 1059	00,2470	00133 0	LBUF2	ADRES	BUF	
1518	REF 1		00,2471	1 2405 0		TCF	DVIVE	DIVISOR NOT LESS THAN DIVIDEND - VF.
1519	REF 2	LAST 1057	00,2472	54 140 0		TS	MAXDVSW	IF THE MAJOR PARTS OF THE DIVIDEND AND DIVISOR ARE EQUAL, A SPECIAL APPROXIMATION IS USED (PROVIDED THE DIVISION IS POSSIBLE, OF COURSE).
1520	REF 570	LAST 1059	00,2473	4 0155 1		CS	MPAC +1	
1521	REF 105	LAST 1059	00,2474	6 0131 1		AD	BUF +1	
1522			00,2475	0 0005 1		EXTEND		
1523	REF 2	LAST 1059	00,2476	6 2405 1		BZMF	DVOVF	
1524	REF 3	LAST 1059	00,2477	1 2505 1		TCF	DVNORM	IF NO OVERFLOW.

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1515			00,2500	0 0006 1	BUF NORM	EXTEND		ADD -1 TO AUGMENT SHIFT COUNT AND SHIFT
1526	REF 2	LAST 1057	00,2501	24 137 1		AUG	DV NORMCT	LEFT ONE PLACE.
1527			00,2502	0 0006 1		EXTEND		
1528	REF 106	LAST 1059	00,2503	3 0131 1		DCA	BUF	
1529	REF 107	LAST 1060	00,2504	20 131 0		DAS	BUF	
1530	REF 108	LAST 1060	00,2505	3 0130 0	DV NORM	CA	BUF	SEE IF DIVISOR NORMALIZED YET.
1531			00,2506	6 0000 1		DOUBLE		
1532			00,2507	54 000 0		DVSK		
1533	REF 1		00,2510	1 2500 1		TCF	BUF NORM	NO - SHIFT LEFT ONE AND TRY AGAIN.
1534	REF 571	LAST 1059	00,2511	52 155 1		DXCH	MPAC	CALL DIVIDEND NORMALIZATION SEQUENCE
1535	REF 3	LAST 1060	00,2512	50 137 1		INDEX	DV NORMCT	PRIOR TO DOING THE DIVIDE.
1536	REF 1		00,2513	0 2565 0		TC	MAXTEST	
1537	REF 572	LAST 1060	00,2514	54 156 1		TS	MPAC +2	RETURNS WITH DIVISION DONE AND G(A) = 0.
1538	REF 33	LAST 1058	00,2515	1 6061 1		TCF	DANZIG	
1539	REF 341	LAST 1059	00,2516	10 000 0	BUF POS	CCS	A	
1540	REF 2	LAST 1057	00,2517	1 2422 0		TCF	BUF+	TO BUF+ IF BUF IS GREATER THAN +.
1541	REF 109	LAST 1060	00,2520	4 0131 0		CS	BUF +1	IF BUF IS +1, FORCING SIGN AGREEMENT
1542			00,2521	0 0006 1		EXTEND		MAY CAUSE BUF TO BECOME ZERO.
1543	REF 3	LAST 1060	00,2522	6 2422 1		BZMF	BUF+	BRANCH IF SIGNS AGREE.
1544	REF 14	LAST 1059	00,2523	3 4736 1		CA	HALF	SIGNS DISAGREE. FORCE AGREEMENT.
1545			00,2524	6 0000 1	+6	DOUBLE		
1546	REF 110	LAST 1060	00,2525	26 131 0		ADS	BUF +1	
1547	REF 205	LAST 1059	00,2526	3 4755 1		CA	ZERO	
1548	REF 111	LAST 1060	00,2527	54 130 1		TS	BUF	
1549	REF 1		00,2530	1 2363 1		TCF	BUFZERO	
1550	REF 342	LAST 1060	00,2531	10 000 0	BUF NEG	CCS	A	
1551	REF 2	LAST 1057	00,2532	1 2416 1		TCF	BUF-	TO BUF- IF BUF IS LESS THAN -1.
1552	REF 112	LAST 1060	00,2533	3 0131 1		CA	BUF +1	IF BUF IS -1, FORCING SIGN AGREEMENT
1553			00,2534	0 0006 1		EXTEND		MAY CAUSE BUF TO BECOME ZERO.
1554	REF 3	LAST 1060	00,2535	6 2416 0		BZMF	BUF-	BRANCH IF SIGNS AGREE.
1555	REF 15	LAST 1060	00,2536	4 4736 0		CS	HALF	SIGNS DISAGREE. FORCE AGREEMENT.
1556	REF 2	LAST 1057	00,2537	1 2524 1		TCF	BUF POS +6	

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P1557 THE FOLLOWING ARE PROLOGUES TO SHIFT THE DIVIDEND ARRIVING IN A AND L BEFORE THE DIVIDE.

1559	REF 14	LAST 1049	00,2540	22 021 1	-21D	LXCH	SR	SPECIAL PROLOGUE FOR UNIT WHEN THE
1560			00,2541	0 0006 1		EXTEND		LENGTH OF THE ARGUMENT WAS NOT LESS THAN
1561	REF 16	LAST 1060	00,2542	7 4736 0		MP	HALF	.5. IN THIS CASE, EACH COMPONENT MUST BE
1562	REF 198	LAST 1054	00,2543	56 001 0		XCH	L	SHIFTED RIGHT ONE TO PRODUCE A HALF-UNIT
1563	REF 15	LAST 1061	00,2544	6 0021 1		AD	SR	VECTOR.
1564	REF 199	LAST 1061	00,2545	56 001 0		XCH	L	
1565	REF 1		00,2546	1 2571 1		TCF	GENDDV +1	WITH DP DIVIDEND IN A,L.
1566			00,2547	20 001 1		DDOUBL		PROLOGUE WHICH NORMALIZES THE DIVIDEND
1567			00,2550	20 001 1		DDOUBL		WHEN IT IS KNOWN THAT NO DIVISION
1568			00,2551	20 001 1		DDOUBL		OVERFLOW WILL OCCUR.
1569			00,2552	20 001 1		DDOUBL		
1570			00,2553	20 001 1		DDOUBL		
1571			00,2554	20 001 1		DDOUBL		
1572			00,2555	20 001 1		DDOUBL		
1573			00,2556	20 001 1		DDOUBL		
1574			00,2557	20 001 1		DDOUBL		
1575			00,2560	20 001 1		DDOUBL		
1576			00,2561	20 001 1		DDOUBL		
1577			00,2562	20 001 1		DDOUBL		
1578			00,2563	20 001 1		DDOUBL		
1579	REF 573	LAST 1060	00,2564	52 155 1		DXCH	MPAC	
1580	REF 3	LAST 1059	00,2565	10 140 0	MAXTEST	CCS	MAXDVSW	0 IF MAJORS MIGHT BE =, -1 OTHERWISE.
1581			00,2566	06552 0	BIASHI	DEC	.4192 R-1	SQRT CONSTANTS
1582	REF 1		00,2567	1 2642 1		TCF	MAXDV	CHECK TO SEE IF THEY ARE NOW EQUAL.

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P1583 THE FOLLOWING IS A GENERAL PURPOSE DOUBLE PRECISION DIVISION ROUTINE. IT DIVIDES MPAC BY BUF AND LEAVES
 R1585 THE RESULT IN MPAC. THE FOLLOWING CONDITIONS MUST BE SATISFIED:

R1586 1. THE DIVISOR (BUF) MUST BE POSITIVE AND NOT LESS THAN .5.

R1587 2. THE DIVIDEND (MPAC) MUST BE POSITIVE WITH THE MAJOR PART OF MPAC STRICTLY LESS THAN THAT OF BUF
 R1589 (A SPECIAL APPROXIMATION, MAXDV, IS USED WHEN THE MAJOR PARTS ARE EQUAL).

R1591 UNDERSTANDING THAT $A/B = Q + S(R/B)$ WHERE $S = 2(-14)$ AND Q AND R ARE QUOTIENT AND REMAINDER, RESPEC-
 R1593 TIVELY, THE FOLLOWING APPROXIMATION IS OBTAINED BY MULTIPLYING ABOVE AND BELOW BY $C - SD$ AND NEGLECTING TERMS OF
 R1595 ORDER S -SQUARED (POSSIBLY INTRODUCING ERROR INTO THE LOW TWO BITS OF THE RESULT). SIGN AGREEMENT IS UNNECESSARY.

R1597
$$\frac{A + SB}{C + SD} = \frac{(R - QD)}{C} \quad \text{WHERE } Q \text{ AND } R \text{ ARE QUOTIENT AND REMAINDER OF } \frac{A + SB}{C} \text{ RESPECTIVELY.}$$

 R1599
 R1601

1603	REF 574	LAST 1061	00,2570	52 155 1	GENDDV	DXCH	MPAC	WE NEED A AND B ONLY FOR FIRST DV.
1604			00,2571	0 0006 1	+1	EXTEND		(SPECIAL UNIT PROLOGUE ENTERS HERE).
1605	REF 113	LAST 1060	00,2572	10 130 1		DV	BUF	A NOW CONTAINS Q AND L, R.
1606	REF 575	LAST 1062	00,2573	52 155 1		DXCH	MPAC	
1607	REF 576	LAST 1062	00,2574	4 0154 0		CS	MPAC	FORM DIVIDEND FOR MINOR PART OF RESULT.
1608			00,2575	0 0006 1		EXTEND		
1609	REF 114	LAST 1062	00,2576	7 0131 0		MP	BUF +1	
1610	REF 577	LAST 1062	00,2577	6 0155 0		AD	MPAC +1	OVERFLOW AT THIS POINT IS POSITIVE SINCE
1611			00,2600	54 000 0		OVSF		R IS POSITIVE IN EVERY CASE.
1612			00,2601	1 2606 1		TCF	+5	
1613			00,2602	0 0006 1		EXTEND		OVERFLOW CAN BE REMOVED BY SUBTRACTING C
1614	REF 115	LAST 1062	00,2603	60 130 0		SU	BUF	(BUF) ONCE SINCE R IS ALWAYS LESS THAN C
1615	REF 578	LAST 1062	00,2604	24 154 1		INCR	MPAC	IN THIS CASE. INCR COMPENSATES SUBTRACT.
1616	REF 1		00,2605	1 2610 0		TCF	+DOWN	(SINCE C(A) IS STILL POSITIVE).
1617			00,2606	0 0006 1	+5	EXTEND		C(A) CAN BE MADE LESS THAN C IN MAGNI-
1618	REF 1		00,2607	6 2620 1		BZMF	-UP	TUDE BY DIMINISHING IT BY C (SINCE C IS
A1619								NOT LESS THAN .5) UNLESS C(A) = 0.

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1620			00,2610	0 0006 1	+DOWN	EXTEND		
1621	REF 116	LAST 1062	00,2611	60 130 0		SU	BUF	IF POSITIVE, REDUCE ONLY IF NECESSARY
1622			00,2612	0 0006 1		EXTEND		SINCE THE COMPENSATING INCR MIGHT CAUSE
1623			00,2613	1 2616 0		BZF	+3	OVERFLOW.
1624			00,2614	0 0006 1		EXTEND		DONT SUBTRACT UNLESS RESULT IS POSITIVE
1625	REF 1		00,2615	6 2624 0		BZMF	ENDMAXDV	OR ZERO.
1626	REF 579	LAST 1062	00,2616	24 154 1	+3	INCR	MPAC	KEEP SUBTRACT HERE AND COMPENSATE.
1627	REF 2	LAST 1067	00,2617	1 2625 0		TCF	FINALDV	
1628			00,2620	0 0006 1	-UP	EXTEND		IF ZERO, SET MINOR PART OF RESULT TO
1629	REF 3	LAST 1063	00,2621	1 2630 1		BZF	FINALDV +3	ZERO.
1630			00,2622	0 0006 1		EXTEND		IF NEGATIVE, ADD C TO A, SUBTRACTING ONE
1631	REF 580	LAST 1063	00,2623	26 154 0		DIM	MPAC	TO COMPENSATE. DIM IS OK HERE SINCE THE
1632	REF 117	LAST 1063	00,2624	6 0130 0	ENDMAXDV	AD	BUF	MAJOR PART NEVER GOES NEGATIVE.

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DO DV TO OBTAIN MINOR PART OF RESULT.

1633			00,2625	22 007 0	FINALDV	ZL	
1634			00,2626	0 0006 1		EXTEND	
1635	REF 118	LAST 1063	00,2627	10 130 1		DV	BUF
1636	REF 581	LAST 1063	00,2630	54 155 1	+3	TS	MPAC +1

1637	REF 6	LAST 1058	00,2631	10 136 1		CCS	DVSIGN	LEAVE RESULT POSITIVE UNLESS C(DVSIGN)=
1638	REF 277	LAST 1054	00,2632	0 0002 0		TC	Q	-0.
1639	REF 278	LAST 1064	00,2633	0 0002 0		TC	Q	
1640	REF 279	LAST 1064	00,2634	0 0002 0		TC	Q	

1641			00,2635	0 0006 1		EXTEND		
1642	REF 582	LAST 1064	00,2636	4 0155 1		DCS	MPAC	
1643	REF 583	LAST 1064	00,2637	52 155 1		DXCH	MPAC	
1644	REF 206	LAST 1060	00,2640	3 4755 1		CAF	ZERO	SO WE ALWAYS RETURN WITH C(A) = 0.
1645	REF 280	LAST 1064	00,2641	0 0002 0		TC	Q	

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P1646 IF THE MAJOR PARTS OF THE DIVISOR AND DIVIDEND ARE EQUAL, BUT THE MINOR PARTS ARE SUCH THAT THE
 R1648 DIVIDEND IS STRICTLY LESS THAN THE DIVISOR IN MAGNITUDE, THE FOLLOWING APPROXIMATION IS USED. THE ASSUMPTIONS
 R1650 ARE THE SAME AS THE GENERAL ROUTINE WITH THE ADDITION THAT SIGN AGREEMENT IS NECESSARY (B, C, & D POSITIVE).

R1652 $C + SB = (C + B - D)$

R1653 $= 37777 + S(-)$

R1654 $C + SD = (-C)$

R1655 THE DIVISION MAY BE PERFORMED IMMEDIATELY SINCE B IS STRICTLY LESS THAN D AND C IS NOT LESS THAN .5.

1657	REF 584	LAST 1064	00,2642 4 0154 0	MAXDV	CS	MPAC	SEE IF MAXDV CASE STILL HOLDS AFTER
1658	REF 119	LAST 1064	00,2643 6 0130 0		AD	BUF	NORMALIZATION.
1659			00,2644 0 0006 1			EXTEND	
1660			00,2645 1 2647 1		BZF	+2	
1661	REF 2	LAST 1061	00,2646 1 2570 0		TCF	GENDDV	MPAC NOW LESS THAN BUF - DIVIDE AS USUAL
1662	REF 28	LAST 1059	00,2647 3 4733 1	+2	CAF	PUSHMAX	SET MAJOR PART OF RESULT.
1663	REF 585	LAST 1065	00,2650 54 154 0		TS	MPAC	
1664	REF 120	LAST 1065	00,2651 4 0131 0		CS	BUF +1	FORM DIVIDEND OF MINOR PART OF RESULT.
1665	REF 586	LAST 1065	00,2652 6 0155 0		AD	MPAC +1	
1666	REF 2	LAST 1063	00,2653 1 2624 1		TCF	ENDMAXDV	GO ADD C AND DO DIVIDE, ATTACHING SIGN
A1667							BEFORE EXITING.

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P1668 VECTOR DIVIDED BY SCALAR, V/SC, IS EXECUTED HERE. THE VECTOR IS NOW IN MPAC WITH SCALAR IN BUF.

1670	REF 111	LAST 1057	00,2654	4 4753 0	V/SC2	CS	ONE	INITIALIZE DIVIDEND NORMALIZATION COUNT
1671	REF 4	LAST 1060	00,2655	54 137 0		TS	DVNORMCT	AND DIVISION SIGN REGISTER.
1672	REF 53	LAST 1043	00,2656	54 127 1		TS	VBUF +5	
1673	REF 1		00,2657	0 3010 0		TC	VECA GREE	FORCE SIGN AGREEMENT IN VECTOR
1674	REF 121	LAST 1065	00,2660	52 131 0		DXCH	BUF	
1675	REF 2	LAST 885	00,2661	0 7544 0		TC	AL SIGNAG	SIGN AGREE BUF
1676	REF 122	LAST 1066	00,2662	52 131 0		DXCH	BUF	
1677	REF 123	LAST 1066	00,2663	10 130 1		CCS	BUF	FORCE DIVISOR POSITIVE WITH MAJOR PART
1678	REF 1		00,2664	1 2721 0		TCF	/BUF+	NON-ZERO (IF POSSIBLE).
1679			00,2665	1 2667 0		TCF	+2	
1680	REF 1		00,2666	1 2715 1		TCF	/BUF-	
1681	REF 124	LAST 1066	00,2667	56 131 1		XCH	BUF +1	SHIFT VECTOR AND SCALAR LEFT 4.
1682	REF 125	LAST 1066	00,2670	56 130 0		XCH	BUF	
1683	REF 587	LAST 1065	00,2671	56 155 0		XCH	MPAC +1	
1684	REF 588	LAST 1066	00,2672	56 154 1		XCH	MPAC	
1685			00,2673	0 0006 1		EXTEND		CHECK FOR OVERFLOW IN EACH CASE.
1686			00,2674	1 2676 0		BZF	+2	
1687	REF 3	LAST 1059	00,2675	1 2405 0		TCF	DVOVF	
1688	REF 589	LAST 1066	00,2676	56 160 0		XCH	MPAC +4	
1689	REF 590	LAST 1066	00,2677	56 157 1		XCH	MPAC +3	
1690			00,2700	0 0006 1		EXTEND		
1691			00,2701	1 2703 0		BZF	+2	
1692	REF 4	LAST 1066	00,2702	1 2405 0		TCF	DVOVF	
1693	REF 591	LAST 1066	00,2703	56 162 1		XCH	MPAC +6	
1694	REF 592	LAST 1066	00,2704	56 161 1		XCH	MPAC +5	
1695			00,2705	0 0006 1		EXTEND		
1696			00,2706	1 2710 1		BZF	+2	
1697	REF 5	LAST 1066	00,2707	1 2405 0		TCF	DVOVF	
1698	REF 126	LAST 1066	00,2710	10 130 1		CCS	BUF	
1699	REF 2	LAST 1066	00,2711	1 2721 0		TCF	/BUF+	
1700	REF 6	LAST 1066	00,2712	1 2405 0		TCF	DVOVF	ZERO DIVISOR - OVERFLOW.
1701	REF 2	LAST 1066	00,2713	1 2715 1		TCF	/BUF-	
1702	REF 7	LAST 1066	00,2714	1 2405 0		TCF	DVOVF	
1703			00,2715	0 0006 1	/BUF-	EXTEND		ON NEGATIVE, COMPLEMENT BUF AND MAINTAIN
1704	REF 127	LAST 1066	00,2716	4 0131 0		DCS	BUF	DVSIGN IN VBUF +5.
1705	REF 128	LAST 1066	00,2717	52 131 0		DXCH	BUF	
1706	REF 54	LAST 1066	00,2720	24 127 0		INCR	VBUF +5	

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1707			00,2721	0 0006 1	/BUF+	EXTEND		
1708	REF 129	LAST 1066	00,2722	3 0131 1		DCA	BUF	LEAVE ABS(ORIG DIVISOR) IN BUF2
1709	REF 17	LAST 1059	00,2723	52 134 0		DXCH	BUF2	FOR OVERFLOW TESTING
1710	REF 1		00,2724	1 2732 1		TCF	/NORM	NORMALIZE DIVISOR IN BUF.
1711			00,2725	0 0006 1	/NORM2	EXTEND		
1712	REF 5	LAST 1066	00,2726	24 137 1		AUG	DVNORMCT	IF LESS THAN .5, AUGMENT DVNORMCT AND
1713			00,2727	0 0006 1		EXTEND		DOUBLE DIVISOR.
1714	REF 130	LAST 1067	00,2730	3 0131 1		DCA	BUF	
1715	REF 131	LAST 1067	00,2731	20 131 0		DAS	BUF	
1716	REF 132	LAST 1067	00,2732	3 0130 0	/NORM	CA	BUF	SEE IF DIVISOR NORMALIZED.
1717			00,2733	6 0000 1		DOUBLE		
1718			00,2734	54 000 0		OVSF		
1719	REF 1		00,2735	1 2725 1		TCF	/NORM2	DOUBLE AND TRY AGAIN IF NOT.
1720	REF 1		00,2736	0 2750 1		TC	V/SCDV	DO X COMPONENT DIVIDE.
1721	REF 593	LAST 1066	00,2737	52 160 1		DXCH	MPAC +3	SUPPLY ARGUMENTS IN USUAL SEQUENCE.
1722	REF 594	LAST 1067	00,2740	52 155 1		DXCH	MPAC	
1723	REF 595	LAST 1067	00,2741	52 160 1		DXCH	MPAC +3	
1724	REF 2	LAST 1067	00,2742	0 2750 1		TC	V/SCDV	Y COMPONENT.
1725	REF 596	LAST 1067	00,2743	52 162 0		DXCH	MPAC +5	
1726	REF 597	LAST 1067	00,2744	52 155 1		DXCH	MPAC	
1727	REF 598	LAST 1067	00,2745	52 162 0		DXCH	MPAC +5	
1728	REF 3	LAST 1067	00,2746	0 2750 1		TC	V/SCDV	Z COMPONENT.
1729	REF 2	LAST 1050	00,2747	1 7420 1		TCF	VRUTATEX	GO RE-ARRANGE COMPONENTS BEFORE EXIT.

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P1730

SUBROUTINE USED BY V/SC TO DIVIDE VECTOR COMPONENT IN MPAC,+1 BY THE SCALAR GIVEN IN BUF.

1732	REF 55	LAST 1066	00,2750	3 0127 0	V/SCDV	CA	VBUF +5	REFLECTS SIGN OF SCALAR.
1733	REF 7	LAST 1064	00,2751	54 136 1	TS	DV SIGN		
1734	REF 599	LAST 1067	00,2752	10 154 0	CCS	MPAC		FORCE MPAC POSITIVE, EXITING ON ZERO.
1735	REF 1		00,2753	1 2767 1	TCF	/MPAC+		
1736			00,2754	1 2756 0	TCF	+2		
1737	REF 1		00,2755	1 2763 0	TCF	/MPAC-		
1738	REF 600	LAST 1068	00,2756	10 155 1	CCS	MPAC +1		
1739	REF 2	LAST 1068	00,2757	1 2767 1	TCF	/MPAC+		
1740	REF 281	LAST 1064	00,2760	0 0002 0	TC	Q		
1741	REF 2	LAST 1068	00,2761	1 2763 0	TCF	/MPAC-		
1742	REF 282	LAST 1068	00,2762	0 0002 0	TC	Q		
1743			00,2763	0 0006 1	/MPAC-	EXTEND		USUAL COMPLEMENTING AND SETTING OF SIGN.
1744	REF 601	LAST 1068	00,2764	4 0155 1	DCS	MPAC		
1745	REF 602	LAST 1068	00,2765	52 155 1	DXCH	MPAC		
1746	REF 8	LAST 1068	00,2766	24 136 0	INCR	DV SIGN		
1747	REF 112	LAST 1066	00,2767	4 4753 0	/MPAC+	CS	ONE	INITIALIZE NEAR-ONE SWITCH.
1748	REF 4	LAST 1061	00,2770	54 140 0	TS	MAXDVSW		
1749	REF 603	LAST 1068	00,2771	4 0154 0	CS	MPAC		CHECK POSSIBLE OVERFLOW.
1750	REF 18	LAST 1067	00,2772	6 0133 0	AD	BUF2		UNNORMALIZED INPUT DIVISOR.
1751	REF 343	LAST 1060	00,2773	10 000 0	CCS	A		
1752	REF 1		00,2774	1 3004 1	TCF	DDV CALL		NOT NEAR-ONE
1753			00,2775	1 2777 0	TCF	+2		+0 IS JUST POSSIBLE
1754	REF 8	LAST 1066	00,2776	1 2405 0	TCF	DVOVF		NO HOPE
1755	REF 5	LAST 1068	00,2777	54 140 0	TS	MAXDVSW		SIGNAL POSSIBLE NEAR-ONE CASE
1756	REF 604	LAST 1068	00,3000	4 0155 1	CS	MPAC +1		SEE IF DIVISION CAN BE DONE
1757	REF 19	LAST 1068	00,3001	6 0134 1	AD	BUF2 +1		
1758			00,3002	0 0006 1	EXTEND			
1759	REF 9	LAST 1068	00,3003	6 2405 1	BZMF	DVOVF		
1760	REF 605	LAST 1068	00,3004	52 155 1	DDV CALL	DXCH	MPAC	CALL PRE-DIVIDE NORMALIZATION.
1761	REF 6	LAST 1067	00,3005	50 137 1	INDEX	DVNORMCT		
1762	REF 2	LAST 1060	00,3006	1 2565 1	TCF	MAXTEST		

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1763 00,3007 32506 0 SLOPELO DEC .8324

1764	REF 283	LAST 1068	00,3010	56 002 0	VECAGREE	XCH	Q	SAVE Q IN A
1765	REF 606	LAST 1068	00,3011	52 155 1		DXCH	MPAC	
1766	REF 3	LAST 1066	00,3012	0 7544 0		TC	ALSIGNAG	SIGNAGREE MPAC
1767	REF 607	LAST 1069	00,3013	52 155 1		DXCH	MPAC	
1768	REF 608	LAST 1069	00,3014	52 160 1		DXCH	MPAC +3	
1769	REF 4	LAST 1069	00,3015	0 7544 0		TC	ALSIGNAG	SIGN AGREE MPAC +3
1770	REF 609	LAST 1069	00,3016	52 160 1		DXCH	MPAC +3	
1771	REF 610	LAST 1069	00,3017	52 162 0		DXCH	MPAC +5	
1772	REF 5	LAST 1069	00,3020	0 7544 0		TC	ALSIGNAG	SIGNAGREE MPAC +5
1773	REF 611	LAST 1069	00,3021	52 162 0		DXCH	MPAC +5	
1774	REF 344	LAST 1068	00,3022	0 0000 1		TC	A	

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P1775 THE FOLLOWING ROUTINE EXECUTES THE UNIT INSTRUCTION, WHICH TAKES THE UNIT OF THE VECTOR IN MPAC.

1777	REF 2	LAST 1066	00,3023	0 3010 0	UNIT	TC	VECAGREE	FORCE SIGN AGREEMENT IN VECTOR
1778	REF 3	LAST 1039	00,3024	0 7532 1		TC	MPACVRUF	SAVE ARGUMENT IN VBUF
1779	REF 207	LAST 1064	00,3025	3 4755 1		CAF	ZERO	MUST SENSE OVERFLOW IN FOLLOWING DOT.
1780	REF 6	LAST 1057	00,3026	56 121 0		XCH	DVFIND	
1781	REF 20	LAST 924	00,3027	54 141 1		TS	TEML	
1782	REF 1		00,3030	0 3317 1		TC	VSQSUB	DOT MPAC WITH ITSELF.
1783	REF 21	LAST 1070	00,3031	3 0141 0		CA	TEML	
1784	REF 7	LAST 1070	00,3032	56 121 0		XCH	DVFIND	
1785			00,3033	0 0006 1		EXTEND		
1786			00,3034	1 3036 0		BZF	+2	
1787	REF 10	LAST 1068	00,3035	1 2405 0		TCF	DVOVF	
1788			00,3036	0 0006 1		EXTEND		
1789	REF 612	LAST 1069	00,3037	3 0155 0		DCA	MPAC	LEAVE THE SQUARE OF THE LENGTH OF THE
1790	REF 46	LAST 1024	00,3040	50 120 1		INDEX	FIXLOC	ARGUMENT IN LVSQUARE.
1791	REF 1		00,3041	52 043 1		DXCH	LVSQUARE	
1792	REF 1		00,3042	0 3343 0		TC	SQRTSUB	GO TAKE THE NORMALIZED SQUARE ROOT.
1793	REF 613	LAST 1070	00,3043	10 154 0		CCS	MPAC	CHECK FOR UNIT OVERFLOW.
1794			00,3044	1 3051 1		TCF	+5	MPAC IS NOT LESS THAN .5 UNLESS
1795	REF 200	LAST 1061	00,3045	54 001 1		TS	L	
1796	REF 47	LAST 1070	00,3046	50 120 1		INDEX	FIXLOC	
1797	REF 1		00,3047	52 045 1		DXCH	LV	
1798	REF 11	LAST 1070	00,3050	1 2405 0		TCF	DVOVF	INPUT TO SQRTSUB WAS 0.
1799	REF 2	LAST 562	00,3051	4 4317 1		CS	FOURTEEN	SEE IF THE INPUT WAS SO SMALL THE THE
1800	REF 47	LAST 1056	00,3052	6 0135 0		AD	MPTEMP	FIRST TWO REGISTERS OF THE SQUARE WERE 0
1801	REF 345	LAST 1069	00,3053	10 000 0		CCS	A	
1802			00,3054	4 0000 0		COM		IF SO, SAVE THE NEGATIVE OF THE SHIFT
1803	REF 1		00,3055	1 3133 1		TCF	SMALL	COUNT -150.
1804	REF 1		00,3056	1 3065 0		TCF	LARGE	(THIS IS USUALLY THE CASE.)
1805	REF 1		00,3057	4 4761 1		CS	THIRTEEN	IF THE SHIFT COUNT WAS EXACTLY 14, SET
1806	REF 48	LAST 1070	00,3060	54 135 1		TS	MPTEMP	THE PRE-DIVIDE-NORM COUNT TO -130.
1807	REF 614	LAST 1070	00,3061	3 0154 1		CA	MPAC	SHIFT THE LENGTH RIGHT 14 BEFORE STORING
1808	REF 201	LAST 1070	00,3062	54 001 1	SMALL2	TS	L	(SMALL EXITS TO THIS POINT).
1809	REF 208	LAST 1070	00,3063	3 4755 1		CAF	ZERO	
1810	REF 1		00,3064	1 3112 1		TCF	LARGE2	GO TO STORE LENGTH AND PROCEED.
1811	REF 49	LAST 1070	00,3065	10 135 1	LARGE	CCS	MPTEMP	MOST ALL CASES COME HERE.
1812	REF 1		00,3066	1 3074 0		TCF	LARGE3	SEE IF NO NORMALIZATION WAS REQUIRED BY
1813	REF 1		00,3067	4 2024 1		CS	SQDDV	SQRT, AND IF SO, SET UP FOR A SHIFT
1814	REF 50	LAST 1070	00,3070	54 135 1		TS	MPTEMP	RIGHT 1 BEFORE DIVIDING TO PRODUCE
1815			00,3071	0 0006 1		EXTEND		THE DESIRED HALF-UNIT VECTOR.
1816	REF 615	LAST 1070	00,3072	3 0155 0		DCA	MPAC	

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1817 REF 2 LAST 1070 00.3073 1 3112 1 TCF LARGE2

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1818			00,3074	4 0000 0	LARGE3	COM		LEAVE NEGATIVE OF SHIFT COUNT-1 FOR
1819	REF 51	LAST 1070	00,3075	54 135 1		TS	MPTEMP	PREDIVIDE LEFT SHIFT.
1820			00,3076	4 0000 0		COM		PICK UP REQUIRED SHIFTING BIT TO UNNORM-
1821	REF 346	LAST 1070	00,3077	50 000 1		INDEX	A	ALIZE THE SORT RESULT.
1822	REF 61	LAST 1055	00,3100	3 4736 1		CAF	BIT14	
1823	REF 133	LAST 1067	00,3101	54 130 1		TS	BUF	
1824			00,3102	0 0006 1		EXTEND		
1825	REF 616	LAST 1070	00,3103	7 0155 1		MP	MPAC +1	
1826	REF 134	LAST 1072	00,3104	56 130 0		XCH	BUF	
1827			00,3105	0 0006 1		EXTEND		(UNNORMALIZE THE SORT FOR LV).
1828	REF 617	LAST 1072	00,3106	7 0154 0		MP	MPAC	
1829	REF 202	LAST 1070	00,3107	56 001 0		XCH	L	
1830	REF 135	LAST 1072	00,3110	6 0130 0		AD	BUF	
1831	REF 203	LAST 1072	00,3111	56 001 0		XCH	L	
1832	REF 48	LAST 1070	00,3112	50 120 1	LARGE2	INDEX	FIXLOC	
1833	REF 2	LAST 1070	00,3113	52 045 1		DXCH	LV	LENGTH NOW STORED IN WORK AREA.
1834	REF 113	LAST 1068	00,3114	4 4753 0		CS	ONE	
1835	REF 6	LAST 1068	00,3115	54 140 0		TS	MAXDVSW	NO MAXDV CASES IN UNIT.
1836	REF 56	LAST 1068	00,3116	52 123 0		DXCH	VBUF	PREPARE X COMPONENT FOR DIVIDE, SETTING
1837	REF 618	LAST 1072	00,3117	52 155 1		DXCH	MPAC	LENGTH OF VECTOR AS DIVISOR IN BUF.
1838	REF 136	LAST 1072	00,3120	52 131 0		DXCH	BUF	
1839	REF 1		00,3121	0 3151 1		TC	UNITDV	
1840	REF 57	LAST 1072	00,3122	52 125 0		DXCH	VBUF +2	DO Y AND Z IN USUAL FASHION SO WE CAN
1841	REF 619	LAST 1072	00,3123	52 155 1		DXCH	MPAC	EXIT THROUGH VROTATEX.
1842	REF 620	LAST 1072	00,3124	52 160 1		DXCH	MPAC +3	
1843	REF 2	LAST 1072	00,3125	0 3151 1		TC	UNITDV	
1844	REF 58	LAST 1072	00,3126	52 127 1		DXCH	VBUF +4	
1845	REF 621	LAST 1072	00,3127	52 155 1		DXCH	MPAC	
1846	REF 622	LAST 1072	00,3130	52 162 0		DXCH	MPAC +5	
1847	REF 3	LAST 1072	00,3131	0 3151 1		TC	UNITDV	
1848	REF 3	LAST 1067	00,3132	1 7420 1		TCF	VROTATEX	AND EXIT.

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P1849 IF THE LENGTH OF THE ARGUMENT VECTOR WAS LESS THAN 2(-28), EACH COMPONENT MUST BE SHIFTED LEFT AT LEAST
 R1851 14 PLACES BEFORE THE DIVIDE. NOTE THAT IN THIS CASE, THE MAJOR PART OF EACH COMPONENT IS ZERO.

1853 REF 52 LAST 1072 00,3133 54 135 1 SMALL TS MPTEMP NEGATIVE OF PRE-DIVIDE SHIFT COUNT.

1854 REF 209 LAST 1070 00,3134 3 4755 1 CAF ZERO SHIFT EACH COMPONENT LEFT 14.

1855 REF 59 LAST 1072 00,3135 56 123 1 XCH VBUF +1

1856 REF 60 LAST 1073 00,3136 56 122 0 XCH VBUF

1857 REF 61 LAST 1073 00,3137 56 125 1 XCH VBUF +3

1858 REF 62 LAST 1073 00,3140 56 124 0 XCH VBUF +2

1859 REF 63 LAST 1073 00,3141 56 127 0 XCH VBUF +5

1860 REF 64 LAST 1073 00,3142 56 126 1 XCH VBUF +4

1861 REF 53 LAST 1073 00,3143 4 0135 1 CS MPTEMP

1862 REF 347 LAST 1072 00,3144 50 000 1 INDEX A

1863 REF 62 LAST 1072 00,3145 3 4736 1 CAF BIF14

1864 REF 1 LAST 1072 00,3146 0 0006 1 EXTEND

1865 REF 623 LAST 1072 00,3147 7 0154 0 MP MPAC

1866 REF 1 LAST 1072 00,3150 1 3062 1 TCF SMALL2

1867 REF 4 LAST 950 4761 THIRTEEN = OCT15

1868 REF 1 LAST 950 4317 FOURTEEN = OCT16

1869 REF 13 LAST 457 4317 OCT16 = R101

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P1870 THE FOLLOWING ROUTINE SETS UP THE CALL TO THE DIVIDE ROUTINES.

1871	REF 624	LAST 1073	00,3151	10-154 0	UNITDV	CCS	MPAC	FORCE MPAC POSITIVE IF POSSIBLE, SETTING
1872	REF 1		00,3152	1 3170 0		TCF	UMPAC+	DVSIGN ACCORDING TO THE SIGN OF MPAC
1873			00,3153	1-3155-1		TCF	+2	SINCE THE DIVISOR IS ALWAYS POSITIVE
1874	REF 1		00,3154	1 3162 0		TCF	UMPAC-	HERE.
1875	REF 625	LAST 1074	00,3155	10-155-1		CCS	MPAC +1	
1876	REF 2	LAST 1074	00,3156	1 3170 0		TCF	UMPAC+	
1877	REF 284	LAST 1069	00,3157	0 0002 0		TC	Q	EXIT IMMEDIATELY ON ZERO.
1878	REF 2	LAST 1074	00,3160	1 3162 0		TCF	UMPAC-	
1879	REF 285	LAST 1074	00,3161	0 0002 0		TC	Q	
1880	REF 210	LAST 1073	00,3162	4 4755 0	UMPAC-	CS	ZERO	IF NEGATIVE, SET -0 IN DVSIGN FOR FINAL
1881	REF 9	LAST 1068	00,3163	54-136-1		TS	DVSIGN	COMPLEMENT.
1882			00,3164	0 0006 1		EXTEND		
1883	REF 626	LAST 1074	00,3165	4 0155-1		DCS	MPAC	PICK UP ABSOLUTE VALUE OF ARG AND JUMP.
1884	REF 54	LAST 1073	00,3166	50-135 0		INDEX	MPTEMP	
1885	REF 3	LAST 1068	00,3167	1-2564 0		TCF	MAXTEST -1	
1886	REF 10	LAST 1074	00,3170	54-136 1	UMPAC+	TS	DVSIGN	SET DVSIGN FOR POSITIVE QUOTIENT.
1887	REF 627	LAST 1074	00,3171	52-155-1		DXCH	MPAC	
1888	REF 55	LAST 1074	00,3172	50-135 0		INDEX	MPTEMP	
1889	REF 4	LAST 1074	00,3173	1-2564 0		TCF	MAXTEST -1	

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P1890 MISCELLANEOUS UNARY OPERATIONS.

1891	REF	1		00,3174	0 3300 1	DSQ	TC	DSQSUB	SQUARE THE DP CONTENTS OF MPAC.
1892	REF	34	LAST 1060	00,3175	1 6061 1		TCF	DANZIG	
1893	REF	33	LAST 1056	00,3176	10 163 1	ABVALABS	CCS	MODE	ABVAL OR ABS INSTRUCTION.
1894	REF	3	LAST 824	00,3177	1 3226 0		TCF	ABS	DO ABS ON SCALAR.
1895	REF	4	LAST 1075	00,3200	1 3226 0		TCF	ABS	
1896	REF	2	LAST 1070	00,3201	0 3317 1	ABVAL	TC	VSQSUB	DOT MPAC WITH ITSELF.
1897	REF	34	LAST 1075	00,3202	22 163 0		LXCH	MODE	MODE IS NOW DP (L ZERO AFTER DAS).
1898				00,3203	0 0006 1		EXTEND		STORE SQUARE OF LENGTH IN WORK AREA.
1899	REF	628	LAST 1074	00,3204	3 0155 0		DCA	MPAC	
1900	REF	49	LAST 1072	00,3205	50 120 1		INDEX	FIXLOC	
1901	REF	2	LAST 1070	00,3206	52 043 1		DXCH	LVSQUARE	

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P1902-----PROGRAM DESCRIPTION-----SUBROUTINE SQR

R1903-----FUNCTIONAL DESCRIPTION-----DOUBLE PRECISION SQUARE ROOT ROUTINE

R1904-----THIS PROGRAM TAKES THE SQUARE ROOT OF THE 27 OR 28 MOST SIGNIFICANT BITS IN THE TRIPLE PRECISION SET OF

R1906-----NUMBERS-MPAC, MPAC+1, AND MPAC+2. THE ROOT IS RETURNED DOUBLE PRECISION IN MPAC AND MPAC+1.

R1908-----WARNING- THIS SUBROUTINE USES A TRIPLE PRECISION INPUT. THE PROGRAMMER MUST ASSURE THE CONTENTS OF MPAC+2

R1910-----ESPECIALLY IF THE CONTENTS OF MPAC IS SMALL OR ZERO. FOR DETAILS SEE STG MEMO NO. 949.

R1912-----CALLING SEQUENCE- IN INTERPRETIVE MODE I.E., FOLLOWING TC INTPRET, SQR NO ADDRESS IS ALLOWED

R1914-----INPUT SCALING THE BINARY POINT IS ASSUMED TO THE RIGHT OF BIT 15. THE ANSWER IS RETURNED WITH THE SAME SCALING

R1916-----SUBROUTINES- GENSCR, MPACSHR, SQRSUB, ABORT

R1917-----ABORT EXIT MODE- ABORTS ON NEGATIVE INPUT -1.2X10E-4 (77775 OCTAL) OR LESS.

R1919-----DISPLAYS ERROR CODE 1302

R1920-----TC ABORT

R1921-----OCT 1302

R1922-----DEBRIS - LOCATIONS BUF, MPTMP, ADDRWD ARE USED

1923 REF 2 LAST 1070 00,3207 0 3343 0 SQR TC SQRSUB TAKE THE SQUARE ROOT OF MPAC.

1924 REF 56 LAST 1074 00,3210 10 135 1 CCS MPTMP RETURNED NORMALIZED SQUARE ROOT. SEE IF

1925 00,3211 1 3213 0 TCF +2 ANY UN-NORMALIZATION REQUIRED AND EXIT

1926 REF 35 LAST 1075 00,3212 1 6061 1 TCF DANZIG IF NOT.

1927 REF 3 LAST 1055 00,3213 6 3733 0 AD NEG12 A RIGHT SHIFT OF MORE THAN 13 COULD BE

1928 00,3214 0 0006 1 EXTEND REQUIRED IF INPUT WAS ZERO IN MPAC, +1.

1929 REF 1 00,3215 6 3221 0 BZNF SQRSHFT GOES HERE IN MOST CASES.

1930 00,3216 22 007 0 ZL IF A LONG SHIFT IS REQUIRED, GO TO

1931 REF 80 LAST 1056 00,3217 22 116 1 LXCH ADDRWD GENERAL RIGHT SHIFT ROUTINES.

1932 REF 4 LAST 1055 00,3220 1 2303 1 TCF GENSCR +4 ADDRWD WAS ZERO TO PREVENT ROUND.

1933 REF 57 LAST 1076 00,3221 50 135 0 SQRSHFT INDEX MPTMP SELECT SHIFTING BIT AND EXIT THROUGH

1934 REF 56 LAST 1026 00,3222 3 4735 1 CAF BIT 5 SHIFT ROUTINES.

1935 REF 58 LAST 1076 00,3223 54 135 1 TS MPTMP

1936 REF 211 LAST 1074 00,3224 3 4755 1 CAF ZERO TO ZERO MPAC +2 IN THE PROCESS.

1937 REF 2 LAST 1055 00,3225 1 2036 1 TCF MPACSHR +3

1938 REF 6 LAST 1052 00,3226 0 6723 1 ABS TC BRANCH TEST SIGN OF MPAC AND COMPLEMENT IF

1939 REF 36 LAST 1076 00,3227 1 6061 1 TCF DANZIG

1940 REF 37 LAST 1076 00,3230 1 6061 1 TCF DANZIG

1941 REF 4 LAST 1046 00,3231 1 7670 0 TCF COMP

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1942	REF 22	LAST 1041	00,3232	4 4751 1	VDEF	CS	FOUR	VECTOR DEFINE - ESSENTIALLY TREATS
1943	REF 23	LAST 1044	00,3233	26 166 1		ADS	PUSHLOC	SCALAR IN MPAC AS X COMPONENT, PUSHES UP
1944			00,3234	0-0006 1		EXTEND		FOR Y AND THEN AGAIN FOR Z.
1945	REF 348	LAST 1073	00,3235	5 0000 1		INDEX	A	
1946			00,3236	3-0003 1		DCA	2	
1947	REF 629	LAST 1075	00,3237	52 160 1		DXCH	MPAC +3	
1948			00,3240	0-0006 1		EXTEND		
1949	REF 24	LAST 1077	00,3241	5 0166 0		INDEX	PUSHLOC	
1950			00,3242	3-0001 0		DCA	0	
1951	REF 630	LAST 1077	00,3243	52 162 0		DXCH	MPAC +5	
1952	REF 2	LAST 1041	00,3244	1 6521 0		TCF	VMODE	MODE IS NON VECTOR.
1953	REF 3	LAST 1075	00,3245	0 3517 1	VSQ	TC	VSQSUB	DOT MPAC WITH ITSELF.
1954	REF 1		00,3246	1 7332 0		TCF	DMODE	MODE IS NOW DP.
1955			00,3247	0 0006 1	PUSH	EXTEND		PUSH DOWN MPAC LEAVING IF LOADED.
1956	REF 631	LAST 1077	00,3250	3 0155 0		DCA	MPAC	
1957	REF 25	LAST 1077	00,3251	50 166 0		INDEX	PUSHLOC	PUSH DOWN FIRST TWO REGISTERS IN EACH
1958			00,3252	52 001 1		DXCH	0	
1959	REF 35	LAST 1075	00,3253	50 163 0		INDEX	MODE	INCREMENT-PUSHDOWN-POINTER.
1960	REF 5	LAST 1021	00,3254	3 6244 0		CAF	NO.WDS	
1961	REF 26	LAST 1077	00,3255	26 166 1		ADS	PUSHLOC	
1962	REF 36	LAST 1077	00,3256	10 163 1		CCS	MODE	
1963	REF 1		00,3257	1 3272 1		TCF	TPUSH	PUSH DOWN MPAC +2.
1964	REF 38	LAST 1076	00,3260	1 6061 1		TCF	DANZIG	DONE FOR DP.
1965			00,3261	0 0006 1		EXTEND		ON VECTOR, PUSH DOWN Y AND Z COMPONENTS.
1966	REF 632	LAST 1077	00,3262	3 0160 0		DCA	MPAC +3	
1967	REF 27	LAST 1077	00,3263	50 166 0		INDEX	PUSHLOC	
1968			00,3264	51 775 0		DXCH	0 -4	
1969			00,3265	0-0006 1		EXTEND		
1970	REF 633	LAST 1077	00,3266	3 0162 1		DCA	MPAC +5	
1971	REF 28	LAST 1077	00,3267	50 166 0		INDEX	PUSHLOC	
1972			00,3270	51 777 1		DXCH	0 -2	
1973	REF 39	LAST 1077	00,3271	1 6061 1		TCF	DANZIG	
1974	REF 634	LAST 1077	00,3272	3 0156 0	TPUSH	CA	MPAC +2	
1975	REF 2	LAST 1020	00,3273	1 6554 1		TCF	ENDTPUSH +2	
1976	REF 50	LAST 1075	00,3274	50 120 1	RVQ	INDEX	FIXLOC	RVQ - RETURN IVA QPRET.
1977	REF 11	LAST 1023	00,3275	3-0052 0		CA	QPRET	
1978	REF 22	LAST 1035	00,3276	54 117 1		TS	POLISH	
1979	REF 5	LAST 1024	00,3277	1 6652 1		TCF	GUTS +4	(ASSUME QPRET POINTS TO FIXED ONLY.)

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P1980 THE FOLLOWING SUBROUTINES ARE USED IN SQUARING MPAC. IN BOTH THE SCALAR AND VECTOR SECT. THEY ARE
 R1982 SPECIAL CASES OF DMPSUB AND DOTSUB, PUT IN TO SAVE SOME TIME.

1983	REF 635	LAST 1077	00,3300	3 0155 0	DSQSUB	CA	MPAC +1	SQUARES THE SCALAR CONTENTS OF MPAC.
1984			00,3301	0-0006-1	EXTEND			
1985			00,3302	7-0000-0	SQUARE			
1986	REF 636	LAST 1078	00,3303	54 156 1	TS	MPAC +2		
1987	REF 212	LAST 1076	00,3304	3 4755 1	CAF	ZERO		FORM 2(CROSS TERM).
1988	REF 637	LAST 1078	00,3305	56 155 0	XCH	MPAC +1		
1989			00,3306	0-0006-1	EXTEND			
1990	REF 638	LAST 1078	00,3307	7 0154 0	MP	MPAC		
1991			00,3310	20-001-1	DDOUBL			AND MAYBE OVERFLOW.
1992	REF 639	LAST 1078	00,3311	20 156 1	DAS	MPAC +1		AND SET A TO NET OVERFLOW.
1993	REF 640	LAST 1078	00,3312	56 154 1	XCH	MPAC		
1994			00,3313	0 0006 1	EXTEND			
1995			00,3314	7 0000 0	SQUARE			
1996	REF 641	LAST 1078	00,3315	20 155 1	DAS	MPAC		
1997	REF 286	LAST 1074	00,3316	0-0002-0	TC	Q		
1998			00,3317	0 0006 1	VSQSUB	EXTEND		DOTS THE VECTOR IN MPAC WITH ITSELF.
1999	REF 8	LAST 1033	00,3320	22 137 1	QXCH	DOTRET		
2000	REF 2	LAST 1075	00,3321	0 3000 1	TC	DSQSUB		SQUARE THE X COMPONENT.
2001	REF 642	LAST 1078	00,3322	52 160 1	DXCH	MPAC +3		
2002	REF 643	LAST 1078	00,3323	52 155 1	DXCH	MPAC		
2003	REF 137	LAST 1072	00,3324	52 131 0	DXCH	BUF		SO WE CAN END IN DOTSUB.
2004	REF 644	LAST 1078	00,3325	3-0156-0	CA	MPAC +2		
2005	REF 138	LAST 1078	00,3326	54 132 0	TS	BUF +2		
2006	REF 3	LAST 1078	00,3327	0 3300 1	TC	DSQSUB		SQUARE Y COMPONENT.
2007	REF 645	LAST 1078	00,3330	52 156 1	DXCH	MPAC +1		
2008	REF 139	LAST 1078	00,3331	20 132 0	DAS	BUF +1		
2009	REF 646	LAST 1078	00,3332	6-0154-1	AD	MPAC		
2010	REF 140	LAST 1078	00,3333	6-0130-0	AD	BUF		
2011	REF 141	LAST 1078	00,3334	54 130 1	TS	BUF		
2012			00,3335	1-3337-1	TCF	+2		
2013	REF 8	LAST 1070	00,3336	54 121 1	TS	OVFIND		IF OVERFLOW.
2014	REF 647	LAST 1078	00,3337	52 162 0	DXCH	MPAC +5		
2015	REF 648	LAST 1078	00,3340	52 155 1	DXCH	MPAC		
2016	REF 4	LAST 1078	00,3341	0 3300 1	TC	DSQSUB		SQUARE Z COMPONENT.
2017	REF 1		00,3342	1-7205-0	TCF	ENDDOT		END AS IN DOTSUB.

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P2018 DOUBLE PRECISION SQUARE ROOT ROUTINE. TAKE THE SQUARE ROOT OF THE TRIPLE PRECISION (MPAC +2 USED ONLY
 R2020 IN NORMALIZATION) CONTENTS OF MPAC AND LEAVE THE NORMALIZED RESULT IN MPAC (C(MPAC) GREATER THAN OR EQUAL TO
 R2022 .5). THE RIGHT SHIFT COUNT (TO UNNORMALIZE) IS LEFT IN MPTMP.

2023	REF 213	LAST 1078	00,3343	3 4755 1	SQRTSUB	CAF	ZERO	START BY ZEROING RIGHT SHIFT COUNT.
2024	REF 59	LAST 1076	00,3344	54 135 1	TS		MPTMP	
2025	REF 649	LAST 1078	00,3345	10 154 0	CCS		MPAC	CHECK FOR POSITIVE ARGUMENT, SHIFTING
2026	REF 1		00,3346	1 3405 1	TCF		SMPAC+	FIRST SIGNIFICANT MPAC REGISTER INTO
2027			00,3347	1 3351 1	TCF		+2	MPAC ITSELF.
2028	REF 1		00,3350	1 3373 1	TCF		SQRTNEG	SEE IF MAG OF ARGUMENT LESS THAN 10(-4).
2029	REF 650	LAST 1079	00,3351	56 156 0	XCH		MPAC +2	MPAC IS ZERO - SHIFT LEFT 14.
2030	REF 651	LAST 1079	00,3352	56 155 0	XCH		MPAC +1	
2031	REF 652	LAST 1079	00,3353	54 154 0	TS		MPAC	
2032	REF 14	LAST 960	00,3354	3 4757 0	CAF		SEVEN	AUGMENT RIGHT SHIFT COUNTER.
2033	REF 60	LAST 1079	00,3355	54 135 1	TS		MPTMP	
2034	REF 653	LAST 1079	00,3356	10 154 0	CCS		MPAC	SEE IF MPAC NOW PNZ.
2035	REF 2	LAST 1079	00,3357	1 3405 1	TCF		SMPAC+	
2036			00,3360	1 3362 1	TCF		+2	
2037	REF 1		00,3361	1 3376 1	TCF		ZEROANS	NEGATIVE BUT LESS THAN 10(-4) IN MAG.
2038	REF 654	LAST 1079	00,3362	56 155 0	XCH		MPAC +1	ZERO - SHIFT LEFT 14 AGAIN.
2039	REF 655	LAST 1079	00,3363	54 154 0	TS		MPAC	
2040	REF 15	LAST 1079	00,3364	3 4757 0	CAF		SEVEN	AUGMENT RIGHT SHIFT COUNTER.
2041	REF 61	LAST 1079	00,3365	26 135 1	ADS		MPTMP	
2042	REF 656	LAST 1079	00,3366	10 154 0	CCS		MPAC	
2043	REF 3	LAST 1079	00,3367	1 3405 1	TCF		SMPAC+	
2044	REF 287	LAST 1078	00,3370	0 0002 0	TC		Q	SQRT(0) = 0.
2045	REF 2	LAST 1079	00,3371	1 3376 1	TCF		ZEROANS	
2046	REF 1		00,3372	1 3453 1	TCF		FIXROOT	DO NOT LEAVE SQRTSUB WITH 0 IN MPAC.
2047	REF 349	LAST 1077	00,3373	10 000 0	SQRTNEG	CCS	A	ARGUMENT IS NEGATIVE, BUT SEE IF SIGN-
2048	REF 1		00,3374	1 3402 0	TCF		SQRTABRT	CORRECTED ARGUMENT IS LESS THAN 10(-4)
2049	REF 657	LAST 1079	00,3375	10 155 1	CCS		MPAC +1	IN MAGNITUDE. IF SO, CALL ANSWER ZERO.
2050	REF 214	LAST 1079	00,3376	3 4755 1	ZEROANS	CAF	ZERO	FORCE ANSWER TO ZERO HERE.
2051	REF 2	LAST 1079	00,3377	1 3453 1	TCF		FIXROOT	
2052	REF 2	LAST 1079	00,3400	1 3402 0	TCF		SQRTABRT	
2053	REF 3	LAST 1079	00,3401	1 3453 1	TCF		FIXROOT	
2054	REF 27	LAST 1025	00,3402	52 165 1	SQRTABRT	DXCH	LOC	
20541	REF 1		00,3403	0 5726 1	TC		PODD001	
2055			00,3404	01302 1	OCT		1302	

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2056	REF 1		00,3405	6 2444 1	SMPAC+	AD	-1/2+?	SEE IF ARGUMENT GREATER THAN OR EQUAL TO
2057			00,3406	0 0006 1		EXTEND		.5.
2058	REF 1		00,3407	6 3456 0		BZMF	SRTEST	IF SO, SEE IF LESS THAN .25.
2059	REF 658	LAST 1079	00,3410	52 155 1		DXCH	MPAC	WE WILL TAKE THE SQUARE ROOT OF MPAC/2.
2060	REF 16	LAST 1061	00,3411	22 021 1		LXCH	SR	SHIFT RIGHT 1 AND GO TO THE SORT ROUTINE
2061			00,3412	0 0006 1		EXTEND		
2062	REF 17	LAST 1061	00,3413	7 4736 0		MP	HALF	
2063	REF 659	LAST 1080	00,3414	52 155 1		DXCH	MPAC	
2064	REF 17	LAST 1080	00,3415	56 021 1		XCH	SR	
2065	REF 660	LAST 1080	00,3416	26 155 1		ADS	MPAC +1	GUARANTEED NO OVERFLOW.
2066	REF 1		00,3417	3 2314 0	ARGHI	CAF	SLOPEHI	ARGUMENT BETWEEN .25 AND .5. GET A
2067			00,3420	0 0006 1		EXTEND		LINEAR APPROXIMATION FOR THIS RANGE.
2068	REF 661	LAST 1080	00,3421	7 0154 0		MP	MPAC	
2069	REF 1		00,3422	6 2566 0		AD	BIASHI	$X0/2 = (MPAC/2)(SLOPEHI) + BIASHI/2.$
2070	REF 142	LAST 1078	00,3423	54 130 1	+4	TS	BUF	$X0/2$ (ARGLO ENTERS HERE).
2071	REF 662	LAST 1080	00,3424	3 0154 1		CA	MPAC	SINGLE-PRECISION THROUGHOUT.
2072			00,3425	22 007 0		ZL		
2073			00,3426	0 0006 1		EXTEND		
2074	REF 143	LAST 1080	00,3427	10 130 1		DV	BUF	$(MPAC/2)/(X0/2)$
2075			00,3430	0 0006 1		EXTEND		
2076	REF 18	LAST 1080	00,3431	7 4736 0		MP	HALF	
2077	REF 144	LAST 1080	00,3432	26 130 1		ADS	BUF	$X1 = X0/2 + .5(MPAC/2)/(X0/2).$
2078			00,3433	0 0006 1		EXTEND		
2079	REF 19	LAST 1080	00,3434	7 4736 0		MP	HALF	FORM UP $X1/2.$
2080	REF 663	LAST 1080	00,3435	52 155 1		DXCH	MPAC	SAVE AND BRING OUT ARGUMENT.
2081			00,3436	0 0006 1		EXTEND		TAKE DP QUOTIENT WITH $X1.$
2082	REF 145	LAST 1080	00,3437	10 130 1		DV	BUF	
2083	REF 146	LAST 1080	00,3440	54 131 0		TS	BUF +1	SAVE MAJOR PART OF QUOTIENT.
2084	REF 215	LAST 1079	00,3441	3 4755 1		CAF	ZERO	FORM MINOR PART OF QUOTIENT USING
2085	REF 204	LAST 1072	00,3442	56 001 0		XCH	L	(REMAINDER, 0).
2086			00,3443	0 0006 1		EXTEND		
2087	REF 147	LAST 1080	00,3444	10 130 1		DV	BUF	
2088	REF 205	LAST 1080	00,3445	54 001 1		TS	L	IN PREPARATION FOR DAS.
2089	REF 148	LAST 1080	00,3446	3 0131 1		CA	BUF +1	
2090	REF 664	LAST 1080	00,3447	20 155 1		DAS	MPAC	$X2 = X1/2 + (MPAC/2)X1$
2091			00,3450	0 0006 1		EXTEND		OVERFLOWS IF ARG. NEAR POSMAX.
2092	REF 1		00,3451	1 3455 1		BZF	TCQBANK00	
2093	REF 29	LAST 1065	00,3452	3 4733 1		CAF	POS MAX	
2094	REF 665	LAST 1080	00,3453	54 154 0	FIXROOT	TS	MPAC	
2095	REF 666	LAST 1080	00,3454	54 155 1		TS	MPAC +1	
2096	REF 288	LAST 1079	00,3455	0 0002 0	TCQBANK00	TC	0	RETURN TO CALLER TO UNNORMALIZE, ETC.

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2097	REF 1		00,3456 6 4737 0	SRTEST	AD	QUARTER	ARGUMENT WAS LESS THAN .5, SEE IF LESS
2098			00,3457 0 0006 1		EXTEND		THAN .25.
2099	REF 1		00,3460 6 3502 0		BZMF	SQRTNORM	IF SO, BEGIN NORMALIZATION.
2100	REF 667	LAST 1080	00,3461 52 155 1		DXCH	MPAC	IF BETWEEN .5 AND .25, SHIFT RIGHT 1 AND
2101	REF 18	LAST 1080	00,3462 22 021 1		LXCH	SR	START AT ARGLO.
2102			00,3463 0 0006 1		EXTEND		
2103	REF 20	LAST 1080	00,3464 7 4736 0		MP	HALF	
2104	REF 668	LAST 1081	00,3465 52 155 1		DXCH	MPAC	
2105	REF 19	LAST 1081	00,3466 56 021 1		XCH	SR	
2106	REF 669	LAST 1081	00,3467 26 155 1		ADS	MPAC +1	NO OVERFLOW.
2107	REF 1		00,3470 3 3007 0	ARGLO	CAF	SLOPFLD	(NORMALIZED) ARGUMENT BETWEEN .125 AND
2108			00,3471 0 0006 1		EXTEND		.25
2109	REF 670	LAST 1081	00,3472 7 0154 0		MP	MPAC	
2110	REF 1		00,3473 6 2270 0		AD	BIASLO	
2111	REF 1		00,3474 1 3423 0		TCF	ARGHI +4	BEGIN SQUARE ROOT.
2112			00,3475 0 0006 1	SQRTNM2	EXTEND		SHIFT LEFT 2 AND INCREMENT RIGHT SHIFT
2113	REF 671	LAST 1081	00,3476 3 0156 0		DCA	MPAC +1	COUNT (FOR TERMINAL UNNORMALIZATION).
2114	REF 672	LAST 1081	00,3477 20 156 1		DAS	MPAC +1	
2115	REF 673	LAST 1081	00,3500 6 0154 1		AD	MPAC	
2116	REF 674	LAST 1081	00,3501 26 154 0		ADS	MPAC	(NO OVERFLOW).
2117	REF 62	LAST 1079	00,3502 24 135 0	SQRTNORM	INCR	MPAC	FIRST TIME THROUGH, JUST SHIFT LEFT
2118			00,3503 0 0006 1		EXTEND		(PUTS IN EFFECTIVE RIGHT SHIFT SINCE
2119	REF 675	LAST 1081	00,3504 3 0156 0		DCA	MPAC +1	WE WANT MPAC/2).
2120	REF 676	LAST 1081	00,3505 20 156 1		DAS	MPAC +1	
2121	REF 677	LAST 1081	00,3506 6 0154 1		AD	MPAC	
2122	REF 678	LAST 1081	00,3507 26 154 0		ADS	MPAC	(AGAIN NO OVERFLOW).
2123			00,3510 6 0000 1		DOUBLE		
2124	REF 19	LAST 461	00,3511 54 022 0		TS	CYL	
2125	REF 20	LAST 1081	00,3512 10 022 0	NORMTEST	CCS	CYL	SEE IF ARGUMENT NOW NORMALIZED AT
2126	REF 21	LAST 1081	00,3513 10 022 0		CCS	CYL	GREATER THAN .125.
2127	REF 1		00,3514 1 3475 0		TCF	SQRTNM2	NO - SHIFT LEFT 2 MORE AND TRY AGAIN.
2128	REF 2	LAST 1081	00,3515 1 3417 1		TCF	ARGHI	YES - NOW BETWEEN .5 AND .25.
2129	REF 1		00,3516 1 3470 0		TCF	ARGLO	ARGUMENT NOW BETWEEN .25 AND .125.

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P2130 TRIGONOMETRIC FUNCTION PACKAGE.

R2131 THE FOLLOWING TRIGONOMETRIC FUNCTIONS ARE AVAILABLE AS INTERPRETIVE OPERATIONS:

R2133 1. SIN COMPUTES $(1/2) \text{SINE}(2 - \text{PI} - \text{MPAC})$.
 R2134 2. COS COMPUTES $(1/2) \text{COSINE}(2 - \text{PI} - \text{MPAC})$.
 R2135 3. ASIN COMPUTES $(1/2\text{PI}) \text{ARCSINE}(2 - \text{MPAC})$.
 R2136 4. ACOS COMPUTES $(1/2\text{PI}) \text{ARCCOSINE}(2 - \text{MPAC})$.

R2137 SIN-ASIN AND COS-ACOS ARE MUTUALLY INVERSE, IE $\text{SIN}(\text{ASIN}(X)) = X$.

2139	REF	7	LAST 1076	00,3517	0 6723 1	COSINE	TC	BRANCH	FINDS COSINE USING THE IDENTITY
2139				00,3520	1 3523 1		TCF	+3	$\text{COS}(X) = \text{SIN}(\text{PI}/2 - \text{ABS}(X))$.
2140	REF	1		00,3521	1 3526 1		TCF	PRESINE	
2141	REF	2	LAST 1082	00,3522	1 3526 1		TCF	PRESINE	
2142				00,3523	0 0006 1	+3		EXTEND	
2143	REF	679	LAST 1081	00,3524	4 0155 1		DCS	MPAC	
2144	REF	680	LAST 1082	00,3525	52 155 1		DXCH	MPAC	
2145	REF	2	LAST 1081	00,3526	3 4737 0	PRESINE	CAF	QUARTER	PI/2 SCALED.
2146	REF	681	LAST 1082	00,3527	26 154 0		ADS	MPAC	
2147	REF	682	LAST 1082	00,3530	52 155 1	SINE	DXCH	MPAC	DOUBLE ARGUMENT.
2148				00,3531	20 001 1		DOUBL		
2149				00,3532	54 000 0		OVSK		SEE IF OVERFLOW PRESENT.
2150				00,3533	1 3536 0		TCF	+3	IF NOT, ARGUMENT OK AS IS.
2151				00,3534	0 0006 1			EXTEND	IF SO, WE LOST (OR GAINED) PI. SO
2152				00,3535	4 0001 1		DCOM		COMPLEMENT MPAC USING THE IDENTITY
A2153									$\text{SIN}(X - (+)\text{PI}) = \text{SIN}(-X)$.
2154	REF	683	LAST 1082	00,3536	52 155 1	+3	DXCH	MPAC	
2155	REF	684	LAST 1082	00,3537	3 0154 1		CA	MPAC	SEE IF ARGUMENT GREATER THAN .5 IN
2156				00,3540	6 0000 1		DOUBLE		MAGNITUDE. IF SO, REDUCE IT TO LESS THAN
2157	REF	206	LAST 1080	00,3541	54 001 1		TS	L	.5 ($\pm \text{PI}/2$ SCALED) AS FOLLOWS:
2158	REF	1		00,3542	1 3553 0		TCF	SNL	
2159	REF	350	LAST 1079	00,3543	50 000 1		INDEX	A	IF POSITIVE, FORM $\text{PI} - X$. IF NEGATIVE
2160	REF	4	LAST 858	00,3544	3 4735 1		CAF	NEG1/2 +1	USE $-\text{PI} - X$.
2161				00,3545	6 0000 1		DOUBLE		
2162				00,3546	0 0006 1		EXTEND		
2163	REF	685	LAST 1082	00,3547	60 154 1		SU	MPAC	GUARANTEED NO OVERFLOW.
2164	REF	686	LAST 1082	00,3550	54 154 0		TS	MPAC	
2165	REF	687	LAST 1082	00,3551	4 0155 1		CS	MPAC +1	
2166	REF	688	LAST 1082	00,3552	54 155 1		TS	MPAC +1	

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2167			00,3553	0 0006 1	SN1	EXTEND	SET UP TO EVALUATE HASTINGS POLYNOMIAL
2168	REF 689	LAST 1082	00,3554	3 0155 0		DCA MPAC	
2169	REF 20	LAST 1068	00,3555	52 134 0		DXCH BUF2	
2170	REF 5	LAST 1078	00,3556	0 3300 1		TC DSUSUB	SQUARE MPAC.
2171	REF 2	LAST 856	00,3557	0 7222 1		TC POLY	EVALUATE FOURTH ORDER POLYNOMIAL.
2172			00,3560	00003 1		DEC 3	
2173			00,3561	14441 0		2DEC +.3926990796	
2173			00,3562	37325 1			
2174			00,3563	53250 0		2DEC -.6459637111	
2174			00,3564	60764 1			
2175			00,3565	12146 1		2DEC +.318758717	
2175			00,3566	21276 1			
2176			00,3567	75466 1		2DEC -.074780249	
2176			00,3570	71471 0			
2177			00,3571	00236 0		2DEC +.009694988	
2177			00,3572	32757 0			
2178	REF 1		00,3573	3 2470 0		CAF LBUF2	MULTIPLY BY ARGUMENT AND SHIFT LEFT 2.
2179	REF 19	LAST 1044	00,3574	0 7106 1		TC DMPSUB -1	
2180			00,3575	0 0006 1		EXTEND	
2181	REF 690	LAST 1083	00,3576	3 0156 0		DCA MPAC +1	
2182	REF 691	LAST 1083	00,3577	20 156 1		DAS MPAC +1	
2183	REF 692	LAST 1083	00,3600	6 0154 1		AD MPAC	
2184	REF 693	LAST 1083	00,3601	26 154 0		ADS MPAC	NEITHER SHIFT OVERFLOWS.
2185			00,3602	0 0006 1		EXTEND	
2186	REF 694	LAST 1083	00,3603	3 0156 0		DCA MPAC +1	
2187	REF 695	LAST 1083	00,3604	20 156 1		DAS MPAC +1	
2188	REF 696	LAST 1083	00,3605	6 0154 1		AD MPAC	
2189	REF 697	LAST 1083	00,3606	26 154 0		ADS MPAC	
2190	REF 40	LAST 1077	00,3607	1 6061 1		TCF DANZIG	

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P2191 ARCSIN/ARCCOS ROUTINE.

2192	REF	1		00,3610	3 3631 0	ARCSIN	CAF	LASINEX	COMPUTE ARCSIN BY USING THE IDENTITY
2193				00,3611	1 3613 1		TCF	+2	ARCSIN(X) = PI/2 - ARCCOS(X).
2194	REF	1		00,3612	3 3713 1	ARCCOS	CAF	LDANZIG	(EXITS IMMEDIATELY).
2195	REF	1		00,3613	54 136 1		TS	ESCAPE	
2196	REF	8	LAST 1082	00,3614	0 6723 1		TC	BRANCH	TEST SIGN OF INPUT.
2197	REF	1		00,3615	1 3625 1		TCF	ACOSST	START IMMEDIATELY IF POSITIVE.
2198	REF	1		00,3616	1 3731 0		TCF	ACOSZERO	ARCCOS(0) = PI/2 = .25.
2199				00,3617	0 0006 1		EXTEND		IF NEGATIVE, USE THE IDENTITY
2200	REF	698	LAST 1083	00,3620	4 0155 1		DCS	MPAC	ARCCOS(X) = PI - ARCCOS(-X). FORCING
2201	REF	699	LAST 1084	00,3621	52 155 1		DXCH	MPAC	ARGUMENT POSITIVE.
2202	REF	1		00,3622	3 3734 1		CAF	TCSUBTR	SET EXIT TO DO ABOVE BEFORE
2203	REF	2	LAST 1084	00,3623	56 136 0		XCH	ESCAPE	ARCSIN/ARCCOS CONSIDERATIONS.
2204	REF	1		00,3624	54 137 0		TS	ESCAPE2	
2205	REF	21	LAST 1081	00,3625	4 4736 0	ACOSST	CS	HALF	TEST MAGNITUDE OF INPUT.
2206	REF	700	LAST 1084	00,3626	6 0154 1		AD	MPAC	
2207	REF	351	LAST 1082	00,3627	10 000 0		CCS	A	
2208	REF	1		00,3630	1 3721 1		TCF	ACOSOVF	THIS IS PROBABLY AN OVERFLOW CASE.
2209	REF	1		00,3631	1 3707 0	LASINEX	TCF	ASINEX	
2210	REF	1		00,3632	1 3642 0		TCF	ACOSST2	NO OVERFLOW - PROCEED.
2211	REF	701	LAST 1084	00,3633	10 155 1		CCS	MPAC +1	IF MAJOR PART IS .5, CALL ANSWER
2212	REF	216	LAST 1080	00,3634	3 4755 1		CAF	ZERO	UNLESS MINOR PART NEGATIVE.
2213	REF	1		00,3635	1 3637 1		TCF	ACOS=0	
2214	REF	2	LAST 1084	00,3636	1 3642 0		TCF	ACOSST2	
2215	REF	702	LAST 1084	00,3637	54 155 1	ACOS=0	TS	MPAC +1	
2216	REF	703	LAST 1084	00,3640	54 154 0		TS	MPAC	
2217	REF	3	LAST 1084	00,3641	0 0136 0		TC	ESCAPE	
2218				00,3642	0 0006 1	ACOSST2	EXTEND		NOW THAT ARGUMENT IS IN PROPER RANGE,
2219	REF	704	LAST 1084	00,3643	4 0155 1		DCS	MPAC	BEGIN COMPUTATION. USE HASTINGS
2220	REF	22	LAST 1084	00,3644	6 4736 1		AD	HALF	APPROXIMATION ARCCOS(X) = SQRT(1-X)P(X)
2221	REF	705	LAST 1084	00,3645	52 155 1		DXCH	MPAC	IN A SCALED VERSION WHERE P(X) IS A
2222	REF	21	LAST 1083	00,3646	52 134 0		DXCH	BUF2	SEVENTH-ORDER POLYNOMIAL.
2223	REF	3	LAST 1076	00,3647	0 3343 0		TC	SORTSUB	RETURNS WITH NORMALIZED SQUARE ROOT.
2224	REF	63	LAST 1081	00,3650	10 135 1		CCS	MPTEMP	SEE IF UN-NORMALIZATION REQUIRED.
2225	REF	1		00,3651	1 3714 1		TCF	ACOSSHR	IF SO.

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2226 REF 706 LAST 1084 00,3652 52 155 1 ACOS3 DXCH MPAC SET UP FOR POLYNOMIAL EVALUATION.
2227 REF 22 LAST 1084 00,3653 52 134 0 DXCH BUF2
2228 REF 707 LAST 1085 00,3654 52 155 1 DXCH MPAC

2229 REF 3 LAST 1083 00,3655 0 7222 1 TC POLY
2230 00,3656 00006 1 DEC 6
2231 00,3657 13240 0 2DEC +.353553385 COEFFICIENTS ARE C 2(I+1)/PISQRT(2) WHERE
2231 00,3660 23630 0 2DEC* -.0483017006 B+1* I
2232 00,3661 74721 0 2DEC* +.0200273085 B+2* WHERE C STANDS FOR ORIGINAL COEFFS.
2232 00,3662 47775 1 2DEC* -.0112931863 B+3*
2233 00,3663 02440 0 2DEC* +.00695311612 B+4*
2233 00,3664 20237 0 2DEC* -.00384617957 B+5*
2234 00,3665 75067 1 2DEC* +.001501297736 B+6*
2234 00,3666 70742 1 2DEC* -.000284160334 B+7*
2235 00,3667 03436 0
2235 00,3670 26756 1
2236 00,3671 74037 0
2236 00,3672 57640 1
2237 00,3673 03046 0
2237 00,3674 07143 0
2238 00,3675 76654 1
2238 00,3676 42244 0

2239 REF 2 LAST 1083 00,3677 3 2470 0 CAF LBUF2 DO FINAL MULTIPLY AND GO TO ANY
2240 REF 20 LAST 1083 00,3700 0 7106 1 TC DMPSUB -1 EPILOGUE SEQUENCES.
2241 REF 4 LAST 1084 00,3701 0 0136 0 TC ESCAPE

2242 00,3702 0 0006 1 SUBTR EXTEND EPILOGUE FOR NEGATIVE INPUTS TO ARCCOS.
2243 REF 708 LAST 1085 00,3703 4 0155 1 DCS MPAC
2244 REF 23 LAST 1084 00,3704 6 4736 1 AD HALF FORMS PI - ARCCOS(-X) = ARCCOS(X).
2245 REF 709 LAST 1085 00,3705 52 155 1 DXCH MPAC
2246 REF 2 LAST 1084 00,3706 0 0137 1 TC ESCAPE2 GO TO POSSIBLE ARCSIN EPILOGUE.

2247 00,3707 0 0006 1 ASINEX EXTEND
2248 REF 710 LAST 1085 00,3710 4 0155 1 DCS MPAC ARCSIN EPILOGUE - GET ARCSIN(X)
2249 REF 3 LAST 1082 00,3711 6 4737 0 AD QUARTER = PI/2 - ARCCOS(X).
2250 REF 711 LAST 1085 00,3712 52 155 1 DXCH MPAC
2251 REF 41 LAST 1082 00,3713 1 6061 1 LDANZIG TCF DANZIG

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2252	REF 352	LAST 1084	00,3714	50 000 1	ACOSSHR	INDEX A	THE SHIFT RIGHT IS LESS THAN 14 SINCE
2253	REF 63	LAST 1073	00,3715	3 4736 1	CAF	BIT14	THE INPUT WAS NON-ZERO DP.
2254	REF 64	LAST 1084	00,3716	54 135 1	TS	MPTEMP	
2255	REF 4	LAST 1050	00,3717	0 2073 1	TC	VSHRRND	DP SHIFT RIGHT AND ROUND.
2256	REF 1		00,3720	1 3652 1	TCF	ACOS3	PROCEED.
2257			00,3721	0 0006 1	ACOSOVF	EXTEND	IF MAJOR PART WAS ONLY 1 MORE THAN .5.
2258	REF 2	LAST 1084	00,3722	1 3637 1	BZF	ACOS=0	CALL ANSWER ZERO.
2259			00,3723	0 0006 1	ACOSABRT	EXTEND	IF OVERFLOW, CALL ANSWER ZERO BUT
22591	REF 28	LAST 1079	00,3724	3 0165 0	DCA	LOG	SOUND AN ALARM.
22592	REF 1		00,3725	0 5732 1	TC	ALAR 11	
22593			00,3726	01301 1	OCT	1301	
2260	REF 217	LAST 1084	00,3727	3 4755 1	CAF	ZERL	
22601	REF 3	LAST 1086	00,3730	1 3637 1	TCF	ACOS=0	
2261	REF 4	LAST 1085	00,3731	3 4737 0	ACOSZERO	CAF	ACOS(0) = PI/2.
2262	REF 4	LAST 1086	00,3732	1 3640 1	TCF	ACOS=0 +1	SET MPAC AND EXIT VIA ESCAPE.
2263			00,3733	77763 0	NEG12	DEC	-12
2264	REF 1		00,3734	1 3702 0	TCSUBTR	TCF	SUBTR

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P2265 THE FOLLOWING INSTRUCTIONS ARE AVAILABLE FOR SETTING, MODIFYING, AND BRANCHING ON INDEX REGISTERS:

R2267	1.	AXT	ADDRESS TO INDEX TRUE.
R2268	1.	AXC	ADDRESS TO INDEX COMPLEMENTED.
R2269	3.	LXA	LOAD INDEX FROM ERASABLE.
R2270	4.	LXC	LOAD INDEX COMPLEMENTED FROM ERASABLE.
R2271	5.	SXA	STORE INDEX IN ERASABLE.
R2272	6.	XCHX	EXCHANGE INDEX REGISTER WITH ERASABLE.
R2273	7.	INCR	INCREMENT INDEX REGISTER.
R2274	8.	XAD	ERASABLE ADD TO INDEX REGISTER.
R2275	9.	XSU	ERASABLE SUBTRACT FROM INDEX REGISTER.
R2276	10.	TIX	BRANCH ON INDEX REGISTER AND DECREMENT.

2277			01,2344		BANK 01	
2278	REF	1			COUNT*	\$/INTER
2279	REF	1	01,2344	0 2441 1	TC	TAGSUB SELECT APPROPRIATE INDEX REGISTER.
2280	REF	23	LAST 1077	01,2345 3-0117-0	CA	POLISH
2281	REF	4	LAST 1006	01,2346 50 130 0	INDEX	INDEXLOC CONTAINS C(FIXLOC) OR C(FIXLOC)+1.
2282	REF	30	LAST 1016	01,2347 54 046 1	TS	XI
2283	REF	42	LAST 1085	01,2350 1 6061 1	TCF	DANZIG
2284	REF	2	LAST 1087	01,2351 0 2441 1	TC	TAGSUB
2285	REF	24	LAST 1087	01,2352 4 0117 1	CS	POLISH
2286	REF	1		01,2353 0 2346 1	TC	XSTORE
2287	REF	1		01,2354 0 2427 1	TC	15ADRSERS LOAD INDEX REGISTER FROM ERASABLE.
2288	REF	25	LAST 1087	01,2355 50 117 0	INDEX	POLISH
2289				01,2356 3 0000 1	CA	0
2290	REF	2	LAST 1087	01,2357 1 2346 0	TCF	XSTORE
2291	REF	2	LAST 1087	01,2360 0 2427 1	TC	15ADRSERS LOAD INDEX REG FROM ERASABLE COMPLEMENTED.
2292	REF	26	LAST 1087	01,2361 50 117 0	INDEX	POLISH
2293				01,2362 4 0000 0	CS	0
2294	REF	3	LAST 1087	01,2363 1 2346 0	TCF	XSTORE
2295	REF	3	LAST 1087	01,2364 0 2427 1	TC	15ADRSERS STORE INDEX REGISTER IN ERASABLE.
2296	REF	5	LAST 1087	01,2365 50 130 0	INDEX	INDEXLOC
2297	REF	31	LAST 1087	01,2366 3 0046 0	CA	XI
2298	REF	27	LAST 1087	01,2367 50 117 0	INDEX	POLISH
2299				01,2370 54 000 0	TS	0
2300	REF	43	LAST 1087	01,2371 1 6061 1	TCF	DANZIG

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2301	REF	4	LAST 1087	01,2372	0 2427 1	XCHX	TC	15ADRERS	EXCHANGE INDEX REGISTER WITH ERASABLE.
2302	REF	28	LAST 1087	01,2373	50 117 0		INDEX	POLISH	
2303				01,2374	3 0000 1		CA	0	
2304	REF	6	LAST 1087	01,2375	50 130 0		INDEX	INDEXLOC	
2305	REF	32	LAST 1087	01,2376	56 046 0		XCH	X1	
2306	REF	1		01,2377	1 2367 0		TCF	STORE1	
2307	REF	5	LAST 1088	01,2400	0 2427 1	XAD	TC	15ADRERS	ADD ERASABLE TO INDEX REGISTER.
2308	REF	29	LAST 1088	01,2401	50 117 0		INDEX	POLISH	
2309				01,2402	3 0000 1		CA	0	
2310	REF	7	LAST 1088	01,2403	50 130 0	XAD2	INDEX	INDEXLOC	
2311	REF	33	LAST 1088	01,2404	26 046 1		ADS	X1	IGNORING OVERFLOWS.
2312	REF	44	LAST 1087	01,2405	1 6061 1		TCF	DANZIG	
2313	REF	3	LAST 1087	01,2406	0 2441 1	INCR	TC	TAGSUB	INCREMENT INDEX REGISTER.
2314	REF	30	LAST 1088	01,2407	3 0117 0		CA	POLISH	
2315	REF	1		01,2410	1 2403 0		TCF	XAD2	
2316	REF	6	LAST 1088	01,2411	0 2427 1	XSU	TC	15ADRERS	SUBTRACT ERASABLE FROM INDEX REGISTER.
2317	REF	31	LAST 1088	01,2412	50 117 0		INDEX	POLISH	
2318				01,2413	4 0000 0		CS	0	
2319	REF	2	LAST 1088	01,2414	1 2403 0		TCF	XAD2	
2320	REF	4	LAST 1088	01,2415	0 2441 1	TIX	TC	TAGSUB	BRANCH AND DECREMENT ON INDEX.
2321	REF	8	LAST 1088	01,2416	50 130 0		INDEX	INDEXLOC	
2322	REF	12	LAST 1084	01,2417	4 0050 0		CS	51	
2323	REF	9	LAST 1088	01,2420	50 130 0		INDEX	INDEXLOC	
2324	REF	34	LAST 1088	01,2421	6 0046 0		AD	X1	
2325				01,2422	0 0006 1		EXTEND		
2326	REF	45	LAST 1088	01,2423	6 6061 0		BZMF	DANZIG	NO OPERATION IF DECREMENTED INDEX IS NEGATIVE OR ZERO.
2327	REF	10	LAST 1088	01,2424	50 130 0	DOTIXBR	INDEX	INDEXLOC	
2328	REF	35	LAST 1088	01,2425	56 046 0		XCH	X1	IGNORING OVERFLOWS.
2329	REF	6	LAST 1077	01,2426	1 6646 1		TCF	GOTO	DO THE BRANCH USING THE CADDR IN POLISH.

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P2330 SUBROUTINE TO CONVERT AN EFASABLE ADDRESS (11 BITS) TO AN EBANK SETTING AND SUBADDRESS.

2332	REF 32	LAST 1088	01,2427	4 0117 1	15ADRERS	CS	POLISH	
2333	REF 2	LAST 1016	01,2430	6 4772 1		AD	DEC45	
2334	REF 353	LAST 1086	01,2431	10 000 0		CCS	A	DOES THE ADDRESS POINT TO THE WORK AREA?
2335	REF 51	LAST 1077	01,2432	3 0120 1		CA	FIXLOC	YES. ADD FIXLOC. EBANK OK AS IS.
2336			01,2433	1 2440 1		TCF	+5	
2337	REF 6	LAST 1016	01,2434	3 5007 0		CA	OCT400	NO. SET EBANK & MAKE UP SUBADDRESS.
2338	REF 33	LAST 1089	01,2435	56 117 0		XCH	POLISH	
2339	REF 61	LAST 1024	01,2436	54 003 0		TS	EBANK	
2340	REF 14	LAST 1024	01,2437	7 4357 0		MASK	LOW8	
2341	REF 34	LAST 1089	01,2440	26 117 1	+5	ADS	POLISH	FALL INTO TAGSUB. AND RETURN VIA Q.

R2342 SUBROUTINE WHICH SETS THE ADDRESS OF THE SPECIFIED INDEX IN INDEXLOC. (ACTUALLY, THE ADDRESS -38D.)

2344	REF 52	LAST 1089	01,2441	3 0120 1	TAGSUB	CA	FIXLOC	
2345	REF 11	LAST 1088	01,2442	54 130 1		TS	INDEXLOC	
2346	REF 36	LAST 1056	01,2443	10 020 1		CCS	CYR	BIT 15 SPECIFIES INDEX.
2347	REF 12	LAST 1089	01,2444	24 130 0		INCR	INDEXLOC	0 MEANS USE X2.
2348	REF 289	LAST 1080	01,2445	0 0002 0		TC	Q	
2349	REF 290	LAST 1089	01,2446	0 0002 0		TC	Q	1 FOR X1.

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P2350 MISCELLANEOUS OPERATION CODES WITH DIRECT ADDRESSES. INCLUDED HERE ARE:

R2352	1. ITA	STORE QPRET (RETURN ADDRESS) IN ERASABLE.
R2354	2. CALL	CALL A SUBROUTINE, LEAVING RETURN IN QPRET.
R2356	3. RTB	RETURN TO BASIC LANGUAGE AT THE GIVEN ADDRESS.
R2358	4. BHIZ	BRANCH IF THE HIGH ORDER OF MPAC IS ZERO (SINGLE PRECISION).
R2360	5. BOV	BRANCH ON OVERFLOW.
R2361	6. GOTO	SIMPLE SEQUENCE CHANGE.

2362	REF	57	LAST 1089	01,2447	10 020 1	RTB/BHIZ	CCS	CYR	
2363	REF	35	LAST 1089	01,2450	3 0117 0	RTB	CA	POLISH	
2364	REF	5	LAST 940	01,2451	0 4621 0		TC	SACALL -1	SO A "TC Q" FROM ROUTINE LEADS TO DANZIG
2365	REF	712	LAST 1085	01,2452	10 154 0	BHIZ	CCS	MPAC	
2366	REF	46	LAST 1088	01,2453	1 6061 1		TCF	DANZIG	
2367	REF	7	LAST 1088	01,2454	1 6646 1		TCF	GOTO	
2368	REF	47	LAST 1090	01,2455	1 6061 1		TCF	DANZIG	
2369	REF	8	LAST 1090	01,2456	1 6646 1		TCF	GOTO	
2370	REF	9	LAST 1078	01,2457	10 121 1	BOV(8)	CCS	OVFIND	BRANCH ON OVERFLOW TO BASIC OR INTERP.
2371				01,2460	1 2462 1		TCF	+2	
2372	REF	48	LAST 1090	01,2461	1 6061 1		TCF	DANZIG	
2373	REF	10	LAST 1090	01,2462	54 121 1		TS	OVFIND	
2374	REF	38	LAST 1090	01,2463	10 020 1		CCS	CYR	
2375	REF	1		01,2464	1 2450 0		TCF	RTB	IF BASIC.
2376				01,2465	00360 1	B5TOB8	GCT	360	
2377	REF	9	LAST 1090	01,2466	1 6646 1		TCF	GOTO	

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2378	REF	39	LAST	1090	01,2467	10-020-1	BZE/GOTO	CCS	CYR	SEE WHICH OP-CODE IS DESIRED.
2379	REF	9	LAST	1084	01,2470	0-6723-1		TC	BRANCH	DO BZE.
2380	REF	49	LAST	1090	01,2471	1-6061-1		TCF	DANZIG	
2381	REF	10	LAST	1090	01,2472	1-6646-1		TCF	GOTO	DO GOTO.
2382	REF	50	LAST	1091	01,2473	1-6061-1		TCF	DANZIG	
2383	REF	40	LAST	1091	01,2474	10-020-1	BPL/BMN	CCS	CYR	
2384	REF	1			01,2475	1-2503-1		TCF	BPL	
2385					01,2476	12000-1	5B10	DEC	5-B+10	SHIFTS OP-CODE IN SWITCH INSTRUCTION-ADR
2386	REF	10	LAST	1091	01,2477	0-6723-1		TC	BRANCH	DO BMN.
2387	REF	51	LAST	1091	01,2500	1-6061-1		TCF	DANZIG	
2388	REF	52	LAST	1091	01,2501	1-6061-1		TCF	DANZIG	
2389	REF	11	LAST	1091	01,2502	1-6646-1		TCF	GOTO	ONLY IF NNZ.
2390	REF	11	LAST	1091	01,2503	0-6723-1	BPL	TC	BRANCH	
2391	REF	12	LAST	1091	01,2504	1-6646-1		TCF	GOTO	IF POSITIVE OR ZERO.
2392	REF	13	LAST	1091	01,2505	1-6646-1		TCF	GOTO	
2393	REF	53	LAST	1091	01,2506	1-6061-1		TCF	DANZIG	
2394	REF	41	LAST	1091	01,2507	10-020-1	CALL/ITA	CCS	CYR	
2395	REF	1			01,2510	1-6640-1		TCF	CALL	
2396	REF	7	LAST	445	01,2511	0-5705-0		TC	CCSHOLE	
2397	REF	7	LAST	1088	01,2512	0-2427-1		TC	15ADRRS	STORE QPRET. (TAGSUB AFTER 15ADRRS IS
2398	REF	53	LAST	1089	01,2513	50-120-1		INDEX	FIXLOC	SLOW IN THIS CASE, BUT SAVES STORAGE.)
2399	REF	12	LAST	1077	01,2514	3-0052-0		CA	QPRET	
2400	REF	2	LAST	1088	01,2515	1-2367-0		TCF	MSTORE1	

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P2401 THE FOLLOWING OPERATIONS ARE AVAILABLE FOR ALTERING AND TESTING INTERPRETIVE SWITCHES:

R2403	00	BONSET	SET A SWITCH AND DO A GOTO IF IT WAS ON.
R2404	01	SETGO	SET A SWITCH AND DO A GOTO.
R2405	02	BOFSET	SET A SWITCH AND DO A GOTO IF IT WAS OFF.
R2406	03	SET	SET A SWITCH.

R2407	04	BONINV	INVERT A SWITCH AND BRANCH IF IT WAS ON.
R2408	05	INVGO	INVERT A SWITCH AND DO A GOTO.
R2409	06	BOFINV	INVERT A SWITCH AND BRANCH IF IT WAS OFF.
R2410	07	INVERT	INVERT A SWITCH.

R2411	10	BONCLR	CLEAR A SWITCH AND BRANCH IF IT WAS ON.
R2412	11	CLRGO	CLEAR A SWITCH AND DO A GOTO.
R2413	12	BOFCLR	CLEAR A SWITCH AND BRANCH IF IT WAS OFF.
R2414	13	CLEAR	CLEAR A SWITCH.

R2415	14	BON	BRANCH IF A SWITCH WAS ON.
R2416	16	BOFF	BRANCH IF A SWITCH WAS OFF.

R2417 THE ADDRESS SUPPLIED WITH THE SWITCH INSTRUCTION IS INTERPRETED AS FOLLOWS:

R2419	BITS 1-4		SWITCH BIT NUMBER (1-15).
R2420	BITS 5-8		SWITCH OPERATION NUMBER.
R2421	BITS 9-		SWITCH WORD NUMBER (UP TO 64 SWITCH WORDS).

R2422 THE ADDRESS ITSELF IS MADE UP BY THE YUL SYSTEM ASSEMBLER. THE BRANCH INSTRUCTIONS REQUIRE TWO
 R2424 ADDRESSES. THE SECOND TAKEN AS THE DIRECT (OR INDIRECT IF IN EKASABLE) ADDRESS OF THE BRANCH.

2426	REF	2	LAST	745	01,2516	3	4762	0	SWITCHES	CAF	LOW4	LEAVE THE SWITCH BIT IN SWBIT .
2427	REF	36	LAST	1090	01,2517	7	0117	1	MASK	POLISH		
2428	REF	354	LAST	1089	01,2520	50	000	1	INDEX	A		
2429	REF	37	LAST	1076	01,2521	3	4735	1	CAF	BIT15	(NUMBER FROM LEFT TO RIGHT.)	
2430	REF	1			01,2522	54	131	0	TS	SWBIT		

2431	REF	39	LAST	997	01,2523	3	4745	0	CAF	BIT7	LEAVE THE SWITCH NUMBER IN SWWORD.
2432					01,2524	0	0006	1	EXTEND		
2433	REF	37	LAST	1092	01,2525	7	0117	1	MP	POLISH	
2434	REF	1			01,2526	54	130	1	TS	SWWORD	

2435					01,2527	0	0004	0	INHINT		DURING SWITCH CHANGE SO RUPT CAN USE TOO
2436	REF	355	LAST	1092	01,2530	50	000	1	INDEX	A	LEAVE THE SWITCH WORD ITSELF IN L.
2437	REF	43	LAST	598	01,2531	3	0074	1	CA	STATE	
2438	REF	291	LAST	1089	01,2532	54	002	1	TS	Q	Q WILL BE USED AS A CHANNEL.

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2439	REF 23	LAST 918	01,2533	3 4741 1	CAF	BIT11	
2440			01,2534	0 0006 1	EXTEND		DISPATCH SWITCH BIT OPERATION AS IN BITS
2441	REF 38	LAST 1092	01,2535	7 0117 1	MP	POLISH	7-8 OF POLISH.
2442	REF 1		01,2536	7 2576 0	MASK	B3T034	GETS 4X2-BIT CODE.
2443	REF 356	LAST 1092	01,2537	50 000 1	INDEX	A	
2444			01,2540	1 2541 1	TCF	+1	
2445	REF 2	LAST 1092	01,2541	3 0131 1	CA	SWBIT	00 - SET SWITCH IN QUESTION.
2446			01,2542	0 0006 1	EXTEND		
2447	REF 1		01,2543	04 002 1	ROR	QCHAN	
2448	REF 1		01,2544	1 2553 1	TCF	SWSTORE	
2449	REF 3	LAST 1093	01,2545	3 0131 1	CA	SWBIT	01 - INVERT SWITCH.
2450			01,2546	0 0006 1	EXTEND		
2451	REF 2	LAST 1093	01,2547	06 002 0	RXOR	QCHAN	
2452	REF 2	LAST 1093	01,2550	1 2553 1	TCF	SWSTORE	
2453	REF 4	LAST 1093	01,2551	4 0131 0	CS	SWBIT	10 - CLEAR.
2454	REF 292	LAST 1092	01,2552	7 0002 1	MASK	Q	
2455	REF 2	LAST 1092	01,2553	50 130 0	INDEX	SWWORD	
2456	REF 44	LAST 1092	01,2554	54 074 0	TS	STATE	NEW SWITCH WORD.

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2457		01,2555	0 0003 1	+13D	RELINT	11 -- NOOP.
2458	REF 38 LAST 958	01,2556	3 4737 0		CAF BIT13	
2459		01,2557	0 0006 1		EXTEND	DISPATCH SEQUECE CHANGING OR BRANCHING
2460	REF 39 LAST 1093	01,2560	7 0117 1		MP POLISH	CODE.
2461	REF 2 LAST 1093	01,2561	7 2576 0		MASK B3T0B4	
2462	REF 357 LAST 1093	01,2562	50 000 1		INDEX A	
2463		01,2563	1 2564 0		TCF +1	ORIGINALLY STORED IN BITS 5-6.
2464	REF 293 LAST 1093	01,2564	4 0002 1	+1	CS Q	00 - BRANCH IF ON.
2465	REF 5 LAST 1093	01,2565	7 0131 0	TEST	MASK SWBIT	
2466	REF 358 LAST 1094	01,2566	10 000 0		CCS A	
2467	REF 1	01,2567	1 2577 1		TCF SWSKIP	
2468	REF 1	01,2570	1 6715 0	+5	TCF SWBRANCH	01 - GO TO.
2469	REF 2 LAST 1094	01,2571	1 2577 1		TCF SWSKIP	HERE ONLY ON BIT 15.
2470	REF 8 LAST 1091	01,2572	0 5705 0		TC CASHOLE	
2471	REF 9 LAST 1094	01,2573	0 5705 0		TC CASHOLE	
2472	REF 294 LAST 1094	01,2574	3 0002 0	+9D	CA Q	10 - BRANCH IF OFF.
2473	REF 1	01,2575	1 2565 1		TCF TEST	
2474		01,2576	00014 1	B3T0B4	OCT 0014	
2475	REF 29 LAST 1086	01,2577	24 164 1	SWSKIP	INCK LCC	
2476	REF 1	01,2516		SW/	EQUALS SWITCHES	
2477	REF 54 LAST 1091	01,2600	1 6061 1	+13D	TCF DANZIG	11 - NOOP.

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0001 4732 BLOCK 02

00015 REF 1 COUNT* \$\$/FCONS

R00016 THE FOLLOWING TABLE OF 18 VALUES IS INDEXED. DO NOT INSERT OR REMOVE ANY QUANTITIES.

0002 4732 37777-1 DPOSMAX OCT 37777 MUST PRECEDE POSMAX

0003 4733 37777-1 POSMAX OCT 37777

0004 REF 5 LAST 1082 4734 LIMITS = NEG1/2

0007 4734 57777-1 NEG1/2 OCT 20000 USED BY SIN ROUTINE (MUST BE TWO LOCATIONS IN FRONT OF BIT14)

A0008

R0009 BIT TABLE

0010 4735 40000 0 BIT15 OCT 40000

0011 4736 20000 0 BIT14 OCT 20000

0012 4737 10000 0 BIT13 OCT 10000

0013 4740 04000 0 BIT12 OCT 04000

0014 4741 02000 0 BIT11 OCT 02000

0015 4742 01000 0 BIT10 OCT 01000

0016 4743 00400 0 BIT9 OCT 00400

0017 4744 00200 0 BIT8 OCT 00200

0018 4745 00100 0 BIT7 OCT 00100

0019 4746 00040 0 BIT6 OCT 00040

0020 4747 00020 0 BIT5 OCT 00020

0021 4750 00010 0 BIT4 OCT 00010

0022 4751 00004 0 BIT3 OCT 00004

0023 4752 00002 0 BIT2 OCT 00002

0024 4753 00001 0 BIT1 OCT 00001

R0025 DO NOT DESTROY THIS COMBINATION. SINCE IT IS USED IN DOUBLE PRECISION INSTRUCTIONS.

0027 4754 77777-0 NEG0 OCT 0 MUST PRECEDE ZERO

0028 4755 00000 1 ZERO OCT 0 MUST FOLLOW NEG0

A0029 BIT1 OCT 00001

A0030 NO.WDS OCT 2 INTERPRETER

A0031 OCTAL3 OCT 3 INTERPRETER

A0032 R3D1 OCT 4 PINBALL

0033 4756 00005 1 FIVE OCT 5

A0034 REVCNT OCT 6 INTERPRETER

0035 4757 00007 0 SEVEN OCT 7

A0036 BIT4 OCT 00010

A0037 R2D1 OCT 11 PINBALL

00375 REF 6 LAST 457 4320 OCT11 = R2D1 P20S

A0038 BINCON DEC 10 PINBALL (OCTAL-12)

0039 4760 00013 0 ELEVEN DEC 11

A0040 OCT14 OCT 14 ALARM AND ABORT (FILLER)

00401 4761 00015 0 OCT15 OCT 15

A0041 R1D1 OCT 16 PINBALL

0043 4762 00017 1 LOW4 OCT 17

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A0044			BIT5	OCT	00020	
A0045			ND1	OCT	21	PINBALL
A0046			VD1	OCT	23	PINBALL
A0047			OCT24	OCT	24	SERVICE ROUTINES
A0048			MD1	OCT	25	PINBALL
00485		4763	00030	1	BITS4&5	OCT 30
A0049			OCT31	OCT	31	SERVICE ROUTINES
00491		4764	00033	1	OCT33	OCT 33
00492	REF 3	LAST 865	4764		DEC27	= OCT33
00493			4765	00035	1	OCT35
00494	REF 2	LAST 745	4765		DEC29	= OCT35
0050			4766	00032	0	CALLCODE
A0051					OCT	00032
A0052			LOW5	OCT	37	PINBALL
A0053			33DEC	DEC	33	PINBALL (OCTAL 41)
0054		4767	00045	0	TBUILDFX	DEC 47
0055		4770	00046	0	TDECAYFX	DEC 38
A0056					BIT6	OCT 00040
0057		4771	00050	1	OCT50	OCT 50
0058		4772	00055	1	DEC45	DEC 45
0059		4773	00060	1	SUPER011	OCT 60
0060		4774	00062	0	.5SEC	DEC 50
A0061					BIT7	OCT 00100
0062	REF 40	LAST 1092	4745		SUPER100	= BIT7
A0063						BITS FOR SUPERBNK SETTING 100 (LAST 4K OF ROPE)
0064		4775	00120	1	SUPER101	OCT 120
A0065					OCT121	OCT 121
A0066						SERVICE ROUTINES (FIRST 8K OF ACM)
0067		4776	00140	1	SUPER110	OCT 140
A0068						BITS FOR SUPERBNK SETTING 110 (LAST 8K OF ACM)
0069		4777	00144	0	1SEC	DEC 100
A0070					LOW7	OCT 177
A0071					BIT8	OCT 00200
A0072					OT215	OCT 215
A0073					8.5	OCT 00220
0074		5000	00310	0	2SECS	DEC 200
A0075					LOW8	OCT 377
A0076					BIT9	OCT 00400
0077		5001	00401	1	GN/CCODE	OCT 00401
0079		5002	00454	1	3SECS	DEC 300
0080		5003	00620	0	4SECS	DEC 400
00801		5004	00777	0	LOW9	OCT 777
A0081					BIT10	OCT 01000
A0082					5.5DEGS	DEC .03056
A0083					OCT1103	OCT 1103
0084		5005	01124	1	C5/2	DEC .0363551
0085		5006	01211	1	V05N09	VN 0509
0086		5007	01400	1	OCT1400	OCT 01400
00865		5010	01426	0	V06N22	VN 0622
						P20-P25 SUNDANCE (OCTAL 00765)
						ALARM AND ABORT (OCTAL 01124)
						(SAME AS OCTAL 1211)

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A0087			MID5	OCT	1740	PINBALL
00875	5011	01776 0	BITS2-10	OCT	1776	
0088	5012	01777-1	LOW10	OCT	1777	
A0089			BIT11	OCT	02000	
A0090			2K+3	OCT	2003	PINBALL
0091	5013	02177 1	LOW7+2K	OCT	2177	OP CODE MASK + BANK 1 FBANK SETTING.
0092	5014	02400 1	EBANK5	OCT	02400	
0093	5015	03000 1	PRI03	OCT	03000	
0094	5016	03400 0	EBANK7	OCT	03400	
A0095			LOW11	OCT	3777	PINBALL
A0096			BIT12	OCT	04000	
A0097			RELTAB	OCT	04025	T4RUPT
0098	5017	05000 1	PRI05	OCT	05000	
0099	5020	06000 1	PRI06	OCT	06000	
0100	5021	07000 0	PRI07	OCT	07000	
A0102			BIT13	OCT	10000	
A0103				OCT	10003	T4RUPT RELTAB +1D
A0104			13,7,2	OCT	10102	P20-P25 SUNDANCE
0105	5022	11000 1	PRI011	OCT	11000	
A0106			PRI012	OCT	12000	BANKCALL
0107	5023	13000 0	PRI013	OCT	13000	
0108	5024	14000 1	PRI014	OCT	14000	
A0109				OCT	14031	T4RUPT RELTAB +2D
0110	5025	15000 0	PRI015	OCT	15000	
0111	5026	16000 0	PRI016	OCT	16000	
A0112			85DEGS	DEC	.45556	P20-P25 SUNDANCE (OCTAL 16450)
0113	5027	17000 1	PRI017	OCT	17000	
0114	5030	17770 1	OCT17770	OCT	17770	
A0115			BIT14	OCT	20000	
A0116				OCT	20033	T4RUPT RELTAB +3D
0117	5031	21000 1	PRI021	OCT	21000	
01175	7710		BLOCK	03		
01176	REF	1	COUNT*	44/FCONS		
0118	7710	22000 1	PRI022	OCT	22000	SERVICE ROUTINES
0119	7711	23000 0	PRI023	OCT	23000	
0120	7712	24000 1	PRI024	OCT	24000	
A0121			5/8+1	OCT	24001	SINGLE PRECISION SUBROUTINES
A0122				OCT	24017	T4RUPT RELTAB +4D
0123	7713	25000 0	PRI025	OCT	25000	
0124	7714	26000 0	PRI026	OCT	26000	
0125	7715	27000 1	PRI027	OCT	27000	
A0126			CHRPRI0	OCT	30000	PINBALL
A0127				OCT	30036	T4RUPT RELTAB +5D
0128	7716	31000 0	PRI031	OCT	31000	
0129	7717	31103 1	C1/2	DEC	.7853134	(OCTAL 31103)
0130	7720	32000 0	PRI032	OCT	32000	
0131	7721	33000 1	PRI033	OCT	33000	
0132	7722	34000 0	PRI034	OCT	34000	
A0133				OCT	34034	T4RUPT RELTAB +6D

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0134	7723	35000-1	PRI035	OCT	35000	
0135	7724	36000-1	PRI036	OCT	36000	
0136	7725	37000-0	PRI037	OCT	37000	
0137	7726	37401-0	63/64+1	OCT	37401	
A0138			MID7	OCT	37600	PINBALL
0139	7727	37766-1	OCT37766	OCT	37766	
0140	7730	37774-1	OCT37774	OCT	37774	
0141	7731	37776-0	OCT37776	OCT	37776	
A01411			DPOS MAX	OCT	37777	
A0142			BIT15	OCT	40000	
A0143			OCT40001	OCT	40001	INTERPRETER (CS 1 INSTRUCTION)
0144	7732	40014-0	DLOADCOD	OCT	40014	
0145	7733	40015-1	DLOAD*	OCT	40015	
A0146				OCT	40023	T4RUPT RELTAB +7D
01465	7734	40040-1	BIT15+6	OCT	40040	
01466	7735	40200-1	OCT40200	OCT	40200	
A0147				OCT	44035	T4RUPT RELTAB +8D
A0148				OCT	50037	T4RUPT RELTAB +9D
A0149				OCT	54000	T4RUPT RELTAB +10D
01495	7736	57777-1	-BIT14	OCT	57777	
A0150			RELTAB11	OCT	60000	T4RUPT
0151	7737	65552-0	C3/2	DEC	-3216147	(OCTAL 65552)
0152	7740	70000-0	13,14,15	OCT	70000	
0153	7741	73777-1	-1/8	OCT	73777	
0154	7742	74000-1	HIGH4	OCT	74000	
0155	7743	74056-1	-ENDERAS	DEC	-2001	(OCTAL 74056)
A0156			HI5	OCT	76000	PINBALL
0157	7744	77700-0	HIGH9	OCT	77700	
A0158			-ENDVAC	DEC	-45	INTERPRETER (OCTAL 77722)
A0159			-OCT10	OCT	-10	(OCT 77767)
A0161			NEG4	DEC	-4	(OCTAL 77773)
0162	7745	77774-0	NEG3	DEC	-3	
0163	7746	77775-1	NEG2	OCT	77775	
0164	7747	77776-1	NEGONE	DEC	-1	

L FIXED-FIXED CONSTANT POOL

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P0165 DEFINED BY EQUALS

R0166 IT WOULD BE TO THE USERS ADVANTAGE TO OCCASIONALLY CHECK ANY OF THESE SYMBOLS IN ORDER TO PREVENT ANY
 R0168 ACCIDENTAL DEFINITION CHANGES.

0169	REF	5	LAST	867	7747	MINUS1	=	NEG1
0170	REF	11	LAST	1059	7747	NEG1	=	NEGONE
0171	REF	50	LAST	1004	4753	ONE	=	BIT1
0172	REF	47	LAST	976	4752	TWO	=	BIT2
0173	REF	1			6245	THREE	=	OCTAL3
0174	REF	31	LAST	1028	6245	LOW2	=	THREE
0175	REF	33	LAST	902	4751	FOUR	=	BIT3
0176	REF	5	LAST	1008	6242	SIX	=	REVONT
0177	REF	16	LAST	1079	4757	LOW3	=	SEVEN
0178	REF	40	LAST	976	4750	EIGHT	=	BIT4
0179	REF	7	LAST	1095	4320	NINE	=	R2D1
0180	REF	3	LAST	470	4363	TEN	=	BINCON
0181	REF	3	LAST	745	4760	NOUTCON	=	ELEVEN
0182	REF	15	LAST	456	4360	OCT23	=	VD1
01825	REF	3	LAST	789	4362	OCT25	=	MD1
0183	REF	36	LAST	1055	4742	PRI01	=	BIT10
0184	REF	7	LAST	1089	5007	EBANK3	=	OCT1400
0185	REF	24	LAST	1093	4741	PRI02	=	BIT11
0186	REF	1			4775	OCT120	=	SUPER101
0187	REF	3	LAST	604	4776	OCT140	=	SUPER110
0188	REF	25	LAST	1099	4741	2K	=	BIT11
0189	REF	26	LAST	1099	4741	EBANK4	=	BIT11
0190	REF	31	LAST	827	4740	PRI04	=	BIT12
0191	REF	13	LAST	873	5015	EBANK6	=	PRI03
0192	REF	39	LAST	1094	4737	QUARTER	=	BIT13
0193	REF	40	LAST	1099	4737	PRI010	=	BIT13
01935	REF	1			7663	OCT10001	=	CCSL
0194	REF	24	LAST	1085	4736	PDS1/2	=	HALF
0195	REF	64	LAST	1086	4736	PRI020	=	BIT14
0196	REF	65	LAST	1099	4736	HALF	=	BIT14
0197	REF	5	LAST	468	4355	PRI030	=	CHRPRIO
0198	REF	10	LAST	1026	4355	BIT13-14	=	PRI09
01985	REF	3	LAST	1011	6471	OCT30002	=	TLOAD+1
0199	REF	2	LAST	996	7722	B12T14	=	PRI034
0200	REF	38	LAST	1092	4735	NEGMAX	=	BIT15
0201	REF	39	LAST	1099	4735	VLOADCOD	=	BIT15
0202	REF	1			6107	VLOAD*	=	OCT40001
0203	REF	2	LAST	156	4101	OCT60000	=	RELTAB11
0204	REF	6	LAST	914	4350	BANKMASK	=	HI5

INTERPRETER USES IN PROCESSING STORECODE

L INTERPRETIVE CONSTANTS

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0001	REF	1	23,2000	SETLOC-INTPRET-1
0002			23,2511	BANK
0003	REF	1		COUNT* \$\$/ICONS
0004			23,2511 10000 0	DP1/4TH 2DEC .25
0004			23,2512 00000 1	
0005			23,2513 00000 1	UNITZ 2DEC 0
0005			23,2514 00000 1	
0006			23,2515 00000 1	UNITY 2DEC 0
0006			23,2516 00000 1	
0007			23,2517 20000 0	UNITX 2DEC .5
0007			23,2520 00000 1	
0008			23,2521 00000 1	ZEROVECS 2DEC 0
0008			23,2522 00000 1	
0009			23,2523 00000 1	2DEC 0
0009			23,2524 00000 1	
0010			23,2525 00000 1	2DEC 0
0010			23,2526 00000 1	
0011	REF	13 LAST 910	23,2517	DPHALF = UNITX
0012			23,2527 37777 1	DPPDSMAX OCT 37777
0013			23,2530 37777 1	OCT 37777

L INTERPRETIVE CONSTANTS

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P0014 INTERPRETIVE CONSTANTS IN THE OTHER HALF-MEMORY

0015	REF	1	12,2000		SETLOC	INTPRET2	
0016			12,2000		BANK		
0017	REF	1			COUNT*	\$/ICONS	
0018			12,2000	00000-1	ZUNIT	2DEC	0
0018			12,2001	00000-1			
0019			12,2002	00000-1	YUNIT	2DEC	0
0019			12,2003	00000-1			
0020			12,2004	20000-0	XUNIT	2DEC	.5
0020			12,2005	00000-1			
0021			12,2006	00000-1	ZEROVEC	2DEC	0
0021			12,2007	00000-1			
0022			12,2010	00000-1		2DEC	0
0022			12,2011	00000-1			
0023			12,2012	00000-1		2DEC	0
0023			12,2013	00000-1			
0024			12,2014	77777-0	OCT	77777	-0,-6,-12-MUST-REMAIN-IN-THIS-ORDER
0025			12,2015	77771-0	DEC-6	DEC	-6
0026			12,2016	77762-0	DEC-12	DEC	-12
0027			12,2017	37777-1	LODPMAX	2OCT	3777737777
0027			12,2020	37777-1			THESE TWO CONSTANTS MUST REMAIN
0028			12,2021	37777-1	LODPMAX1	2OCT	3777737777
0028			12,2022	37777-1			ADJACENT AND THE SAME FOR INTEGRATION
0029	REF	6	LAST-965	12,2006	ZERODP	=	ZEROVEC
0030	REF	7	LAST-968	12,2004	HALFDP	=	XUNIT

L SINGLE PRECISION SUBROUTINES

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0001 5032 BLOCK 02
R0002 SINGLE PRECISION SINE AND COSINE

							COUNT*	\$/INTER	
00025	REF	1					AD	HALF	ARGUMENTS SCALED AT PI
0003	REF	25	LAST 1099	5032	6 4736 1	SPCOS	TS	TEMK	
0004	REF	1		5033	55 076 0	SPSIN	TCF	SPT	
0005	REF	1		5034	1 5036 0		CS	TEMK	
0006	REF	2	LAST 1102	5035	4 1076 0		DDOUBLE		
0007				5036	6 0000 1	SPT	TS	TEMK	
0008	REF	3	LAST 1102	5037	55 076 0		TCF	POLLEY	
0009	REF	1		5040	1 5051 1		XCH	TEMK	
0010	REF	4	LAST 1102	5041	57 076 1		INDEX	TEMK	
0011	REF	5	LAST 1102	5042	51 076 1		AD	LIMITS	
0012	REF	3	LAST 1028	5043	6 4734 0		COM		
0013				5044	4 0000 0		AD	TEMK	
0014	REF	6	LAST 1102	5045	6 1076 1		TS	TEMK	
0015	REF	7	LAST 1102	5046	55 076 0		TCF	POLLEY	
0016	REF	2	LAST 1102	5047	1 5051 1		TCF	ARG90	
0017	REF	1		5050	1 5067 1		EXTEND		
0018				5051	0 0006 1	POLLEY	MP	TEMK	
0019	REF	8	LAST 1102	5052	7 1076 0		TS	SQ	
0020	REF	1		5053	55 077 1		EXTEND		
0021				5054	0 0006 1		MP	C5/2	
0022	REF	1		5055	7 5005 0		AD	C3/2	
0023	REF	1		5056	6 7737 0		EXTEND		
0024				5057	0 0006 1		MP	SQ	
0025	REF	2	LAST 1102	5060	7 1077 1		AD	C1/2	
0026	REF	1		5061	6 7717 1		EXTEND		
0027				5062	0 0006 1		MP	TEMK	
0028	REF	9	LAST 1102	5063	7 1076 0		DDOUBL		
0029				5064	20 001 1		TS	TEMK	
0030	REF	10	LAST 1102	5065	55 076 0		TC	Q	
0031	REF	295	LAST 1094	5066	0 0002 0		INDEX	A	
0032	REF	359	LAST 1094	5067	50 000 1	ARG90	CS	LIMITS	
0033	REF	4	LAST 1102	5070	4 4734 1		TC	Q	RESULT SCALED AT 1
0034	REF	296	LAST 1102	5071	0 0002 0				

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0001 5072 BLOCK 02
R0002 TO ENTER A JOB REQUEST REQUIRING NO VAC AREA:

00025	REF	1		5072	0 0004 0	NOVAC	COUNT* \$\$/EXEC	
00029				5072	6 5164 1		INHINT	
0003	REF	1		5073	54 063 0		AD	FAKEPRET
00031	REF	3	LAST 369	5074	54 063 0		TS	NEWPRIO
								LOC(MPAC +6) - LOC(QPRET)
								PRIORITY OF NEW JOB + NOVAC C(FIXLOC)
0004				5075	0 0006 1		EXTEND	
0005	REF	297	LAST 1102	5076	5 0002 0		INDEX	Q
0006				5077	3 0001 0		DCA	0
0007	REF	1		5100	52 066 0		DXCH	NEWLOC
0008	REF	1		5101	3 5163 0		CAF	EXECBANK
0009	REF	24	LAST 1045	5102	56 004 0		XCH	FBANK
0010	REF	1		5103	54 061 1		TS	EXECTEM1
0011	REF	1		5104	1 2625 0		TCF	NOVAC2

ENTER EXECUTIVE BANK.

R0012 TO ENTER A JOB REQUEST REQUIRING A VAC AREA - E.G., ALL (PARTIALLY) INTERPRETIVE JOBS.

0014				5105	0 0004 0	FINDVAC	INHINT	
00145	REF	4	LAST 1103	5106	54 063 0		TS	NEWPRIO
0015				5107	0 0006 1		EXTEND	
0016	REF	298	LAST 1103	5110	5 0002 0		INDEX	Q
0017				5111	3 0001 0		DCA	0
0018	REF	2	LAST 1103	5112	52 066 0	SPVACIN	DXCH	NEWLOC
0019	REF	2	LAST 1103	5113	3 5163 0		CAF	EXECBANK
0020	REF	25	LAST 1103	5114	56 004 0		XCH	FBANK
0021	REF	1		5115	1 2601 0		TCF	FINDVAC2

OFF TO EXECUTIVE SWITCHED-BANK.

R00211 TO ENTER A FINDVAC WITH THE PRIORITY IN NEWPRIO TO THE 2CADR ARRIVING IN A AND L:

R002125 USERS OF SPVAC MUST INHINT BEFORE STORING IN NEWPRIO.

00213	REF	299	LAST 1103	5116	56 002 0	SPVAC	XCH	Q
00214	REF	5	LAST 888	5117	6 7746 0		AD	NEG2
00215	REF	300	LAST 1103	5120	56 002 0		XCH	Q
00216	REF	1		5121	1 5112 1		TCF	SPVACIN

R0022 TO SUSPEND A BASIC JOB SO A HIGHER PRIORITY JOB MAY BE SERVICED:

0024	REF	301	LAST 1103	5122	22 002 0	CHANG1	LXCH	Q
0025	REF	3	LAST 1103	5123	3 5163 0		CAF	EXECBANK
0026	REF	29	LAST 1025	5124	56 006 1		XCH	BBANK
0027	REF	1		5125	1 2706 0		TCF	CHANJOB

R0030 TO SUSPEND AN INTERPRETIVE JOB:

0031	REF	30	LAST 1094	5126	4 0164 0	CHANG2	CS	LUC
R00315			ITRACE (4) REFERS TO "CHANG2".					
0032	REF	207	LAST 1082	5127	54 001 1		TS	L

NEGATIVE LOC SHOWS JOB = INTERPRETIVE.

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0032	REF	4	LAST	1103	5130	3	5163	0	+2	CAF	EXECBANK
00335	REF	30	LAST	1103	5131	54	006	0		TS	BBANK
0034	REF	2	LAST	1103	5132	1	2705	0		TCF	CHANJOB -1

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P0035 TO VOLUNTARILY SUSPEND A JOB UNTIL THE COMPLETION OF SOME ANTICIPATED EVENT (I/O EVENT ETC.):

0037	REF	31	LAST 1103	5133	54 164 0	JOB SLEEP	TS	LOC
0038	REF	5	LAST 1104	5134	3 5163 0	CAF	EXECBANK	
0039	REF	26	LAST 1103	5135	54 004 1	TS	FBANK	
0040	REF	1		5136	1 2776 1	TCF	JOB SLP1	

R0041 TO AWAKEN A JOB PUT TO SLEEP IN THE ABOVE FASHION:

0042				5137	0 0004 0	JOB WAKE	INHINT	
00421	REF	3	LAST 1103	5140	54 065 0	TS	NEWLOC	
0043	REF	71	LAST 1042	5141	4 4752 1	CS	TWO	EXIT IS VIA FINDVAC/NOVAC PROCEDURE.
0044	REF	302	LAST 1103	5142	26 002 1	ADS	Q	
0045	REF	6	LAST 1105	5143	3 5163 0	CAF	EXECBANK	
0046	REF	27	LAST 1105	5144	56 004 0	XCH	FBANK	
0047	REF	1		5145	1 3023 1	TCF	JOB WAKE2	

R0048 TO CHANGE THE PRIORITY OF A JOB CURRENTLY UNDER EXECUTION:

0049				5146	0 0004 0	PRIORCHNG	INHINT	NEW PRIORITY ARRIVES IN A. RETURNS TO
0050	REF	5	LAST 1103	5147	54 063 0	TS	NEWPRIO	CALLER AS SOON AS NEW JOB PRIORITY IS
0051	REF	7	LAST 1105	5150	3 5163 0	CAF	EXECBANK	HIGHEST. PREPARE FOR POSSIBLE BASIC-
0052	REF	31	LAST 1104	5151	56 006 1	XCH	BBANK	STYLE CHANGE-JOB.
0053	REF	9	LAST 1025	5152	54 165 1	TS	BANKSET	
0054	REF	303	LAST 1105	5153	3 0002 0	CA	Q	
0055	REF	1		5154	1 3072 0	TCF	PRIORCH2	

R0058 TO REMOVE A JOB FROM EXECUTIVE CONSIDERATIONS:

0059	REF	8	LAST 1105	5155	3 5163 0	ENDOFJOB	CAF	EXECBANK	
0060	REF	28	LAST 1105	5156	54 004 1	TS	FBANK		
0061	REF	1		5157	1 3103 1	TCF	ENDJOB1		
0062	REF	2	LAST 1103	5160	3 0061 0	ENDFIND	CA	EXECTEM1	RETURN TO CALLER AFTER JOB ENTRY
0063	REF	29	LAST 1105	5161	54 004 1	TS	FBANK		COMPLETE.
0064	REF	2	LAST 521	5162	1 6741 1	TCF	Q+2		
0066	REF	2	LAST 1103	5163	02601 1	EXECBANK	CADR	FINDVAC2	
00665	REF	713	LAST 1090	5164	00110 1	FAKEPRET	ADRES	MPAC -360	LOC(MPAC +6) - LOC(QPRET)

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P0067 LOCATE AN AVAILABLE VAC AREA.

0068				01,2601	BANK	01	
00685	REF	1			COUNT*	\$\$\$EXEC	
0069	REF	3	LAST 1105	01,2601 54 061 1	FINDVAC2	TS	EXECTEM1 (SAVE CALLER'S BANK FIRST.)
0070	REF	4	LAST 244	01,2602 10 400 1	CCS	VAC1USE	
0071	REF	1		01,2603 1 2620 0	TCF	VACFOUND	
0072	REF	3	LAST 244	01,2604 10 454 0	CCS	VAC2USE	
0073	REF	2	LAST 1106	01,2605 1 2620 0	TCF	VACFOUND	
0074	REF	3	LAST 244	01,2606 10 530 0	CCS	VAC3USE	
0075	REF	3	LAST 1106	01,2607 1 2620 0	TCF	VACFOUND	
0076	REF	3	LAST 244	01,2610 10 604 1	CCS	VAC4USE	
0077	REF	4	LAST 1106	01,2611 1 2620 0	TCF	VACFOUND	
0078	REF	3	LAST 244	01,2612 10 660 0	CCS	VAC5USE	
0079	REF	5	LAST 1106	01,2613 1 2620 0	TCF	VACFOUND	
00792	REF	4	LAST 1106	01,2614 22 061 0	LXCH	EXECTEM1	
00794	REF	304	LAST 1105	01,2615 3 0002 0	CA	Q	
0080	REF	3	LAST 245	01,2616 0 5716 1	TC	BAILOUT1	
0081				01,2617 01201 0	OCT	1201	NO VAC AREAS.
0082	REF	72	LAST 1105	01,2620 6 4752 0	VACFOUND	AD TWO	RESERVE THIS VAC AREA BY STORING A ZERO
0083				01,2621 22 007 0	ZL		IN ITS VAC USE REGISTER AND STORE THE
0084	REF	360	LAST 1102	01,2622 50 000 1	INDEX	A	ADDRESS OF THE FIRST WORD OF IT IN THE
0085				01,2623 21 777 0	LXCH	0 -1	LOW NINE BITS OF THE PRIORITY WORD.
0086	REF	6	LAST 1105	01,2624 26 063 0	ADS	NEWPRIO	
0087	REF	218	LAST 1086	01,2625 3 4755 1	NOVAC2	CAF ZERO	NOVAC ENTERS HERE. FIND A CORE SET.
0088	REF	5	LAST 458	01,2626 54 064 1	TS	LOGCTR	
0089	REF	1		01,2627 3 2634 1	CAF	NO CORES	SEVEN SETS OF ELEVEN REGISTERS EACH.
0090	REF	1		01,2630 54 062 1	NOVAC3	TS	EXECTEM2
0091	REF	6	LAST 1106	01,2631 50 064 0	INDEX	LOGCTR	
0092	REF	12	LAST 863	01,2632 10 167 0	CCS	PRIORITY	EACH PRIORITY REGISTER CONTAINS -0 IF
0093	REF	1		01,2633 1 2674 1	TCF	NEXTCORE	THE CORRESPONDING CORE SET IS AVAILABLE.
0094				01,2634 00007 0	NO CORES	DEC 7	
0095	REF	2	LAST 1106	01,2635 1 2674 1	TCF	NEXTCORE	AN ACTIVE JOB HAS A POSITIVE PRIORITY
A0096							BUT A DORMANT JOB'S PRIORITY IS NEGATIVE

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0097	REF	7	LAST 1106	01,2636	3 0063 1	CORFOUND	CA	NEWPRIO	SET THE PRIORITY OF THIS JOB IN THE CORE
0098	REF	7	LAST 1106	01,2637	50 064 0		INDEX	LOCCTR	SET'S PRIORITY REGISTER AND SET THE
0099	REF	13	LAST 1106	01,2640	54 167 0		TS	PRIORITY	JOB'S PUSH-DOWN POINTER AT THE BEGINNING
0100	REF	9	LAST 863	01,2641	7 5004 1		MASK	LOW9	OF THE WORK AREA AND OVERFLOW INDICATOR
0101	REF	8	LAST 1107	01,2642	50 064 0		INDEX	LOCCTR	
0102	REF	29	LAST 1077	01,2643	54 166 1		TS	PUSHLOC	OFF TO PREPARE FOR INTERPRETIVE PROGRAMS
0103	REF	9	LAST 1107	01,2644	10 064 1		CCS	LOCCTR	IF CORE SET-ZERO IS BEING LOADED, SET-UP
0104	REF	1		01,2645	1 2661 0		TCF	SETLOC	OVFIND AND FIXLOC IMMEDIATELY.
0105	REF	11	LAST 1090	01,2646	54 121 1		TS	OVFIND	
0106	REF	30	LAST 1107	01,2647	3 0166 0		CA	PUSHLOC	
0107	REF	54	LAST 1091	01,2650	54 120 0		TS	FIXLOC	
0108	REF	6	LAST 1003	01,2651	10 067 1	SPECTEST	CCS	NEWJOB	SEE IF ANY ACTIVE JOBS WAITING (RAKE).
0109	REF	2	LAST 1107	01,2652	1 2661 0		TCF	SETLOC	MUST BE AWAKENED BUT UNCHANGED JOB.
0110	REF	10	LAST 1094	01,2653	0 5705 0		TC	CCSHOLE	
0111	REF	11	LAST 1107	01,2654	0 5705 0		TC	CCSHOLE	
0112	REF	7	LAST 1107	01,2655	54 067 1		TS	NEWJOB	+0 SHOWS ACTIVE JOB ALREADY SET.
0113	REF	4	LAST 1105	01,2656	52 066 0		DXCH	NEWLOC	
0114	REF	32	LAST 1105	01,2657	52 165 1		DXCH	LOC	
0115	REF	1		01,2660	1 5160 1		TCF	ENDFIND	
0116	REF	5	LAST 1107	01,2661	52 066 0	SETLOC	DXCH	NEWLOC	SET UP THE LOCATION REGISTERS FOR THIS
0117	REF	10	LAST 1107	01,2662	50 064 0		INDEX	LOCCTR	
0118	REF	33	LAST 1107	01,2663	52 165 1		DXCH	LOC	
0119	REF	8	LAST 1107	01,2664	50 067 0		INDEX	NEWJOB	THIS INDEX INSTRUCTION INSURES THAT THE
0120	REF	14	LAST 1107	01,2665	4 0167 0		CS	PRIORITY	HIGHEST ACTIVE PRIORITY WILL BE COMPARED
0121	REF	8	LAST 1107	01,2666	6 0063 1		AD	NEWPRIO	WITH THE NEW PRIORITY TO SEE IF NEWJOB
0122				01,2667	0 0006 1		EXTEND		SHOULD BE SET TO SIGNAL-A SWITCH.
0123	REF	2	LAST 1107	01,2670	6 5160 0		BZMF	ENDFIND	
0124	REF	11	LAST 1107	01,2671	3 0064 0		CA	LOCCTR	LOCCTR IS LEFT SET AT THIS CORE SET IF
0125	REF	9	LAST 1107	01,2672	54 067 1		TS	NEWJOB	THE CALLER WANTS TO LOAD ANY MPAC
0126	REF	3	LAST 1107	01,2673	1 5160 1		TCF	ENDFIND	REGISTERS, ETC.
0127	REF	1		01,2674	3 3033 1	NEXTCORE	CAF	COREINC	
0128	REF	12	LAST 1107	01,2675	26 064 1		ADS	LOCCTR	
0129	REF	2	LAST 1106	01,2676	10 062 1		CCS	EXECTEM2	
0130	REF	1		01,2677	1 2630 1		TCF	NOVAC3	
01302	REF	5	LAST 1106	01,2700	22 061 0		LXCH	EXECTEM1	
01304	REF	305	LAST 1106	01,2701	3 0002 0		CA	@	
0131	REF	4	LAST 1106	01,2702	0 5716 1		TC	BAILOUT1	NO CORE SETS AVAILABLE.
0132				01,2703	01202 0		OCT	1202	

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P0133 THE FOLLOWING ROUTINE SWAPS CORE SET 0 WITH THAT WHOSE RELATIVE ADDRESS IS IN NEWJOB.

01345	REF 34	LAST 1107	01,2704	22 164 1	-2	LXCH	LOC	
0135	REF 10	LAST 1105	01,2705	30 165 0	-1	CAE	BANKSET	BANKSET, NOT BBANK, HAS RIGHT CONTENTS.
0136			01,2706	0 0004 0		CHANJOB	INHINT	
01362			01,2707	0 0006 1			EXTEND	
01364	REF 15	LAST 1001	01,2710	04 007 1		ROR	SUPERBNK	PICK UP CURRENT SBANK FOR BBCON
01366	REF 208	LAST 1103	01,2711	56 001 0		XCH	L	LOC IN A AND BBCON IN L.
01368	REF 10	LAST 1107	01,2712	50 067 0	+4	INDEX	NEWJOB	SWAP LOC AND BANKSET.
0137	REF 35	LAST 1108	01,2713	52 165 1		DXCH	LOC	
0138	REF 36	LAST 1108	01,2714	52 165 1		DXCH	LOC	
01382	REF 11	LAST 1108	01,2715	30 165 0		CAE	BANKSET	
01384			01,2716	0 0006 1			EXTEND	
01398	REF 16	LAST 1108	01,2717	01 007 1		WRITE	SUPERBNK	SET SBANK FOR NEW JOB.
0139	REF 714	LAST 1105	01,2720	52 155 1		DXCH	MPAC	SWAP MULTI-PURPOSE ACCUMULATOR AREAS.
0140	REF 11	LAST 1108	01,2721	50 067 0		INDEX	NEWJOB	
0141	REF 715	LAST 1108	01,2722	52 155 1		DXCH	MPAC	
0142	REF 716	LAST 1108	01,2723	52 155 1		DXCH	MPAC	
0143	REF 717	LAST 1108	01,2724	52 157 0		DXCH	MPAC +2	
0144	REF 12	LAST 1108	01,2725	50 067 0		INDEX	NEWJOB	
0145	REF 718	LAST 1108	01,2726	52 157 0		DXCH	MPAC +2	
0146	REF 719	LAST 1108	01,2727	52 157 0		DXCH	MPAC +2	
0147	REF 720	LAST 1108	01,2730	52 161 0		DXCH	MPAC +4	
0148	REF 13	LAST 1108	01,2731	50 067 0		INDEX	NEWJOB	
0149	REF 721	LAST 1108	01,2732	52 161 0		DXCH	MPAC +4	
0150	REF 722	LAST 1108	01,2733	52 161 0		DXCH	MPAC +4	
0151	REF 723	LAST 1108	01,2734	52 163 1		DXCH	MPAC +6	
0152	REF 14	LAST 1108	01,2735	50 067 0		INDEX	NEWJOB	
0153	REF 724	LAST 1108	01,2736	52 163 1		DXCH	MPAC +6	
0154	REF 725	LAST 1108	01,2737	52 163 1		DXCH	MPAC +6	
0155	REF 219	LAST 1106	01,2740	3 4755 1		CAF	ZERO	
0156	REF 12	LAST 1107	01,2741	56 121 0		XCH	OVFIND	MAKE PUSHLOC NEGATIVE IF OVFIND NZ.
0157			01,2742	0 0006 1			EXTEND	
0158			01,2743	1 2746 1		BZF	+3	
0159	REF 31	LAST 1107	01,2744	4 0166 1		CS	PUSHLOC	
0160	REF 32	LAST 1108	01,2745	54 166 1		TS	PUSHLOC	
0161	REF 33	LAST 1108	01,2746	52 167 0		DXCH	PUSHLOC	
0162	REF 15	LAST 1108	01,2747	50 067 0		INDEX	NEWJOB	
0163	REF 34	LAST 1108	01,2750	52 167 0		DXCH	PUSHLOC	
0164	REF 35	LAST 1108	01,2751	52 167 0		DXCH	PUSHLOC	SWAPS PUSHLOC AND PRIORITY.
0165	REF 10	LAST 1107	01,2752	3 5004 0		CAF	LOW9	SET FIXLOC TO BASE OF VAC AREA.
0166	REF 15	LAST 1107	01,2753	7 0167 0		MASK	PRIORITY	
0167	REF 55	LAST 1107	01,2754	54 120 0		TS	FIXLOC	
0168	REF 36	LAST 1108	01,2755	10 166 1		CCS	PUSHLOC	SET OVERFLOW INDICATOR ACCORDING TO
0169	REF 220	LAST 1108	01,2756	3 4755 1		CAF	ZERO	
0170	REF 1		01,2757	1 2764 1		TCF	ENDPRCHG -1	

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0171	REF 37	LAST 1108	01,2760	4 0166 1	CS	PUSHLOC
0172	REF 38	LAST 1109	01,2761	54 166 1	TS	PUSHLOC
0173	REF 114	LAST 1072	01,2762	3 4753 1	CAF	ONE
0174	REF 13	LAST 1108	01,2763	56 121 0	XCH	GVFIND
0175	REF 16	LAST 1108	01,2764	54 067 1	TS	NEWJOB

0176			01,2765	0 0003 1	ENDPRCHG	RELINT
0177	REF 37	LAST 1108	01,2766	52 165 1	DXCH	LDC
0178			01,2767	0 0006 1		EXTEND
0179			01,2770	6 2772 1	BZMF	+2
0180			01,2771	52 066 0		DTCB

BASIC JOBS HAVE POSITIVE ADDRESSES, SO
DISPATCH WITH A DTCB.
IF INTERPRETIVE, SET UP EBANK, ETC.

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0181			01,2772	4 0000 0	COM		EPILOGUE TO JOB CHANGE FOR INTERPRETIVE
0182	REF 115	LAST 1109	01,2773	6 4753 1	AD	ONE	
0183	REF 38	LAST 1109	01,2774	54 164 0	TS	LOC	RESUME.
0186	REF 1		01,2775	1 6050 0	TCF	INTRSM	

R0187 COMPLETE JOBSLEEP PREPARATIONS.

0188			01,2776	0 0004 0	JOBSLP1	INHINT	
0189	REF 16	LAST 1108	01,2777	4 0167 0	CS	PRIORITY	NNZ PRIORITY SHOWS JOB ASLEEP.
0190	REF 17	LAST 1110	01,3000	54 167 0	TS	PRIORITY	
0191	REF 8	LAST 1044	01,3001	3 6074 1	CAF	LOW7	
0192	REF 32	LAST 1105	01,3002	7 0006 0	MASK	BBANK	
01921			01,3003	0 0006 1	EXTEND		
01922	REF 17	LAST 1108	01,3004	04 007 1	RGR	SUPERBNK	SAVE OLD SUPERBANK VALUE.
0193	REF 12	LAST 1108	01,3005	54 165 1	TS	BANKSET	
0194	REF 221	LAST 1108	01,3006	4 4755 0	CS	ZERO	
0195	REF 149	LAST 1080	01,3007	54 131 0	JOBSLP2	TS	HOLDS - HIGHEST PRIORITY.
0196	REF 1		01,3010	1 3120 0	TCF	LSJCAN	SCAN FOR HIGHEST PRIORITY ALA ENDOFJOB.
01961			01,3011	0 0004 0	NUCHANG2	INHINT	QUICK... DONT LET NEWJOB CHANGE TO +0 .
019611	REF 17	LAST 1109	01,3012	10 067 1	CCS	NEWJOB	
019612			01,3013	1 3016 1	TCF	+3	NEWJOB STILL PNZ
019613			01,3014	0 0003 1	RELINT		NEWJOB HAS CHANGED TO +0. WAKE UP JOB
019614	REF 1		01,3015	1 3216 0	TCF	ADV +2	VIA NUDIRECT. (VERY RARE CASE.)
01962	REF 73	LAST 1106	01,3016	3 4752 0	CAF	TWO	
01963			01,3017	0 0006 1	EXTEND		
01964	REF 30	LAST 863	01,3020	05 011 1	WOK	USALMOUT	TURN ON ACTIVITY LIGHT
01965	REF 39	LAST 1110	01,3021	52 165 1	DXCH	LOC	AND SAVE ADDRESS INFO FOR BENEFIT OF
01966	REF 3	LAST 1104	01,3022	1 2712 0	TCF	CHANJOB + 4	POSSIBLE SLEEPING JOB.

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P0197 TO WAKE UP A JOB, EACH CORE SET IS FOUND TO LOCATE ALL JOBS WHICH ARE ASLEEP. IF THE FCADR IN THE
 R0199 LOC REGISTER OF ANY SUCH JOB MATCHES THAT SUPPLIED BY THE CALLER, THAT JOB IS AWAKENED. IF NO JOB IS FOUND,
 R0201 LOCCTR IS SET TO -1 AND NO FURTHER ACTION TAKES PLACE.

0202	REF	6	LAST	1107	01,3023	54 061 1	JOBWAKE2	TS	EXECTEM1	
0203	REF	222	LAST	1110	01,3024	3 4755 1	CAF	ZERO	BEGIN CORE SET SCAN.	
0204	REF	13	LAST	1107	01,3025	54 064 1	TS	LOCCTR		
0205	REF	2	LAST	1106	01,3026	3 2634 1	CAF	NO CORES		
0206	REF	3	LAST	1107	01,3027	54 062 1	JOBWAKE4	TS	EXECTEM2	
0207	REF	14	LAST	1111	01,3030	50 064 0	INDEX	LOCCTR		
0208	REF	18	LAST	1110	01,3031	10 167 0	CCS	PRIORITY		
0209	REF	1			01,3032	1 3035 0	TCF	JOBWAKE3	ACTIVE JOB - CHECK NEXT CORE SET.	
0210					01,3033	00014 1	COREINC	DEC	12	12-REGISTERS PER CORE SET.
0211	REF	1			01,3034	1 3044 0	TCF	WAKETEST	SLEEPING JOB - SEE IF CADR MATCHES.	
0212	REF	2	LAST	1107	01,3035	3 3033 1	JOBWAKE3	CAF	COREINC	
0213	REF	15	LAST	1111	01,3036	26 064 1	ADS	LOCCTR		
0214	REF	4	LAST	1111	01,3037	10 062 1	CCS	EXECTEM2		
0215	REF	1			01,3040	1 3027 0	TCF	JOBWAKE4		
0216	REF	116	LAST	1110	01,3041	4 4753 0	CS	ONE	EXIT IF SLEEPING JOB NOT FOUND.	
0217	REF	16	LAST	1111	01,3042	54 064 1	TS	LOCCTR		
0218	REF	4	LAST	1107	01,3043	1 5160 1	TCF	ENDFIND		
0219	REF	6	LAST	1107	01,3044	4 0065 0	WAKETEST	CS	NEWLOC	
0220	REF	17	LAST	1111	01,3045	50 064 0	INDEX	LOCCTR		
0221	REF	40	LAST	1110	01,3046	6 0164 1	AD	LOC		
0222					01,3047	0 0006 1	EXTEND			
0223					01,3050	1 3052 1	BZF	+2	IF MATCH.	
0224	REF	2	LAST	1111	01,3051	1 3035 0	TCF	JOBWAKE5	EXAMINE NEXT CORE SET IF NO MATCH.	
0225	REF	18	LAST	1111	01,3052	50 064 0	INDEX	LOCCTR	RE-COMPLEMENT PRIORITY TO SHOW JOB AWAKE	
0226	REF	19	LAST	1111	01,3053	4 0167 0	CS	PRIORITY		
0227	REF	9	LAST	1107	01,3054	54 063 0	TS	NEWPRIO		
0228	REF	19	LAST	1111	01,3055	50 064 0	INDEX	LOCCTR		
0229	REF	20	LAST	1111	01,3056	54 167 0	TS	PRIORITY		
0230	REF	1			01,3057	4 4350 1	CS	FBANKMSK	MAKE UP THE 2CADR OF THE WAKE ADDRESS	
0231	REF	7	LAST	1111	01,3060	7 0065 0	MASK	NEWLOC	USING THE CADR IN NEWLOC AND THE EBANK	
0232	REF	3	LAST	1023	01,3061	6 4741 1	AD	2K	HALF OF BBANK SAVED IN BANKSET.	
0233	REF	8	LAST	1111	01,3062	56 065 1	XCH	NEWLOC		
0234	REF	2	LAST	1111	01,3063	7 4350 1	MASK	FBANKMSK		
0235	REF	20	LAST	1111	01,3064	50 064 0	INDEX	LOCCTR		
0236	REF	13	LAST	1110	01,3065	6 0165 0	AD	BANKSET		
0237	REF	9	LAST	1111	01,3066	54 066 0	TS	NEWLOC +1		
0238	REF	21	LAST	1111	01,3067	10 064 1	CCS	LOCCTR	SPECIAL TREATMENT IF THIS JOB WAS	
0239	REF	3	LAST	1107	01,3070	1 2661 0	TCF	SETLOC	ALREADY IN THE RUN (0) POSITION.	
0240	REF	1			01,3071	1 2651 0	TCF	SPECTEST		

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P0241 PRIORITY CHANGE. CHANGE THE CONTENTS OF PRIORITY AND SCAN FOR THE JOB OF HIGHEST PRIORITY.

0242	REF 41	LAST 1111	01,3072	54 164 0	PRI0CH2	TS	LCC	
0244	REF 223	LAST 1111	01,3073	3 4755 1		CAF	ZLR:	SET FLAG TO TELL ENDJOB SCANNER IF THIS
0245	REF 150	LAST 1110	01,3074	54 130 1		TS	RUF	JOB IS STILL HIGHEST PRIORITY.
0246	REF 11	LAST 1108	01,3075	3 5004 0		CAF	LOW9	
0247	REF 21	LAST 1111	01,3076	7 0167 0		MASK	PRIORITY	
0248	REF 10	LAST 1111	01,3077	6 0063 1		AD	NEWPRIO	
0249	REF 22	LAST 1112	01,3100	54 167 0		TS	PRIORITY	
0250			01,3101	4 0000 0		COM		
0251	REF 1		01,3102	1 3007 1		TCF	JOBSLP2	AND TO EJSCAN.

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P0252 RELEASE THIS CORE SET AND VAC AREA AND SCAN FOR THE JOB OF HIGHEST ACTIVE PRIORITY.

0254			01,3103	0 0004 0	ENDJOB1	INHINT	
0255	REF 224	LAST 1112	01,3104	4 4755 0	CS	ZER0	
0256	REF 151	LAST 1112	01,3105	54 131 0	TS	BUF +1	
0257	REF 23	LAST 1112	01,3106	56 167 1	XCH	PRIORITY	
0258	REF 12	LAST 1112	01,3107	7 5004 1	MASK	LOW9	
02581	REF 209	LAST 1108	01,3110	54 001 1	TS	L	
02582	REF 2	LAST 1103	01,3111	4 5164 0	CS	FAKEPRET	
025821	REF 210	LAST 1113	01,3112	6 0001 0	AD	L	
02583			01,3113	0 0006 1	EXTEND		
02584	REF 2	LAST 1110	01,3114	6 3120 1	BZMF	EJSCAN	NOVAC ENDOFJOB
0259	REF 211	LAST 1113	01,3115	10 001 1	CCS	L	
0260	REF 361	LAST 1106	01,3116	50 000 1	INDEX	A	
0261			01,3117	54 000 0	TS	0	
0262	REF 24	LAST 1113	01,3120	10 203 1	EJSCAN	CCS	PRIORITY +120
0263	REF 1		01,3121	0 3171 0	TC	EJ1	
0264	REF 12	LAST 1107	01,3122	0 5705 0	TC	CCSHOLE	
0265			01,3123	1 3124 1	TCF	+1	
0266	REF 25	LAST 1113	01,3124	10 217 1	CCS	PRIORITY +240	EXAMINE EACH PRIORITY REGISTER TO FIND THE JOB OF HIGHEST ACTIVE PRIORITY.
0267	REF 2	LAST 1113	01,3125	0 3171 0	TC	EJ1	
0268	REF 13	LAST 1113	01,3126	0 5705 0	TC	CCSHOLE	
0269			01,3127	1 3130 1	TCF	+1	
0270	REF 26	LAST 1113	01,3130	10 233 1	CCS	PRIORITY +360	
0271	REF 3	LAST 1113	01,3131	0 3171 0	TC	EJ1	
0272	REF 27	LAST 1113	01,3132	67610 1	-CCSPR	CCS	PRIORITY
0273			01,3133	1 3134 0	TCF	+1	
0274	REF 28	LAST 1113	01,3134	10 247 1	CCS	PRIORITY +480	
0275	REF 4	LAST 1113	01,3135	0 3171 0	TC	EJ1	
0276	REF 14	LAST 1113	01,3136	0 5705 0	TC	CCSHOLE	
0277			01,3137	1 3140 0	TCF	+1	
0278	REF 29	LAST 1113	01,3140	10 263 1	CCS	PRIORITY +600	
0279	REF 5	LAST 1113	01,3141	0 3171 0	TC	EJ1	
0280	REF 15	LAST 1113	01,3142	0 5705 0	TC	CCSHOLE	
0281			01,3143	1 3144 1	TCF	+1	
0282	REF 30	LAST 1113	01,3144	10 277 1	CCS	PRIORITY +720	
0283	REF 6	LAST 1113	01,3145	0 3171 0	TC	EJ1	
0284	REF 16	LAST 1113	01,3146	0 5705 0	TC	CCSHOLE	
0285			01,3147	1 3150 1	TCF	+1	
02851	REF 31	LAST 1113	01,3150	10 313 1	CCS	PRIORITY +840	

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02852	REF	7	LAST 1113	01,3151	0 3171 0	TC	FJ1
02853	REF	17	LAST 1113	01,3152	0 5705 0	TC	CCSHOLE
02854				01,3153	1 3154 0	TCF	+1

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P0286 EVALUATE THE RESULTS OF THE SCAN.

0287	REF 152	LAST 1113	01,3154	10 131 0	CCS	BUF +1	SEE IF THERE ARE ANY ACTIVE JOBS WAITING
0288	REF 18	LAST 1114	01,3155	0 5705 0	TC	CCSHOLE	
0289	REF 19	LAST 1115	01,3156	0 5705 0	TC	CCSHOLE	
0290			01,3157	1 3161 0	TCF	+2	
0291	REF 2	LAST 213	01,3160	1 3206 1	TCF	DUMMYJOB	
0292	REF 153	LAST 1115	01,3161	10 130 1	CCS	BUF	BUF IS ZERO IF THIS IS A PRIORCHG AND
0293			01,3162	1 3164 0	TCF	+2	CHANGED PRIORITY IS STILL HIGHEST.
0294	REF 2	LAST 1108	01,3163	1 2764 1	TCF	ENDPRCHG -1	
0295	REF 362	LAST 1113	01,3164	50 000 1	INDEX	A	OTHERWISE, SET NEWJOB TO THE RELATIVE
0296			01,3165	2 7777 0	CAF	0 -1	ADDRESS OF THE NEW JOB'S CORE SET.
0297	REF 1		01,3166	6 3132 1	AD	-CCSPR	
0298	REF 18	LAST 1110	01,3167	54 067 1	TS	NEWJOB	
0299	REF 4	LAST 1110	01,3170	1 2704 1	TCF	CHANJOB -2	
0300	REF 154	LAST 1115	01,3171	54 132 0	TS	BUF +2	
0301	REF 155	LAST 1115	01,3172	6 0131 1	AD	BUF +1	- OLD HIGH PRIORITY.
0302	REF 363	LAST 1115	01,3173	10 000 0	CCS	A	
0303	REF 156	LAST 1115	01,3174	4 0132 0	CS	BUF +2	
0304	REF 1		01,3175	1 3201 0	TCF	EJ2	NEW HIGH PRIORITY.
0305			01,3176	13 177 1	NOOP		
0306	REF 306	LAST 1107	01,3177	50 002 0	INDEX	Q	
0307			01,3200	0 0002 0	TC	2	PROCEED WITH SEARCH.
0308	REF 157	LAST 1115	01,3201	54 131 0	TS	BUF +1	
0309			01,3202	0 0006 1	EXTEND		
0310	REF 158	LAST 1115	01,3203	22 130 0	QXCH	BUF	FOR LOCATING CCS PRIORITY + X INSTR.
0311	REF 159	LAST 1115	01,3204	50 130 0	INDEX	BUF	
0312			01,3205	0 0002 0	TC	2	

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P0314 IDLING AND COMPUTER ACTIVITY (GREEN) LIGHT MAINTENANCE. THE IDLING ROUTINE IS NOT A JOB IN ITSELF,
R0316 BUT RATHER A SUBROUTINE OF THE EXECUTIVE.

0318	REF	4	LAST	290	1361		EBANK=	SELFRET	SELF-CHECK STORAGE IN EBANK.	
0319	REF	225	LAST	1113	01,3206	4 4755 0	DUMMYJOB	CS	ZERO	SET NEWJOB TO -0 FOR IDLING.
0320	REF	19	LAST	1115	01,3207	54 067 1		TS	NEWJOB	
0321					01,3210	0 0603 1		RELINT		
0322	REF	74	LAST	1110	01,3211	4 4752 1		CS	TWO	TURN OFF THE ACTIVITY LIGHT.
0323					01,3212	0 0006 1		EXTEND		
0324	REF	31	LAST	1110	01,3213	03 011 1		WAND	DSALMOUT	
0328	REF	20	LAST	1116	01,3214	10 067 1	ADVAN	CCS	NEWJOB	IS A NEWJOB ACTIVE?
0329	REF	1			01,3215	1 3011 0		TCF	NUCHANG2	YES... ONE REQUIRING A CHANGE JOB.
0330	REF	75	LAST	1116	01,3216	3 4752 0		CAF	TWO	NEW JOB ALREADY IN POSITION FOR
0331	REF	1			01,3217	1 3225 0		TCF	NUDIRECT	EXECUTION.
03317	REF	5	LAST	1116	01,3220	3 1361 1		CA	SELFRET	
03318	REF	212	LAST	1113	01,3221	54 001 1		TS	L	PUT RETURN ADDRESS IN L.
0332	REF	1			01,3222	3 3224 0		CAF	SEFBANK	
0333	REF	5	LAST	593	01,3223	1 5166 1		TCF	SUPDXCHZ + 1	AND DISPATCH JOB.
03338	REF	6	LAST	1116	1361			EBANK=	SELFRET	
0334	REF	3	LAST	291	01,3224	66102 1	SEFBANK	BBCON	SELFCHK	
0335					01,3225	0 0006 1	NUDIRECT	EXTEND		TURN THE GREEN LIGHT BACK ON.
0336	REF	32	LAST	1116	01,3226	05 011 1		WOR	DSALMOUT	
0337	REF	42	LAST	1112	01,3227	52 165 1		DXCH	LDC	JOBS STARTED IN THIS FASHION MUST BE
03372	REF	6	LAST	1116	01,3230	1 5165 1		TCF	SUPDXCHZ	
03378					5165			BLOCK	2	IN FIXED-FIXED SO OTHERS MAY USE.
03379	REF	2	LAST	1103 TO 1106:	59	59*		COUNT*	\$/EXEC	
R033791	SUPDXCHZ									ROUTINE TO TRANSFER TO SUPERBANK.
R033792	CALLING SEQUENCE									
A033793								TCF	SUPDXCHZ	WITH 2CADR OF DESIRED LOCATION IN A + L.
0338	REF	213	LAST	1116	5165	56 001 0	SUPDXCHZ	XCH	L	BASIC.
03381					5166	0 0006 1	+1	EXTEND		
03382	REF	18	LAST	1110	5167	01 007 1		WRITE	SUPERBNK	
03383	REF	33	LAST	1110	5170	54 006 0		TS	BBANK	
03384	REF	214	LAST	1116	5171	0 0001 0		TC	L	
0339					5172	77677 1	NEG100	OCT	77677	

L WAITLIST

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R0001 PROGRAM DESCRIPTION

DATE - 10 OCTOBER 1966

R0003 MOD NO - 2

LOG SECTION - WAITLIST

R0005 MOD BY - MILLER (DTMAX INCREASED TO 162.5 SEC)

ASSEMBLY SUNBURST REV 5

R00072 MOD 3 BY KERNAN (INHINT INSERTED AT WAITLIST) 2/28/68 SKIPPER REV 4

R00073 MOD 4 BY KERNAN (TWIDDLE IN 54) 3/28/68 SKIPPER REV 13.

R000799

R0008 FUNCTIONAL DESCRIPTION-

R0009 PART OF A SECTION OF PROGRAMS, -WAITLIST, TASKOVER, T3RUPT, USED TO CALL A PROGRAM, (CALLED A TASK),

R0011 WHICH IS TO BEGIN IN C(A) CENTISECONDS. WAITLIST UPDATES TIME3, LST1 AND LST2. THE MEANING OF THESE LISTS

R0013 FOLLOW.

R0014 C(TIME3) = 16384 -(T1-T) CENTISECONDS, (T=PRESENT TIME, T1=TIME FOR TASK1)

R0016

R0017 C(LST1) = -(T2-T1)+1

R0018 C(LST1 +1) = -(T3-T2)+1

R0019 C(LST1 +2) = -(T4-T3)+1

R0020

R0021

R0022 C(LST1 +6) = -(T8-T7)+1

R0023 C(LST1 +7) = -(T9-T8)+1

R0024 C(LST2) = 2CADR OF TASK1

R0025 C(LST2 +2) = 2CADR OF TASK2

R0026

R0027

R0028 C(LST2 +14) = 2CADR OF TASK8

R0029 C(LST2 +16) = 2CADR OF TASK9

R0030 WARNINGS-

R0031 -----

R0032 1) 1 <= C(A) <= 162500 (1 CENTISECOND TO 162.5 SEC)

R0033 2) 9 TASKS MAXIMUM

R0034 3) TASKS CALLED UNDER INTERRUPT INHIBITED

R0035 4) TASKS END BY TC TASKOVER

R0036 CALLING SEQUENCE-

R0037 L-1 CA DELTAT (TIME IN CENTISECONDS TO TASK START)

R0039 L TC WAITLIST

R0040 L+1 2CADR DESIRED TASK

R0041 L+2 (MINOR OF 2CADR)

R0042 L+3 RELINT (RETURNS HERE)

R00421 TWIDDLE-

R00422 -----

R00423 TWIDDLE IS FOR USE WHEN THE TASK BEING SET UP IS IN THE SAME EBANK AND FBANK AS THE USER. IN
R00425 SUCH CASES, IT IMPROVES UPON WAITLIST BY ELIMINATING THE NEED FOR THE BBCON HALF OF THE 2CADR.

L-----WAITLIST-----USER'S PAGE NO. 2-----EO S3-----

R00427 SAVING A WORD. TWIDDLE IS LIKE WAITLIST IN EVERY RESPECT EXCEPT CALLING SEQUENCE. TO WIT-

R0043 L-1 CA DELTAT
R00431 L TC TWIDDLE
R00432 L+1 ADRES DESIRED TASK
R00433 L+2 RELINT (RETURNS-HERE)

R00439 NORMAL EXIT MODES-

R0044 AT L+3 OF CALLING SEQUENCE

R0045 ALARM OR ABORT EXIT MODES-

R0046 TC ABORT
R0047 OCT 1203 (WAITLIST OVERFLOW - TOO MANY TASKS)

R0048 ERASABLE INITIALIZATION REQUIRED-

R0049 ACCOMPLISHED BY FRESH START.--LST2,...., LST2 +16 =ENDTASK
R0050 LST1,...., LST1 +7 =NEG1/2

R0051 OUTPUT--

R0052 LST1 AND LST2 UPDATED WITH NEW TASK AND ASSOCIATED TIME.
R0053 DEBRIS-

R0054 CENTRALS--A,Q,L
R0055 OTHER - WAITEXIT, WAITADR, WAITTEMP, WAITBANK
R0056 DETAILED ANALYSIS OF TIMING-

R0057 CONTROL WILL NOT BE RETURNED TO THE SPECIFIED ADDRESS (2CADR) IN EXACTLY DELTA T CENTISECONDS.
R0059 THE APPROXIMATE TIME MAY BE CALCULATED AS FOLLOWS

R0060 LET TO = THE TIME OF THE TC WAITLIST
R0061 LET TS = TO +1470 + COUNTER INCREMENTS (SET-UP TIME)
R0062 LET X = TS -(100TS)/100 (VARIANCE FROM COUNTERS)
R0063 LET Y = LENGTH OF TIME OF INHIBIT INTERRUPT AFTER T3RUPT
R0064 LET Z = LENGTH OF TIME TO PROCESS TASKS WHICH ARE DUE THIS T3RUPT BUT DISPATCHED EARLIER.
R0066 (Z=0, USUALLY)
R0067 LET DELTD = THE ACTUAL TIME TAKEN TO GIVE CONTROL TO 2CADR
R0068 THEN DELTD = TS+DELTA-T-X+Y+Z +1.05MS* +COUNTERS*
R0069 *-THE TIME TAKEN BY WAITLIST ITSELF AND THE COUNTER TICKING DURING THIS WAITLIST TIME.
R0071

R0072 IN SHORT, THE ACTUAL TIME TO RETURN CONTROL TO A 2CADR IS AUGMENTED BY THE TIME TO SET UP THE TASK:S
R0074 INTERRUPT, ALL COUNTERS TICKING, THE T3RUPT PROCESSING TIME, THE WAITLIST PROCESSING TIME AND THE POSSIBILITY
R0076 OF OTHER TASKS INHIBITING THE INTERRUPT.

L WAITLIST

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0078 REF 14 LAST 220 E3,1400 EBANK= LST1 TASK LISTS IN SWITCHED E BANK.

0079 REF 1 COUNT* \$\$/WAIT

00795 5173 0 0004 0 TWIDDLE INHINT

0080 REF 215 LAST 1116 5174 54 001 1 TS L SAVE DELAY TIME IN L

0081 REF 30 LAST 1080 5175 3 4733 1 CA POSMAX

0082 REF 307 LAST 1115 5176 26 002 1 ADS Q CREATING OVERFLOW AND Q-1 IN Q

0083 REF 34 LAST 1116 5177 3 0006 1 CA BBANK

00832 5200 0 0006 1 EXTEND

00834 REF 19 LAST 1116 5201 04 007 1 ROR SUPERBNK

0084 REF 216 LAST 1119 5202 56 001 0 XCH L

00849 5203 0 0004 0 WAITLIST INHINT

0085 REF 308 LAST 1119 5204 56 002 0 XCH Q SAVE DELTA T IN Q AND RETURN IN

0086 REF 1 5205 54 061 1 TS WAITEXIT WAITEXIT.

0087 5206 0 0006 1 EXTEND

0088 REF 2 LAST 1119 5207 5 0061 0 INDEX WAITEXIT IF TWIDDLING, THE TS SKIPS TO HERE

0089 5210 3 0001 0 DCA 0 PICK UP 2CADR OF TASK.

0090 REF 1 5211 54 063 0 -1 TS WAITADR BBCON WILL REMAIN IN L

0091 REF 1 5212 3 5220 1 DLY2 CAF WAITBB ENTRY FROM FIXDELAY AND VARDELAY.

0092 REF 35 LAST 1119 5213 56 006 1 XCH BBANK

0093 REF 1 5214 1 3231 0 TCF WAIT2

R0094 RETURN TO CALLER AFTER TASK INSERTION:

0095 REF 3 LAST 1119 5215 52 062 1 LVWTLIST DXCH WAITEXIT

0096 REF 76 LAST 1116 5216 6 4752 0 AD TWO

0097 5217 52 006 0 DTGB

0099 REF 15 LAST 1119 E3,1400 EBANK= LST1

0100 REF 2 LAST 1119 5220 02063 0 WAITBB BBCON WAIT2

R0101 RETURN TO CALLER +2 AFTER WAITING DT SPECIFIED AT CALLER +1.

0102 REF 309 LAST 1119 5221 50 002 0 FIXDELAY INDEX Q BOTH ROUTINES MUST BE CALLED UNDER

0103 5222 3 0000 1 CAF 0 WAITLIST CONTROL AND TERMINATE THE TASK

0104 REF 310 LAST 1119 5223 24 002 0 INCR Q IN WHICH THEY WERE CALLED.

R0105 RETURN TO CALLER +1 AFTER WAITING THE DT AS ARRIVING IN A.

0106 REF 311 LAST 1119 5224 56 002 0 VARDELAY XCH Q DT TO Q. TASK ADRES TO WAITADR.

0107 REF 2 LAST 1119 5225 54 063 0 TS WAITADR

0108 REF 36 LAST 1119 5226 3 0006 1 CA BBANK BBANK IS SAVED DURING DELAY.

0109 5227 0 0006 1 EXTEND

0110 REF 20 LAST 1119 5230 04 007 1 ROR SUPERBNK ADD SBANK TO BBCON.

0111 REF 217 LAST 1119 5231 54 001 1 TS L

0112 REF 1 5232 3 5235 0 CAF DELAYEX

0113 REF 4 LAST 1119 5233 54 061 1 TS WAITEXIT GO TO TASKOVER AFTER TASK ENTRY.

0114 REF 1 5234 1 5212 1 TCF DLY2

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0115 REF 67 LAST 966 5235 1 5257 0 DELAYEX TCF TASKOVER -2 RETURNS TO TASKOVER

L WAITLIST

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R0116 ENDTASK MUST BE ENTERED IN FIXED-FIXED SO IT IS DISTINGUISHABLE BY ITS ADRES ALONE.

0118	REF	16	LAST	1119	E3,1400		EBANK=	LST1		
0119	REF	1			5236	72537-0	ENDTASK	2CADR	SVCT3	
0119	REF	1			5237	73714-1				
0120	REF	28	LAST	927	5240	10-076-1	SVCT3	CCS	FLAGWRD2	DRIFT FLAG
0121	REF	68	LAST	1120	5241	1-5261-0		TCF	TASKOVER	
0122	REF	69	LAST	1121	5242	1-5261-0		TCF	TASKOVER	
0123					5243	1-5244-1		TCF	+1	
01231	REF	3	LAST	222	5244	11-304-0	CKIMUSE	CCS	IMUCADR	DON'T DO NBDONLY IF SOMEONE ELSE IS IN
01232	REF	1			5245	1-5256-1		TCF	SVCT3X	IMUSTALL.
01233					5246	1-5251-0		TCF	+3	
01234	REF	2	LAST	1121	5247	1-5256-1		TCF	SVCT3X	
01235	REF	3	LAST	1121	5250	1-5256-1		TCF	SVCT3X	
0124	REF	1			5251	3-7723-0	+3	CAF	PRI035	COMPENSATE FOR NBD COEFFICIENTS ONLY.
0125	REF	25	LAST	889	5252	0-5072-1		TC	POVAC	ENABLE EVERY 81.93 SECONDS
0126	REF	6	LAST	857	F3,1460			EBANK=	NBDX	
0127	REF	1			5253	03555-1		2CADR	NBDONLY	
0127	REF	1			5254	14063-1				
0128	REF	70	LAST	1121	5255	1-5261-0		TCF	TASKOVER	
01281	REF	15	LAST	781	5256	0-5221-0	SVCT3X	TC	FIXDELAY	DELAY MAX OF 2 TIMES FOR IMUZERO.
01282					5257	00764-1		DEC	500	
01283	REF	2	LAST	1121	5260	0-5240-1		TC	SVCT3	CHECK DRIFT FLAG AGAIN.

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PC129 BEGIN TASK INSERTION.

0130			01,3231	BANK	01	
0131	REF	1		COUNT*	\$/WAIT	
0132	REF	1	01,3231 54 062 1	TS	WAITBANK	BBANK OF CALLING PROGRAM.
01322	REF	312	LAST 1119 01,3232 3 0002 0	CA	Q	
01324			01,3233 0 0006 1	EXTEND		
01326	REF	1	01,3234 6 3523 0	BZMF	WAITPOOH	
0133	REF	2	LAST 219 01,3235 4 0026 1	CS	TIME3	
0134	REF	35	LAST 1053 01,3236 6 4744 1	AD	BIT8	BIT 8 = OCT 200
0135	REF	364	LAST 1115 01,3237 10 000 0	CCS	A	TEST 200 - C(TIME3). IF POSITIVE,
A0136	IT MEANS THAT TIME3 OVERFLOW HAS OCCURRED PRIOR TO CS TIME3 AND THAT					
A0137	C(TIME3) = T - T1, INSTEAD OF 1.0 - (T1 - T). THE FOLLOWING FOUR					
A0138	ORDERS SET C(A) = TD - T1 + 1 IN EITHER CASE.					
0139	REF	2	LAST 1099 01,3240 6 6107 1	AD	OCT40001	OVERFLOW HAS OCCURRED. SET C(A) =
0140	REF	365	LAST 1122 01,3241 4 0000 0	CS	A	T - T1 + 1.0 - 201
RO141	NORMAL CASE (C(A) NNZ) YIELDS SAME C(A): $-(-(1.0 - (T1 - T)) + 200) - 1$					
0142	REF	1	01,3242 6 3370 0	AD	OCT40201	
0143	REF	313	LAST 1122 01,3243 6 0002 0	AD	Q	RESULT = TD - T1 + 1.
0144	REF	366	LAST 1122 01,3244 10 000 0	CCS	A	TEST TD - T1 + 1
0145	REF	17	LAST 1121 01,3245 6 1400 1	AD	LST1	IF TD - T1 POS. GO TO WTLST5 WITH
0146	REF	1	01,3246 1 3310 1	TCF	WTLST5	C(A) = (TD - T1) + C(LST1) = TD - T2 + 1
0147			01,3247 13 250 1	NOOP		
0148	REF	314	LAST 1122 01,3250 4 0002 1	CS	Q	
RO149	NOTE THAT THIS PROGRAM SECTION IS NEVER ENTERED WHEN T-T1 G/E -1.					
RO150	SINCE $TD - T1 + 1 = (TD - T) + (T - T1 + 1)$, AND $\Delta T = TD - T$ G/E +1. (G/E					
RO151	SYMBOL MEANS GREATER THAN OR EQUAL TO). THUS THERE NEED BE NO CON-					
RO152	CERN OVER A PREVIOUS OR IMMINENT OVERFLOW OF TIME3 HERE.					
0153	REF	1	01,3251 6 4736 1	AD	POS1/2	WHEN TD IS NEXT, FORM QUANTITY
0154	REF	2	LAST 1122 01,3252 6 4736 1	AD	POS1/2	1.0 - $\Delta T = 1.0 - (TD - T)$
0155	REF	3	LAST 1122 01,3253 56 026 0	XCH	TIME3	
0156	REF	7	LAST 1043 01,3254 6 4735 1	AD	NEGMAX	
0157	REF	315	LAST 1122 01,3255 6 0002 0	AD	Q	1.0 - ΔT - T NOW COMPLETE.
0158			01,3256 0 0006 1	EXTEND		ZERO INDEX Q.
0159			01,3257 22 007 0	QXCH	7	(ZQ)

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0160	REF	18	LAST	1122	01,3260	57'400 1	WTLST4	XCH	LST1	
0161	REF	19	LAST	1123	01,3261	57'401 0		XCH	LST1 +1	
0162	REF	20	LAST	1123	01,3262	57'402 0		XCH	LST1 +2	
0163	REF	21	LAST	1123	01,3263	57'403 1		XCH	LST1 +3	
0164	REF	22	LAST	1123	01,3264	57'404 0		XCH	LST1 +4	
0165	REF	23	LAST	1123	01,3265	57'405 1		XCH	LST1 +5	
0166	REF	24	LAST	1123	01,3266	57'406 1		XCH	LST1 +6	
0167	REF	25	LAST	1123	01,3267	57'407 0		XCH	LST1 +7	
0168	REF	3	LAST	1119	01,3270	3 0063 1		CA	WAITADR	(MINOR PART OF TASK CADR HAS BEEN IN L.)
0169	REF	316	LAST	1122	01,3271	50 002 0		INDEX	Q	
0170					01,3272	1 3273 0		TCF	+1	
0171	REF	24	LAST	751	01,3273	53'411 0		DXCH	LST2	
0172	REF	25	LAST	1123	01,3274	53'413 1		DXCH	LST2 +2	
0173	REF	26	LAST	1123	01,3275	53'415 1		DXCH	LST2 +4	
0174	REF	27	LAST	1123	01,3276	53'417 0		DXCH	LST2 +6	
0175	REF	28	LAST	1123	01,3277	53'421 0		DXCH	LST2 +8D	
0176	REF	29	LAST	1123	01,3300	53'423 1		DXCH	LST2 +10D	AT END, CHECK THAT C(LST2+10) IS STD
0177	REF	30	LAST	1123	01,3301	53'425 1		DXCH	LST2 +12D	
0178	REF	31	LAST	1123	01,3302	53'427 0		DXCH	LST2 +14D	
0179	REF	32	LAST	1123	01,3303	53'431 1		DXCH	LST2 +16D	
0180	REF	3	LAST	221	01,3304	6 5236 0		AD	ENDTASK	END ITEM, AS CHECK FOR EXCEEDING THE LENGTH OF THE LIST.
A0181										
0182					01,3305	0 0006 1		EXTEND		DUMMY TASK ADRES SHOULD BE IN FIXED-
0183	REF	1			01,3306	1 5215 0		BZF	LVWTLIST	FIXED SO ITS ADRES ALONE DISTINGUISHES
0184	REF	1			01,3307	1 3363 0		TCF	WTABORT	IT.

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0185	REF 367	LAST 1122	01.3310	10 000 0	WTLST5	CCS	A	TEST TD - T2 + 1
0186	REF 26	LAST 1123	01.3311	6 1401 0		AD	LST1 +1	
0187			01.3312	1 3316 1		TCF	+4	
0188	REF 117	LAST 1111	01.3313	6 4753 1		AD	ONE	
0189	REF 1		01.3314	0 3374 1		TC	WTLST2	
0190			01.3315	00001 0		OCT	1	
0191	REF 368	LAST 1124	01.3316	10 000 0	+4	CCS	A	TEST TD - T3 + 1
0192	REF 27	LAST 1124	01.3317	6 1402 0		AD	LST1 +2	
0193			01.3320	1 3324 0		TCF	+4	
0194	REF 118	LAST 1124	01.3321	6 4753 1		AD	ONE	
0195	REF 2	LAST 1124	01.3322	0 3374 1		TC	WTLST2	
0196			01.3323	00002 0		OCT	2	
0197	REF 369	LAST 1124	01.3324	10 000 0	+4	CCS	A	TEST TD - T4 + 1
0198	REF 28	LAST 1124	01.3325	6 1403 1		AD	LST1 +3	
0199			01.3326	1 3332 1		TCF	+4	
0200	REF 119	LAST 1124	01.3327	6 4753 1		AD	ONE	
0201	REF 3	LAST 1124	01.3330	0 3374 1		TC	WTLST2	
0202			01.3331	00003 1		OCT	3	
0203	REF 370	LAST 1124	01.3332	10 000 0	+4	CCS	A	TEST TD - T5 + 1
0204	REF 29	LAST 1124	01.3333	6 1404 0		AD	LST1 +4	
0205			01.3334	1 3340 1		TCF	+4	
0206	REF 120	LAST 1124	01.3335	6 4753 1		AD	ONE	
0207	REF 4	LAST 1124	01.3336	0 3374 1		TC	WTLST2	
0208			01.3337	00004 0		OCT	4	
0209	REF 371	LAST 1124	01.3340	10 000 0	+4	CCS	A	TEST TD - T6 + 1
0210	REF 30	LAST 1124	01.3341	6 1405 1		AD	LST1 +5	
0211			01.3342	1 3346 1		TCF	+4	
0212	REF 121	LAST 1124	01.3343	6 4753 1		AD	ONE	
0213	REF 5	LAST 1124	01.3344	0 3374 1		TC	WTLST2	
0214			01.3345	00005 1		OCT	5	
0215	REF 372	LAST 1124	01.3346	10 000 0	+4	CCS	A	TEST TD - T7 + 1
0216	REF 31	LAST 1124	01.3347	6 1406 1		AD	LST1 +6	
0217			01.3350	1 3354 1		TCF	+4	
0218	REF 122	LAST 1124	01.3351	6 4753 1		AD	ONE	
0219	REF 6	LAST 1124	01.3352	0 3374 1		TC	WTLST2	
0220			01.3353	00006 1		OCT	6	

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0221	REF 373	LAST 1124	01,3354	10 000 0	+4	CCS	A
0222	REF 32	LAST 1124	01,3355	6 1407 0		AD	LST1 +7
0223			01,3356	1 3362 1		TCF	+4
0224	REF 123	LAST 1124	01,3357	6 4753 1		AD	ONE
0225	REF 7	LAST 1124	01,3360	0 3374 1		TC	WTLST2
0226			01,3361	00007 0		OCT	7

0227	REF 374	LAST 1125	01,3362	10 000 0	+4	CCS	A
0228	REF 1		01,3363	0 3371 1	WTABORT	TC	FILLED
0229			01,3364	13 365 0		NOUP	CAN'T GET HERE
0230	REF 124	LAST 1125	01,3365	6 4753 1		AD	ONE
0231	REF 8	LAST 1125	01,3366	0 3374 1		TC	WTLST2
0232			01,3367	00010 0		OCT	10
0233			01,3370	40201 0	OCT40201	OCT	40201

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02332	REF	5	LAST 1119	01.3371	52 062 1	FILLED	DXCH	WAITEXIT	
02334	REF	5	LAST 1107	01.3372	0 5716 1		TC	BAILOUT1	NO ROOM IN THE INN
02336				01.3373	01203 1		OCT	01203	

L WAITLIST

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R0234 THE ENTRY TO WTLST2 JUST PRECEDING OCT N IS FOR T LE TD LE T -1.
 R0235 N N+1

R0236 (LE MEANS LESS THAN OR EQUAL TO). AT ENTRY, $C(A) = -(TD - T + 1)$
 R0237 N+1

R0238 THE LST1 ENTRY $-(T - T + 1)$ IS TO BE REPLACED BY $-(TD - T + 1)$, AND
 R0239 N+1 N N

R0240 THE ENTRY $-(T - TD + 1)$ IS TO BE INSERTED IMMEDIATELY FOLLOWING.
 R0241 N+1

0242	REF 1	01,3374	54 064 1	WTLST2	TS	WAITTEMP	$C(A) = -(TD - T + 1)$
0243	REF 317	LAST 1123	01,3375	50 002 0	INDEX	Q	
0244			01,3376	3 0000 1	CAF	0	
0245	REF 318	LAST 1127	01,3377	54 002 1	TS	0	INDEX VALUE INTO Q.
0246	REF 125	LAST 1125	01,3400	3 4753 1	CAF	ONE	
0247	REF 2	LAST 1127	01,3401	6 0064 0	AD	WAITTEMP	
0248	REF 319	LAST 1127	01,3402	50 002 0	INDEX	Q	$C(A) = -(TD - T) + 1.$
0249	REF 33	LAST 1125	01,3403	27 377 1	ADS	LST1 -1	N
0250	REF 3	LAST 1127	01,3404	4 0064 1	CS	WAITTEMP	
0251	REF 320	LAST 1127	01,3405	50 002 0	INDEX	Q	
0252	REF 1		01,3406	1 3260 1	TCP	WTLST4	

R0253 $C(TIME3) = 1.0 - (T1 - T)$

R0254 $C(LST1) = - (T2 - T1) + 1$

R0255 $C(LST1+1) = - (T3 - T2) + 1$

R0256 $C(LST1+2) = - (T4 - T3) + 1$

R0257 $C(LST1+3) = - (T5 - T4) + 1$

R0258 $C(LST1+4) = - (T6 - T5) + 1$

R0259 $C(LST2) = 2CADR TASK1$

R0260 $C(LST2+2) = 2CADR TASK2$

R0261 $C(LST2+4) = 2CADR TASK3$

R0262 $C(LST2+6) = 2CADR TASK4$

R0263 $C(LST2+8) = 2CADR TASK5$

R0264 $C(LST2+10) = 2CADR TASK6$

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P0265

ENTERS HERE ON T3 RUPT TO DISPATCH WAITLISTED TASK.

0266				01,3407	0 0006 1	T3RUPT	EXTEND	
0267	REF	21	LAST 1119	01,3410	04 007 1		RGR	SUPERBNK READ CURRENT SUPERBANK VALUE AND
0268	REF	6	LAST 991	01,3411	54 016 1		TS	BANKRUPT SAVE WITH E AND F BANK VALUES.
0269				01,3412	0 0006 1		EXTEND	
0270	REF	6	LAST 991	01,3413	22 012 1		QXCH	QRUPT
0271	REF	6	LAST 1095	01,3414	3 4734 0	T3RUPT2	CAF	NEG1/2 DISPATCH WAITLIST TASK.
0272	REF	34	LAST 1127	01,3415	57 407 0		XCH	LST1 +7
0273	REF	35	LAST 1128	01,3416	57 406 1		XCH	LST1 +6
0274	REF	36	LAST 1128	01,3417	57 405 1		XCH	LST1 +5
0275	REF	37	LAST 1128	01,3420	57 404 0		XCH	LST1 +4
0276	REF	38	LAST 1128	01,3421	57 403 1		XCH	LST1 +3
0277	REF	39	LAST 1128	01,3422	57 402 0		XCH	LST1 +2
0278	REF	40	LAST 1128	01,3423	57 401 0		XCH	LST1 +1
0279	REF	41	LAST 1128	01,3424	57 400 1		XCH	LST1
0280	REF	31	LAST 1119	01,3425	6 4733 1		AD	POS MAX
0281	REF	4	LAST 1122	01,3426	26 026 1		ADS	TIME3
0282	REF	4	LAST 563	01,3427	54 734 0		TS	RUPTAGN
0283	REF	226	LAST 1116	01,3430	4 4755 0		CS	ZERO
0284	REF	5	LAST 1128	01,3431	54 734 0		TS	RUPTAGN SETS RUPTAGN TO +1 ON OVERFLOW.
0285				01,3432	0 0006 1		EXTEND	DISPATCH TASK.
0286	REF	4	LAST 1123	01,3433	4 5237 0		DCS	ENDTASK
0287	REF	33	LAST 1123	01,3434	53 431 1		DXCH	LST2 +160
0288	REF	34	LAST 1128	01,3435	53 427 0		DXCH	LST2 +140
0289	REF	35	LAST 1128	01,3436	53 425 1		DXCH	LST2 +120
0290	REF	36	LAST 1128	01,3437	53 423 1		DXCH	LST2 +100
0291	REF	37	LAST 1128	01,3440	53 421 0		DXCH	LST2 +80
0292	REF	38	LAST 1128	01,3441	53 417 0		DXCH	LST2 +6
0293	REF	39	LAST 1128	01,3442	53 415 1		DXCH	LST2 +4
0294	REF	40	LAST 1128	01,3443	53 413 1		DXCH	LST2 +2
0295	REF	41	LAST 1128	01,3444	53 411 0		DXCH	LST2
0296	REF	218	LAST 1119	01,3445	56 001 0		XCH	L
0297				01,3446	0 0006 1		EXTEND	
0298	REF	22	LAST 1128	01,3447	01 007 1		WITE	SUPERBNK SET SUPERBANK FROM BBCON OF CAD.
0299	REF	219	LAST 1128	01,3450	56 001 0		XCH	L RESTORE TO L FOR DXCH-Z.
0300				01,3451	52 006 0		DTCB	

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P0301 -RETURN, AFTER EXECUTION OF T3 OVERFLOW TASK:

0302			5261		BLOCK 02-	
0303	REF	2	LAST 1119 TO 1122:	54 54*	COUNT* 55/WAIT	
0304	REF	6	LAST 1128	5261 10 734 0	TASKOVER CCS RUPTAGN	IF +1 RETURN TO T3RUPT, IF -0 RESUME.
0305	REF	2	LAST 1119	5262 3 5220 1	CAF WAITBB	
0306	REF	37	LAST 1119	5263 54 006 0	TS BBANK	
0307	REF	1		5264 1 3414 1	TCF T3RUPT2	DISPATCH NEXT TASK IF IT WAS DUE.
0308	REF	7	LAST 1128	5265 3 0016 0	CA BANKRUPT	
0309				5266 0 0006 1	EXTEND	
0310	REF	23	LAST 1128	5267 01 007 1	WRITE SUPERBANK	RESTORE SUPERBANK BEFORE RESUME IS 0042
0311				5270 0 0006 1	RESUME EXTEND	
0312	REF	7	LAST 1128	5271 22 012 1	QXCH QRUPT	
0313	REF	8	LAST 1129	5272 3 0016 0	NOQRSM CA BANKRUPT	
0314	REF	38	LAST 1129	5273 56 006 1	XCH BBANK	
0315	REF	11	LAST 154	5274 52 011 0	NOQBRSM DXCH ARUPT	
03155				5275 0 0003 1	RELINT	
0316				5276 5 0017 1	RESUME	

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P0317 LONGCALL-

R0318 PROGRAM DESCRIPTION DATE- 17 MARCH 1967

R0319 PROGRAM WRITTEN BY W.H. VANDEVER

LOG SECTION WAITLIST

R0320 MOD BY- R. MELANSON TO ADD DOCUMENTATION

ASSEMBLY SUNDISK REV. 100

R0321 FUNCTIONAL DESCRIPTION-

R0322 LONGCALL IS CALLED WITH THE DELTA TIME ARRIVING IN A,L SCALED AS TIME2.TIME1 WITH THE 2CADR OF THE TASK

R0324 IMMEDIATELY FOLLOWING THE TC LONGCALL. FOR EXAMPLE, IT MIGHT BE DONE AS FOLLOWS WHERE TIMELOC IS THE NAME OF

R0326 A-DP-REGISTER CONTAINING A DELTA TIME AND WHERE TASKODO IS THE NAME OF THE LOCATION AT WHICH LONGCALL IS TO

R0328 START

R0329 CALLING SEQUENCE-

A0330

EXTEND

A0331

DCA TIMELOC

A0332

TC LONGCALL

A0333

2CADR TASKODO

R0334 NORMAL EXIT MODE-

R0335 1). TC WAITLIST

R0336 2). DTCB (TO L+3 OF CALLING ROUTINE 1ST PASS THRU LONGCYCL)

R0337 3). DTCB (TO TASKOVER ON SUBSEQUENT PASSES THRU LONGCYCL)

R0338 ALARM OR ABORT EXIT MODE-

R0339 NONE

R0340 OUTPUT-

R0341 LONGTIME AND LONGTIME+1 = DELTA TIME

R0342 LONGEXIT AND LONGEXIT+1 = RETURN 2CADR

R0343 LONGCADR AND LONGCADR+1 = TASK 2CADR

R0344 A = SINGLE PRECISION TIME FOR WAITLIST

R0345 ERASABLE INITIALIZATION-

R0346 A = MOST SIGNIFICANT PART OF DELTA TIME

R0347 L = LEAST SIGNIFICANT PART OF DELTA TIME

R0348 Q = ADDRESS OF 2CADR TASK VALUE

R0349 DEBRIS-

R0350 A,Q,L

R0351 LONGCADR AND LONGCADR+1

R0352 LONGEXIT AND LONGEXIT+1

R0353 LONGTIME AND LONGTIME+1

R0354 *** THE FOLLOWING IS TO BE IN FIXED-FIXED AND UNSWITCHED ERASIBLE ***

0355

5277

BLOCK 02

0356 REF 42 LAST 1128 E3.1400

EBANK= LST1

0357 REF 1 5277 53'154 1 LONGCALL DXCH LONGTIME OBTAIN THE DELTA TIME

0358 5300 0 0006 1 EXTEND OBTAIN THE 2CADR

L WAITLIST

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0359 REF 321 LAST 1127 5301 5 0002 0 NDX 0
0360 5302 3 0001 0 DCA 0
0361 REF 1 5303 53 150 0 DXCH LONGCADP

0362 5304 0 0006 1 EXTEND
0363 REF 1 5305 3 5310 0 DCA LGCL2CDR
0364 5306 52 006 0 DTCB

NOW GO TO THE APPROPRIATE SWITCHED BANK
FOR THE REST OF LONGCALL

0365 REF 43 LAST 1130 E3.1400 EBANK= LST1
0366 REF 1 5307 03452 1 LGCL2CDR 2CADR LONGCALL2
0366 REF 1 5310 02063 0

R0367 *** THE FOLLOWING MAY BE IN A SWITCHED BANK, INCLUDING ITS ERASABLE ***

0368 01.3452 BANK 01
0369 REF 2 LAST 1122 TO 1129: 145 145* COUNT* \$\$/WAIT
0370 REF 1 01.3452 23 435 1 LONGCALL2 LXCH LONGEXIT +1 SAVE THE CORRECT BB FOR RETURN
0371 REF 77 LAST 1119 01.3453 3 4752 0 CA TWO OBTAIN THE RETURN ADDRESS
0372 REF 322 LAST 1131 01.3454 26 002 1 ADS 0
0373 REF 2 LAST 1131 01.3455 55 434 1 TS LONGEXIT

03731 REF 2 LAST 1130 01.3456 3 1153 1 CA LONGTIME CHECK FOR LEGITIMATE DELTA-TIME
03732 REF 375 LAST 1125 01.3457 10 000 0 CCS A
03733 REF 1 01.3460 1 3466 1 TCF LONGCYCL HI-ORDER OK --> ALL IS OK.
03734 01.3461 1 3463 1 TCF +2 HI-ORDER ZERO --> CHECK LO-ORDER.
03735 REF 1 01.3462 1 3521 0 TCF LONGPOOH HI-ORDER NEG. --> NEG. DT
03736 REF 3 LAST 1131 01.3463 3 1154 0 +2 CA LONGTIME +1 CHECK LO-ORDER FOR ZERO OR NEGATIVE.--
03737 01.3464 0 0006 1 EXTEND
03738 REF 2 LAST 1131 01.3465 6 3521 1 BZMF LONGPOOH BAD DELTA-TIME. ABORT

R0374 *** WAITLIST TASK LONGCYCL ***

0375 01.3466 0 0006 1 LONGCYCL EXTEND CAN WE SUCCESSFULLY TAKE ABOUT 1.25
0376 REF 1 01.3467 4 3500 0 DCS DPBIT14 MINUTES OFF OF LONGTIME
0377 REF 4 LAST 1131 01.3470 21 154 1 DAS LONGTIME

0378 REF 5 LAST 1131 01.3471 11 154 1 CCS LONGTIME +1 THE REASONING BEHIND THIS PART IS
0379 REF 1 01.3472 1 3511 0 TCF MUCHTIME INVOLVED, TAKING INTO ACCOUNT THAT THE
A0380 WORDS MAY NOT BE SIGNED CORRECTED (DP
A0381 BASIC INSTRUCTIONS
A0382 DO NOT SIGN CORRECT) AND THAT WE SUBTRAC
A0383 TED BIT14 (1 OVER HALF THE POS. VALUE
A0384 REPRESENTABLE IN SINGLE WORD)
0385 01.3473 13 474 1 NOOP CAN'T GET HERE *****
0386 01.3474 1 3475 0 TCF +1
0387 REF 6 LAST 1131 01.3475 11 153 0 CCS LONGTIME
0388 REF 2 LAST 1131 01.3476 1 3511 0 TCF MUCHTIME
0389 01.3477 00000 1 DPBIT14 OCT 00000
0390 01.3500 20000 0 OCT 20000

A0391

LONGCALL

L WAITLIST

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0392	REF	66	LAST 1099	01,3501	3 4736 1	LASTTIME	CA	BIT14	GET BACK THE CORRECT DELTA TFOR WAITLIST
0393	REF	7	LAST 1131	01,3502	27 154 1	ADS	LONGTIME	+1	
0395	REF	37	LAST 892	01,3503	0 5203 0	TC	WAITLIST		
0396	REF	44	LAST 1131	E3,1400		EBANK=	LST1		
0397	REF	1		01,3504	03516 0	2CADR	GETCADR		THE ENTRY TO OUR LONGCADR
0397	REF	1		01,3505	02063 0				
0399	REF	1		01,3506	3 3520 0	LONGRTRN	CA	TSKOVCDR	SET IT UP SO THAT ONLY THE FIRST EXIT IS
0400	REF	3	LAST 1131	01,3507	53 435 0	DXCH	LONGEXIT		TO THE CALLER OF LONGCALL
0401				01,3510	52 006 0	DTCB			THE REST ARE TO TASKOVER
0402	REF	67	LAST 1132	01,3511	3 4736 1	MUCHTIME	CA	BIT14	WE HAVE OVER OUR ABOUT 1.25 MINUTES
0404	REF	38	LAST 1132	01,3512	0 5203 0	TC	WAITLIST		SO SET UP FOR ANOTHER CYCLE THROUGH HERE
0405	REF	45	LAST 1132	E3,1400		EBANK=	LST1		
0406	REF	2	LAST 1131	01,3513	03466 0	2CADR	LONGCYCL		
0406				01,3514	02063 0				
0408	REF	1		01,3515	1 3506 0	TCF	LONGRTRN		NOW EXIT PROPERLY
R0409			*** WAITLIST TASK GETCADR ***						
0410	REF	2	LAST 1131	01,3516	53 150 0	GETCADR	DXCH	LONGCADR	GET THE LONGCALL THAT WE WISHED TO START
0411				01,3517	52 006 0	DTCB			AND TRANSFER CONTROL TO IT
0412	REF	71	LAST 1121	01,3520	05261 1	TSKOVCDR	GENADR	TASKOVER	
0413	REF	4	LAST 1132	01,3521	53 435 0	LONGPUCH	DXCH	LONGEXIT	
0414				01,3522	1 3524 0	TCF	+2		
0415	REF	6	LAST 1126	01,3523	52 062 1	WAITPOOH	DXCH	WAITEXIT	
0416	REF	2	LAST 1079	01,3524	0 5726 1	+2	TC	POODD01	
0417				01,3525	01204 0	OCT	01204		

L-----LATITUDE LONGITUDE SUBROUTINES-----

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R0001 SUBROUTINE TO CONVERT RAD VECTOR AT GIVEN TIME TO LAT, LONG AND ALT

R0002 CALLING SEQUENCE

R0003 L-1 CALL

R0004 L LAT-LONG

R0005 SUBROUTINES USED

R0006 R-TO-RP, ARCTAN, SETGAMMA, SETRE

R0007 ERASABLE INIT. REQ.

R0008 AX0, -AY0, AZ0, TEPHEM (SET AT LAUNCH TIME)

R0009 ALPHAV = POSITION VECTOR METERS B-29

R0010 MPAC-- TIME (CSECS B-28)

R0011 ERADFLAG =1, TO COMPUTE EARTH RADIUS, =0 FOR FIXED EARTH RADIUS

R0012 LUNAFLAG=0 FOR EARTH, 1 FOR MOON

R0013 OUTPUT

R0014 LATITUDE IN LAT (REVS. B-0)

R0015 LONGITUDE IN LONG (REVS. B-0)

R0016 ALTITUDE IN ALT METERS B-29

0017 30,3775

BANK 30

0018 REF 1 13,2000

SETLOC LATLONG

0019 13,2351

BANK

0020 REF 1

COUNT* 33/LT-LG

0021 REF 7 LAST 972 E4.1431

EBANK= ALPHAV

0022 13,2351 40220 0 LAT-LONG STQ

SETPD

0023 REF 2 LAST 144 13,2352 03674 1

INCORPEX

0024 13,2353 00001 0

OD

0025 13,2354 24007 0

STOVL 50

SAVE TIME IN 6-7D FOR R-TO-RP

0026 REF 8 LAST 1133 13,2355 02032 1

ALPHAV

0027 13,2356 51406 1

PUSH

ABVAL

0-5D= -R FOR R-TO-RP

0028 REF 2 LAST 114 13,2357 16070 1

STOVL

ALPHAM

ABS. VALUE OF R FOR ALT FORMULA BELOW

0029 REF 7 LAST 1101 13,2360 24007 0

ZEROVEC

SET MPAC=0 FOR EARTH, NON-ZERO FOR MOON

0030 13,2361 71414 0

BOFF

COS

USE COS(0) TO GET NON-ZERO IN MPAC

0031 REF 6 LAST 972 13,2362 01743 0

LUNAFLAG

0=EARTH, 1=MOON

0032 REF 1 13,2363 26364 1

CALLRTRP

0033 13,2364 77624 1

CALLRTRP CALL

0034 REF 5 LAST 979 13,2365 51670 1

R-TO-RP

RP VECTOR CONVERTED FROM R B-29

0035 13,2366 77656 1

UNIT

UNIT RP B-1

0036 REF 9 LAST 1133 13,2367 36032 0

STCALL

ALPHAV

U2= 1/2 SINL FOR SETRE SUBR BELOW

0037 REF 1 13,2370 26550 0

SETGAMMA

SET GAMMA=B2/A2 FOR EARTH, =1 FOR MOON

0038 13,2371 77624 1

CALL

SETRE

SCALED B-1

0039 REF 1 13,2372 26560 0

DLOAD

DSQ

CALC RE METERS B-29

0040 13,2373 63545 0

DLOAD

DSQ

0041 REF 10 LAST 1133 13,2374 02032 1

PDDL

ALPHAV

0042 13,2375 63525 0

PDDL

DSQ

0043 REF 11 LAST 1133 13,2376 02034 1

DAD

ALPHAV +2

0044 13,2377 75415 0

DAD

SQRT

L LATITUDE LONGITUDE SUBROUTINES

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0045				13,2400	76405-1	DMP	SLIR	
0046	REF	1		13,2401	00011-1		GAMRP	
0047	REF	7	LAST 580	13,2402	14021-1	STODL	COSTH	COS(LAT) B-1
0048	REF	12	LAST 1133	13,2403	02036-0		ALPHAV +4	
0049	REF	7	LAST 580	13,2404	34023-1	STCALL	SINTH	SIN(LAT) B-1
0050	REF	4	LAST 580	13,2405	26510-1		ARCTAN	
0051	REF	5	LAST 933	13,2406	15121-1	STODL	LAT	LAT B0
0052	REF	13	LAST 1134	13,2407	02032-1		ALPHAV	
0053	REF	8	LAST 1134	13,2410	14021-1	STODL	COSTH	COS(LONG) B-1
0054	REF	14	LAST 1134	13,2411	02034-1		ALPHAV +2	
0055	REF	8	LAST 1134	13,2412	34023-1	STCALL	SINTH	SIN(LONG) B-1
0056	REF	5	LAST 1134	13,2413	26510-1		ARCTAN	
0057	REF	5	LAST 933	13,2414	15123-0	STODL	LONG	LONG. REVS B-0 IN RANGE -1/2 TO 1/2
0058	REF	3	LAST 1133	13,2415	02070-1		ALPHAM	
0059				13,2416	77625-0	DSU		ALT= R-RE METERS B-29
0060	REF	2	LAST 144	13,2417	03673-0		ERADM	
0061	REF	5	LAST 933	13,2420	35125-1	STCALL	ALT	EXIT WITH ALT METERS B-29
0062	REF	3	LAST 1133	13,2421	03674-1		INCORPEX	

L LATITUDE-LONGITUDE-SUBROUTINES

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P0063 SUBROUTINE TO CONVERT LAT, LONG, ALT AT GIVEN TIME TO RADIUS VECTOR

R0064 CALLING SEQUENCE

R0065 L-1 CALL

R0066 L LALOTRV

R0067 SUBROUTINES USED

R0068 SETGAMMA, SETRE, RP-TO-R

R0069 ERASABLE INIT. REQ.

R0070 AX0, AY0, AZ0, TEPHEM SET AT LAUNCH TIME

R0071 LAT--LATITUDE (REVS B0)

R0072 LONG--LONGITUDE (REVS B0)

R0073 ALT--ALTITUDE (METERS) B-29

R0074 MPAC--TIME (CSECS B-28)

R0075 ERADFLAG =1 TO COMPUTE EARTH RADIUS, =0 FOR FIXED EARTH RADIUS

R0076 LUNAFLAG=0 FOR EARTH, 1 FOR MOON

R0077 OUTPUT

R0078 R-VECTOR IN ALPHAV (METERS B-29)

0079				13.2422	40220 0	LALOTRV STQ	SETPD		LAT, LONG, ALT TO R VECTOR
0080	REF	4	LAST 1134	13.2423	03674 1		INCORPEX		
0081				13.2424	00001 0		OD		
0082				13.2425	34007 1	STCALL	6D		6-7D= TIME FOR RP-TO-R
0083	REF	2	LAST 1133	13.2426	26550 0		SETGAMMA		GAMMA=B2/A2 FOR EARTH, 1 FOR MOON B-1
0084				13.2427	73545 1	DLOAD	SIN		COS(LONG)COS(LAT) IN MPAC
0085	REF	6	LAST 1134	13.2430	01121 1		LAT		UNIT RP= SIN(LONG)COS(LAT) 2-3D
0086				13.2431	65275 1	DMPR	PDDL	PD 2	GAMMA*SIN(LAT) 0-1D
0087	REF	2	LAST 1134	13.2432	00011 1		GAMRP		
0088	REF	7	LAST 1135	13.2433	01121 1		LAT		0-1D= GAMMA*SIN(LAT) B-2
0089				13.2434	65346 0	COS	PDDL	PD 4	2-3D= COS(LAT) B-1 TEMPORARILY
0090	REF	6	LAST 1134	13.2435	01123 0		LONG		
0091				13.2436	57356 0	SIN	DMPR	PD 2	
0092				13.2437	71525 0	PDDL	COS	PD 4	2-3D= SIN(LONG)COS(LAT) B-2
0093	REF	8	LAST 1135	13.2440	01121 1		LAT		
0094				13.2441	71525 0	PDDL	COS	PD 6	4-5D= COS(LAT) B-1 TEMPORARILY
0095	REF	7	LAST 1135	13.2442	01123 0		LONG		
0096				13.2443	55475 1	DMPR	VDEF	PD 4	MPAC= COS(LONG)COS(LAT) B-2
0097				13.2444	41456 0	UNIT	PUSH		0-5D= UNIT RP FOR RP-TO-R SUBR.
0098	REF	15	LAST 1134	13.2445	36032 0	STCALL	ALPHAV		ALPHAV +4= SINL FOR SETRE SUBR.
0099	REF	2	LAST 1133	13.2446	26560 0		SETRE		RE METERS B-29
0100				13.2447	43145 0	DLOAD	BOFF		SET MPAC=0 FOR EARTH, NON-ZERO FOR MOON
0101	REF	8	LAST 1133	13.2450	24007 0		ZEROVEC		
0102	REF	7	LAST 1133	13.2451	01743 0		LUNAFLAG		
0103	REF	1		13.2452	26454 0		CALLRPRT		
0104				13.2453	77746 1		COS		USE COS(0) TO GET NON-ZERO IN MPAC
0105				13.2454	77624 1	CALLRPRT	CALL		
0106	REF	6	LAST 978	13.2455	55716 1		RP-TO-R		EXIT WITH UNIT R VECTOR IN MPAC
0107	REF	16	LAST 1135	13.2456	16032 1	STOOL	ALPHAV		
0108	REF	3	LAST 1134	13.2457	03673 0		ERADH		

L LATITUDE LONGITUDE SUBROUTINES

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0109 13,2460 74215 1 DAD - VXSC (RE + ALT)(UNIT R) METERS B-30
 0110 REF 6 LAST 1134 13,2461 01125 0 ALT
 0111 REF 17 LAST 1135 13,2462 02032 1 ALPHAV
 0112 13,2463 77772 0 VSL1 R METERS B-29
 0113 REF 18 LAST 1136 13,2464 36032 0 STCALL ALPHAV EXIT WITH R IN METERS B-29
 0114 REF 5 LAST 1135 13,2465 03674 1 INCORPEX
 R0115 SUBROUTINE TO COMPUTE EARTH RADIUS

R0116 INPUT

R0117 1/2 SIN LAT IN ALPHAV +4

R0118 OUTPUT

R0119 EARTH RADIUS IN ERADM AND MPAC (METERS B-29)

0120 13,2466 63545 0 GETERAD DLOAD DSQ
 0121 REF 19 LAST 1136 13,2467 02036 0 ALPHAV +4 SIN**2(L)
 0122 13,2470 44352 0 SL1 BDSU
 0123 REF 1 13,2471 24005 1 DP1/2 COS**2(L)
 0124 13,2472 44275 1 DMPR BDSU
 0125 REF 1 13,2473 26507 1 EE
 0126 REF 2 LAST 1136 13,2474 24005 1 DP1/2
 0127 13,2475 75465 1 BDDV SQRT
 0128 REF 1 13,2476 26503 0 B2XSC
 0129 13,2477 77622 1 S24R
 0130 REF 4 LAST 1135 13,2500 03673 0 STORE ERADM
 0131 13,2501 77616 0 RVQ

R01311 THE FOLLOWING CONSTANTS WERE COMPUTED WITH A=6378166, B=6356784 METERS

R01312 B2XSC= B**2 SCALED B-51

R01313 B2/A2= B**2/A**2 SCALED B-1

R01314 EE=(1-B**2/A**2) SCALED B-0

0132 13,2502 00446 1 B2XSC 2DEC .0179450689 B**2 SCALED B-51
 0132 13,2503 00305 1
 0133 REF 8 LAST 1101 12,2004 DP1/2 = XUNIT
 0134 13,2504 17711 0 B2/A2 2DEC .9933064884 B-1 GAMMA= B**2/A**2 B-1
 0134 13,2505 05254 1
 0135 13,2506 00155 0 EE 2DEC 6.6935116 E-3 (1-B**2/A**2) B-0
 0135 13,2507 25250 1

L LATITUDE LONGITUDE SUBROUTINES

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P0137 ARCTAN SUBROUTINE

R0138 CALLING SEQUENCE

R0139 SIN THETA IN SINTH B-1

R0140 COS THETA IN COSTH B-1

R0141 CALL ARCTAN

R0142 OUTPUT

R0143 ARCTAN THETA IN MPAC AND THETA B-0 IN RANGE -1/2 TO +1/2

0144				13,2510	77600 1	ARCTAN	BDV		
0145	REF	1		13,2511	26512 0			CIROVFLW	
0146				13,2512	63545 0	CIROVFLW	DLOAD	DSQ	
0147	REF	9	LAST 1134	13,2513	00023 0			SINTH	
0148				13,2514	63525 0	PDDL		DSQ	
0149	REF	9	LAST 1134	13,2515	00021 1			COSTH	
0150				13,2516	77615 0	DAD			
0151				13,2517	75454 0	BZE		SQRT	
0152	REF	1		13,2520	26536 0			ARCTANXX	ATAN=0/0 SET THETA=0
0153				13,2521	40065 0	BDDV		BDV	
0154	REF	10	LAST 1137	13,2522	00023 0			SINTH	
0155	REF	1		13,2523	26543 1			ATAN=90	
0156				13,2524	67542 0	SR1		ASIN	
0157	REF	4	LAST 946	13,2525	00025 0	STORE		THETA	
0158				13,2526	50125 1	PDDL		BMN	
0159	REF	10	LAST 1137	13,2527	00021 1			COSTH	
0160	REF	1		13,2530	26532 1			NEGCOS	
0161				13,2531	43545 1		DLOAD	RVQ	
0162				13,2532	57545 1	NEGCOS	DLOAD	DCOMP	
0163				13,2533	43244 1	BPL		DAD	
0164	REF	1		13,2534	26540 1			NEGOUT	
0165	REF	3	LAST 1136	13,2535	24005 1			DP1/2	
0166	REF	5	LAST 1137	13,2536	00025 0	ARCTANXX	STORE	THETA	
0167				13,2537	77616 0		RVQ		
0168				13,2540	52025 1	NEGOUT	DSU	GOTO	
0169	REF	4	LAST 1137	13,2541	24005 1			DP1/2	
0170	REF	2	LAST 1137	13,2542	26536 0			ARCTANXX	
0171				13,2543	75345 1	ATAN=90	DLOAD	SIGN	
0172	REF	1		13,2544	11037 0			LODP1/4	
0173	REF	11	LAST 1137	13,2545	00023 0			SINTH	
0174	REF	6	LAST 1137	13,2546	00025 0		STORE	THETA	
0175				13,2547	77616 0		RVQ		
0176	REF	2	LAST 938	12,2006		2DZERO	=	DPZERO	

L LATITUDE-LONGITUDE-SUBROUTINES

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P0177 SETGAMMA-SUBROUTINE

R0178 SUBROUTINE TO SET GAMMA FOR THE LAT-LONG AND LATOTRY SUBROUTINES

R0179 GAMMA = B**2/A**2 FOR EARTH (B-1)

R0180 GAMMA = 1 FOR MOON (B-1)

R0181 CALLING SEQUENCE

R0182 L CALL

R0183 L+1 SETGAMMA

R0184 INPUT

R0185 LUNAFLAG=0 FOR EARTH,=1 FOR MOON

R0186 OUTPUT

R0187 GAMMA IN GAMRP (B-1)

0188			13,2550	43145 0	SETGAMMA DLOAD	BOFF	BRANCH FOR EARTH
0189	REF	1	13,2551	26505 0		B2/A2	EARTH-GAMMA
0190	REF	8 LAST-1135	13,2552	01743 0		LUNAFLAG	
0191	REF	1	13,2553	26556 0		SETGMEX	
0192			13,2554	77735 0	SLOAD		
0193	REF	1	13,2555	24005 1		1R1	MOON GAMMA
0194	REF	3 LAST-1135	13,2556	00011 1	SETGMEX STORE	GAMRP	
0195			13,2557	77616 0		RVQ	
0196			0010		GAMRP	=	8D

L LATITUDE-LONGITUDE-SUBROUTINES

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P0197SETRE-SUBROUTINE.....

R0198 SUBROUTINE TO SET RE (EARTH OR MOON RADIUS)

R0199 RE= RM FOR MOON

R0200 RE= RREF FOR FIXED EARTH RADIUS OR COMPUTED RE FOR FISCHER ELLIPSOID

R0201 CALLING SEQUENCE

R0202 L CALL

R0203 L+1 SETRE

R0204 SUBROUTINES USED

R0205 GETERAD

R0206 INPUT

R0207 ERADFLAG=0 FOR FIXED RE, 1 FOR COMPUTED RE

R0208 ALPHAV +4= 1/2 SINL IF GETERAD IS CALLED

R0209 LUNAFLAG=0 FOR EARTH,=1 FOR MOON

R0210 OUTPUT

R0211 ERADM= 504RM FOR MOON (METERS B-29)

R0212 ERADM= ERAD OR COMPUTED RE FOR EARTH (METERS B-29)

0213				13.2560	71220-1	SETRE	STQ	DLOAD	
0214	REF	1		13.2561	00051-0			SETREX	
0215	REF	1		13.2562	10003-0			504RM	
0216				13.2563	71214-0		BON	DLOAD	BRANCH FOR MOON
0217	REF	9	LAST 1138	13.2564	01703-1			LUNAFLAG	
0218	REF	1		13.2565	26575-1			TSTRLSRM	
0219	REF	1		13.2566	10001-1			ERAD	
0220				13.2567	45014-0		DIFF	CALL	ERADFLAG=0 FOR FIXED RE,1 FOR COMPUTED
0221	REF	4	LAST 973	13.2570	00742-0			ERADFLAG	
0222	REF	1		13.2571	26573-1			SETRXX	
0223	REF	1		13.2572	26466-1			GETERAD	
0224	REF	5	LAST 1136	13.2573	37673-1	SETRXX	STCALL	ERADM	EXIT WITH RE OR RM METERS B-29
0225	REF	2	LAST 1139	13.2574	00051-0			SETREX	
0226				13.2575	77214-0	TSTRLSRM	BON	VLOAD	ERADFLAG=0, SET RO=RLS
0227	REF	5	LAST 1139	13.2576	00702-1			ERADFLAG	=1 RO=RM
0228	REF	2	LAST 1139	13.2577	26573-1			SETRXX	
0229	REF	14	LAST 982	13.2600	02023-1			RLS	
0230				13.2601	64446-0		ABVAL	SRPR	SCALE FROM B-27 TO B-29
0231				13.2602	77650-1		GOTO		
0232	REF	3	LAST 1139	13.2603	26573-1			SETRXX	
0233	REF	12	LAST 971	0051		SETREX	=	S2	

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P0001 RP-TO-R-SUBROUTINE

R0002 SUBROUTINE TO CONVERT RP (VECTOR IN PLANETARY COORDINATE SYSTEM, EITHER

R0003 EARTH-FIXED OR MOON-FIXED) TO R (SAME VECTOR IN THE BASIC REF. SYSTEM)

R0004 $R = MT(T) * (RP + LPXRP)$ MT= M MATRIX TRANSPOSE

R0005 CALLING SEQUENCE

R0006 L CALL

R0007 L+1 RP-TO-R

R0008 SUBROUTINES USED

R0009 EARTHMX, MOONMX, EARTH L

R0010 ITEMS AVAILABLE FROM LAUNCH DATA

R0011 504LM= THE LIBRATION VECTOR L OF THE MOON AT TIME TIMSUBL EXPRESSED

R0012 IN THE MOON-FIXED COORD. SYSTEM RADIANS BO

R0013 ITEMS NECESSARY FOR SUBR. USED (SEE DESCRIPTION OF SUBR.)

R0014 INPUT

R0015 MPAC= 0 FOR EARTH, NON-ZERO FOR MOON

R0016 0-50= RP VECTOR

R0017 6-70= TIME

R0018 OUTPUT

R0019 MPAC= R VECTOR METERS 5-29 FOR EARTH, 8-27 FOR MOON

0020 REF 1 26,2000 SETLOC PLANTINI

0021 26,3716 BANK

0022 REF 2 LAST 52 TO 15: 18 18* COUNT* \$\$/LURDT

0023 26,3716 46020 1 RP-TO-R STQ BHIZ

0024 REF 1 26,3717 00050 1 RPREXIT

0025 REF 1 26,3720 55733 0 RPTORA

0026 26,3721 77624 1 CALL

COMPUTE M MATRIX FOR MOON

0027 REF 1 26,3722 51720 0 MOONMX

LP=LM FOR MOON RADIANS BO

0028 26,3723 77775 1 VLOAD

0029 REF 1 26,3724 02013 1 504LM

0030 26,3725 53235 0 RPTORB VXV VAD

0031 REF 1 26,3726 00001 0 504RPR

0032 REF 2 LAST 1140 26,3727 00001 0 504RPR

0033 26,3730 52105 1 VXM GOTO

0034 REF 1 26,3731 00025 0 MMATRIX

 $MPAC = R = MT(T) * (RP + LPXRP)$

0035 REF 1 26,3732 51706 1 RPRPXXXX

RESET PUSHLOC TO 0 BEFORE EXITING

0036 26,3733 77624 1 RPTORA CALL

EARTH COMPUTATIONS

0037 REF 1 26,3734 55743 1 EARTHMX

M MATRIX 8-1

0038 26,3735 77624 1 CALL

0039 REF 1 26,3736 15753 1 EARTH L

L VECTOR RADIANS BO

0040 26,3737 76521 0 MXV VSL1

LP=M(T)*L RAD-B-0

0041 REF 2 LAST 1140 26,3740 00025 0 MMATRIX

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0042			26.3741	77650 1	GOTO
0043	REF	1	26.3742	55725 1	RPTLRB
00432	REF	1	24,2000		SETLOC PLANTIN
00434			24,3670		BANK
00436	REF	1			COUNT* \$\$/LURDT

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P0044 R-TO-RP-SUBROUTINE.....

R0045 SUBROUTINE TO CONVERT R (VECTOR IN REFERENCE COORD. SYSTEM) TO RP

R0046 (VECTOR IN PLANETARY COORD. SYSTEM) EITHER EARTH-FIXED OR MOON-FIXED

R0047 RP=M(T)*(R-LXR)

R0048 CALLING SEQUENCE

R0049 L CALL

R0050 L+1 R-TO-RP

R0051 SUBROUTINES USED

R0052 EARTHMX, MOONMX, EARTH

R0053 INPUT

R0054 MPAC= 0 FOR EARTH, NON-ZERO FOR MOON

R0055 0-5D= R VECTOR

R0056 6-7D= TIME

R0057 ITEMS AVAILABLE FROM LAUNCH DATA

R0058 504LM= THE LIBRATION VECTOR L OF THE MOON AT TIME TIMSUBL, EXPRESSED

R0059 IN THE MOON-FIXED COORD. SYSTEM RADIANS BO

R0060 ITEMS NECESSARY FOR SUBROUTINES USED (SEE DESCRIPTION OF SUBR.)

R0061 OUTPUT

R0062 MPAC=RP VECTOR METERS B-29 FOR EARTH, B-27 FOR MOON

0063				24,3670	46020 1	R-TO-RP	STO	BH17	
0064	REF	2	LAST 1140	24,3671	00050 1			RPREXIT	
0065	REF	1		24,3672	51712 1			RTORPA	
0066				24,3673	77624 1		CALL		
0067	REF	2	LAST 1140	24,3674	51720 0			MOONMX	
0068				24,3675	61375 1		VLOAD	VXM	
0069	REF	2	LAST 1140	24,3676	02013 1			504LM	LP=LM
0070	REF	3	LAST 1140	24,3677	00025 0			MMATRIX	
0071				24,3700	77772 0		VSL1		L=MT(T)*LP RADIANS BO
0072				24,3701	51235 1	RTORPB	VXV	8V3U	
0073	REF	3	LAST 1140	24,3702	00001 0			504RPR	
0074	REF	4	LAST 1142	24,3703	00001 0			504RPR	
0075				24,3704	77721 0		MXV		M(T)*(R-LXR) B-2
0076	REF	4	LAST 1142	24,3705	00025 0			MMATRIX	
0077				24,3706	40372 0	RPRPXXXX	VSL1	SETPD	
0078				24,3707	00001 0			CD	
0079				24,3710	77650 1		GOTO		
0080	REF	3	LAST 1142	24,3711	00050 1			RPREXIT	
0081				24,3712	77624 1	RTORPA	CALL		EARTH COMPUTATIONS
0082	REF	2	LAST 1140	24,3713	55743 1			EARTHMX	
0083				24,3714	77624 1		CALL		
0084	REF	2	LAST 1140	24,3715	15753 1			EARTH	
0085				24,3716	77650 1		GOTO		MPAC=L=(-AX,-AY,0) RAD B-0
0086	REF	1		24,3717	51701 0			RTORPB	

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PO087 MOONMX SUBROUTINE
 RO088 SUBROUTINE TO COMPUTE THE TRANSFORMATION MATRIX M FOR THE MOON

RO089 CALLING SEQUENCE

RO090 L CALL

RO091 L+1 MOONMX

RO092 SUBROUTINES USED

RO093 NEWANGLE

RO094 INPUT

RO095 6-7D= TIME

RO096 ITEMS AVAILABLE FROM LAUNCH DATA

RO097 BSUBO, BDOT

RO098 TMSUBO, NODIO, NODDOT, FSUBO, FDOT

RO099 COSI= COS(I) B-1

RO100 SINI= SIN(I) B-1

RO101 I IS THE ANGLE BETWEEN THE MEAN LUNAR EQUATORIAL PLANE AND THE

RO102 PLANE OF THE ECLIPTIC (1 DEGREE 32.1 MINUTES)

RO103 OUTPUT

RO104 MMATRIX= 3X3 M MATRIX B-1 (STORED IN VAC AREA)

0105			24,3720	40220 0	MOONMX	STQ	SETPD	
0106	REF	1	24,3721	00051 0			EARTHMX	
0107			24,3722	00011 1			BD	
0108			24,3723	77770 1		AXT,1		B REQUIRES SL 0, SL 5 IN NEWANGLE
0109			24,3724	00005 1			5	
0110			24,3725	65345 0		DLOAD	PDDL	PD 10D 8-9D=BSUBO
0111	REF	1	24,3726	14017 1			BSUBO	10-11D=BDOT
0112	REF	1	24,3727	14011 1			BDOT	
0113			24,3730	45006 0		PUSH	CALL	PD 12D
0114	REF	1	24,3731	53743 1			NEWANGLE	EXIT WITH PD 8D AND MPAC= B REVS B0
0115			24,3732	71406 0		PUSH	COS	PD 10D
0116	REF	1	24,3733	14041 1		STODL	COS	PD 8D COS(B) B-1
0117			24,3734	77756 0		SIN		SIN(B) B-1
0118	REF	1	24,3735	14043 0		STODL	SUB	SETUP INPUT FOR NEWANGLE
0119	REF	1	24,3736	14015 0			FSUBO	8-9D=FSUBO
0120			24,3737	41525 0		PDDL	PUSH	PD 10D THEN 12D 10-11D=FDOT
0121	REF	1	24,3740	14007 0			FDOT	
0122			24,3741	45170 0		AXT,1	CALL	F REQUIRES SL 1, SL 6 IN NEWANGLE
0123			24,3742	00004 0			4	
0124	REF	2	24,3743	53743 1			NEWANGLE	EXIT WITH PD 8D AND MPAC= F REVS B0
0125	REF	1	24,3744	14027 1		STODL	AVECTR +2	SAVE F TEMP
0126	REF	1	24,3745	14013 0			NODIO	8-9D=NODIO
0127			24,3746	41525 0		PDDL	PUSH	PD 10D THEN 12D 10-11D=NODDOT
0128	REF	1	24,3747	14005 1			NODDOT	MPAC=T
0129			24,3750	45170 0		AXT,1	CALL	NODE REQUIRES SL 0, SL 5 IN NEWANGLE
0130			24,3751	00005 1			5	
0131	REF	3	24,3752	53743 1			NEWANGLE	EXIT WITH PD 8D AND MPAC= NODI REVS B0

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0132			24,3753	71406 0	PUSH	COS	PD 10D	8-9D= NODI REVS B0
0133			24,3754	77606 1	PUSH		PD 12D	10-11D= COS(NODI) B-1
0134	REF	2	LAST 1143	24,3755	00025 0	STORE	AVECTR	
0135			24,3756	76405 1	DMP	SL1R		
0136	REF	2	LAST 1143	24,3757	00041 1		COB	COS(NODI) B-1
0137	REF	1		24,3760	14035 1	STODL	BVECTR +2	PD 10D 20-25D=AVECTR= COB*SIN(NODI)
0138			24,3761	76405 1	DMP	SL1R		SOB*SIN(NODI)
0139	REF	2	LAST 1143	24,3762	00043 0		SOB	
0140	REF	2	LAST 1144	24,3763	14037 0	STODL	BVECTR +4	PD 8D
0141			24,3764	41556 1	SIN	PUSH	PD 10D	-SIN(NODI) B-1
0142			24,3765	77676 0	DCOMP			26-31D=BVECTR= COB*COS(NODI)
0143	REF	3	LAST 1144	24,3766	14033 1	STODL	BVECTR	PD 8D SOB*COS(NODI)
0144	REF	3	LAST 1144	24,3767	00027 1		AVECTR +2	MOVE F FROM TEMP LOC. TO 504F
0145	REF	1		24,3770	14007 0	STODL	504F	
0146			24,3771	76405 1	DMP	SL1R		
0147	REF	3	LAST 1144	24,3772	00041 1		COB	
01472			24,3773	77650 1	GOTO			
01474	REF	1		24,3774	53671 1		MOONMXA	
01475			25,3671		BANK	25		
01476	REF	1		25,2000	SETLOC	PLANTIN3		
01477			25,3671		BANK			
01478	REF	1			COUNT*	\$/LUROT		
0148	REF	4	LAST 1144	25,3671	14027 1	MOONMXA	STODL	AVECTR +2
0149	REF	1		25,3672	00011 1		SINNODI	8-9D=SIN(NODI) B-1
0150			25,3673	76405 1	DMP	SL1R		
0151	REF	3	LAST 1144	25,3674	00043 0		SOB	
0152	REF	5	LAST 1144	25,3675	14031 0	STODL	AVECTR +4	0
0153	REF	12	LAST 849	25,3676	06522 1		HI6ZEROS	8-13D= CVECTR= -SOB B-1
0154			25,3677	57525 1	PDDL	DCOMP	PD 10D	COB
0155	REF	4	LAST 1144	25,3700	00043 0		SOB	
0156			25,3701	63325 0	PDDL	PDVL	PD 12D THEN PD 14D	
0157	REF	4	LAST 1144	25,3702	00041 1		COB	
0158	REF	4	LAST 1144	25,3703	00033 1		BVECTR	
0159			25,3704	63361 0	VXSC	PDVL	PD 20D	BVECTR*SINI B-2
0160	REF	1		25,3705	14003 1		SINI	
0161	REF	1		25,3706	00011 1		CVECTR	
0162			25,3707	53361 0	VXSC	VAD	PD 14D	CVECTR*COSI B-2
0163	REF	1		25,3710	14001 0		COSI	
0164			25,3711	77772 0	VSL1			
0165	REF	5	LAST 1142	25,3712	24041 1	STOVL	MMATRIX +12D	PD 8D M2=BVECTR*SINI+CVECTR*COSI B-1
0166			25,3713	63361 0	VXSC	PDVL	PD 14D	
0167	REF	2	LAST 1144	25,3714	14003 1		SINI	CVECTR*SINI B-2
0168	REF	5	LAST 1144	25,3715	00033 1		BVECTR	
0169			25,3716	52361 1	VXSC	VSO	PD 8D	BVECTR*COSI B-2
0170	REF	2	LAST 1144	25,3717	14001 0		COSI	
0171			25,3720	65372 1	VSL1	PDDL	PD 14D	
0172	REF	2	LAST 1144	25,3721	00007 0		504F	8-13D=DVECTR=BVECTR*COSI-CVECTR*SINI B-1
0173			25,3722	74346 0	COS	VXSC		

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0174	REF 1	25,3723	00011-1	DVECTR	
0175		25,3724	73525 1	PDDL SIN	PD 20D 14-19D= DVECTR*COSF 3-2
0176	REF 3 LAST 1144	25,3725	00007-0	504F	
0177		25,3726	52361-1	VXSC VSU	PD 14D AVECTR*SINF 8-2
0178	REF 6 LAST 1144	25,3727	00025-0	AVECTR	
0179		25,3730	77772-0	VSL1	
0180	REF 6 LAST 1144	25,3731	14033-1	STODL MMATRIX +6	M1= AVECTR*SINF-DVECTR*COSF 8-1
0181	REF 4 LAST 1145	25,3732	00007-0	504F	
0182		25,3733	74356-1	SIN VXSC	PD 8D
0183		25,3734	71525 0	PDDL COS	PD 14D 8-13D=DVECTR*SINF 8-2
0184	REF 5 LAST 1145	25,3735	00007-0	504F	
0185		25,3736	53361-0	VXSC VAD	PD 8D AVECTR*COSF 8-2
0186	REF 7 LAST 1145	25,3737	00025-0	AVECTR	
0187		25,3740	57572-0	VSL1 VCOMP	
0188	REF 7 LAST 1145	25,3741	34025-1	STCALL MMATRIX	M0= -(AVECTR*COSF+DVECTR*SINF) 8-1
0189	REF 2 LAST 1143	25,3742	00051-0	EARTHMX	
R0190	COMPUTE X=X0+(XDOT)*(T+T0)				
R0191	8-9D= X0 (REVS 8-0), PUSHLOC SET AT 120				
R0192	10-11D=XDOT (REVS/CSEC) SCALED B+23 FOR WEARTH, B+23 FOR NODDOT AND BDOT				
R0193	AND B+27 FOR FDOT				
R0194	X1=DIFFERENCE IN 23 AND SCALING OF XDOT, =0 FOR WEARTH, 5 FOR NODDOT AND				
R0195	BDOT AND 4 FOR FDOT				
R0196	6-7D=T (CSEC B-28), TIMSUBO= (CSEC B-42 TRIPLE PREC.)				
0197		25,3743	54345-1	NEWANGLE DLOAD SR	ENTER PD 12D
0198		25,3744	00007-0	6D	
0199		25,3745	20617-0	14D	
0200		25,3746	72371-1	TAD TLOAD	CHANGE MODE TO TP
0201	REF 1	25,3747	01707-0	TIMSUBO	
0202	REF 726 LAST 1108	25,3750	00155-0	MPAC	
0203	REF 1	25,3751	14017-1	STODL TIMSUBM	T+T0 CSEC 8-42
0204	REF 2 LAST 1145	25,3752	00020-0	TIMSUBM +1	
0205		25,3753	77605-1	DMP	PD 10D MULT BY XDOT IN 10-11D
0206		25,3754	43257-0	SL* DAD	PD 8D ADD X0 IN 8-9D AFTER SHIFTING
0207		25,3755	20206-1	5,1	SUCH THAT SCALING IS 8-0
0208		25,3756	67206-1	PUSH SLOAD	PD 10D SAVE PARTIAL (X0+XDOT*T) IN 8-9D
0209	REF 3 LAST 1145	25,3757	00017-1	TIMSUBM	
0210		25,3760	41261-1	SL DMP	
0211		25,3761	20212-1	9D	
0212		25,3762	00013-0	10D	XDOT
0213		25,3763	43257-0	SL* DAD	PD 8D SHIFT SUCH THAT THIS PART OF X
0214		25,3764	20213-0	10D,1	IS SCALED REVS/CSEC 8-0
02141		25,3765	77600-1	BOV	TURN OFF OVERFLOW IF SET BY SHIFT
02142		25,3766	53767-1	+1	INSTRUCTION BEFORE EXITING
0215		25,3767	77616-0	RVQ	MPAC=X= X0+(XDOT)*(T+T0) REVS 80

L PLANETARY-INERTIAL-ORIENTATION

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P0216 EARTHMX-SUBROUTINE

R0217 SUBROUTINE TO COMPUTE THE TRANSFORMATION MATRIX M FOR THE EARTH

R0218 CALLING SEQUENCE

R0219 L CALL

R0220 L+1 EARTHMX

R0221 SUBROUTINES USED

R0222 NEWANGLE

R0223 INPUT

R0224 INPUT AVAILABLE FROM LAUNCH DATA AZO REVS B-0

R0225 TEPHEM CSEC B-42

R0226 6-7D= TIME CSEC B-28

R0227 OUTPUT

R0228 MMATRIX= 3X3 M MATRIX B-1 (STORED IN VAC AREA)

02282		26,3743		BANK	26	
02284	REF 2	LAST 1140	26,2000	SETLOC	PLANTIN1	
02286		26,3743		BANK		
02288	REF 3	LAST 1140 TO 1141:	21 39*	COUNT*	11/LURDT	
0229		26,3743	40220 0	EARTHMX	STQ	SETPD SET 8-9D=AZO
0230	REF 3	LAST 1145	26,3744 00051 0		EARTHMX	
0231		26,3745	00011 1		8D	10-11D=WEARTH
0232		26,3746	77770 1	AXT,1		FOR SL 5, AND SL 10 IN NEWANGLE
0233		26,3747	00000 1		0	
0234		26,3750	65345 0	DLOAD	PDDL	LEAVING PD SET AT 12D FOR NEWANGLE
0235	REF 1		26,3751 01712 1		AZO	
0236	REF 1		26,3752 14021 1		WEARTH	
0237		26,3753	45006 0	PUSH	CALL	
0238	REF 4	LAST 1143	26,3754 53743 1		NEWANGLE	
0239		26,3755	41401 1	SETPD	PUSH	18-19D=504AZ
0240		26,3756	00023 0		18D	COS(AZ) SIN(AZ) 0
0241		26,3757	65346 0	COS	PDDL	20-37D= MMATRIX= -SIN(AZ) COS(AZ) 0 B-1
0242	REF 1		26,3760 00023 0		504AZ	0 0 1
0243		26,3761	65356 1	SIN	PDDL	
0244	REF 13	LAST 1144	26,3762 06522 1		H16ZERDS	
0245		26,3763	73525 1	PDDL	SIN	
0246	REF 2	LAST 1146	26,3764 00023 0		504AZ	
0247		26,3765	65276 1	DCOMP	PDDL	
0248	REF 3	LAST 1146	26,3766 00023 0		504AZ	
0249		26,3767	63346 0	COS	PDVL	
0250	REF 14	LAST 1146	26,3770 06522 1		H16ZEROS	
0251		26,3771	41525 0	PDDL	PUSH	
0252	REF 5	LAST 488	26,3772 06520 0		H1DPHALF	
0253		26,3773	77650 1	GOTO		
0254	REF 4	LAST 1146	26,3774 00051 0		EARTHMX	

L PLANETARY INERTIAL ORIENTATION

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P0255 EARTH SUBROUTINE

R0256 SUBROUTINE TO COMPUTE L VECTOR FOR EARTH

R0257 CALLING SEQUENCE

R0258 L CALL

R0259 L+1 EARTH

R0260 INPUT

R0261 AX0,AY0 SET AT LAUNCH TIME WITH AY0 IMMEDIATELY FOLLOWING AX0 IN CORE

R0262 OUTPUT

R0263 -AX

R0264 MPAC= -AY RADIANS B-0

R0265 0

026505 06,3753

02651 REF 1 06,2000

026515 06,3753

02652 REF 1

BANK 06

SETLOC EARTHLOC

BANK

COUNT* \$\$/LURDT

0266 06,3753 57545 1 EARTH

0267 REF 1 06,3754 01716 0

0268 REF 1 06,3755 14017 1

0269 REF 1 06,3756 01714 1

0270 REF 2 LAST 1147 06,3757 14021 1

0271 REF 4 LAST 322 06,3760 24007 0

0272 REF 3 LAST 1147 06,3761 24023 0

0273 REF 4 LAST 1147 06,3762 00017 1

0274 06,3763 77616 0

DLOAD DCOMP

AX0

STODL 504LPL

-AY0

STODL 504LPL +2

L06ZEROS

STOVL 504LPL +4

504LPL

RVQ

L PLANETARY INERTIAL ORIENTATION

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P0275 - CONSTANTS AND ERASABLE ASSIGNMENTS

0276	REF 5 LAST 1137 12,2004	1B1 = DP1/2	1	SCALED B-1
0279	REF 13 LAST 1088 0050	RPREXIT = S1		R-TO-RP AND RP-TO-R SUBR EXIT
0280	REF 13 LAST 1139 0051	EARTHMX = S2		EARTHMX, MOONMX SUBR. EXITS
0281	0000	504RPR = 00	6	REGS R-OR-RP VECTOR
0282	0010	SINNODI = 8D	2	SIN(NODI)
0283	0010	DVECTR = 8D	6	D VECTOR MOON
0284	0010	CVECTR = 8D	6	C VECTOR MOON
0285	0022	504AZ = 18D	2	AZ
0286	0016	TIMSUBM = 14D	3	TIME SUB M (MOON) T+TO IN GETAZ
0287	0016	504LPL = 14D	6	L OR LP VECTOR
0288	0024	AVECTR = 20D	6	A VECTOR (MOON)
0289	0032	BVECTR = 26D	6	B VECTOR (MOON)
0290	0024	MMATRIX = 20D	18	M MATRIX
0291	0040	COB = 32D	2	COS(B) B-1
0292	0042	SOB = 34D	2	SIN(B) B-1
0293	0006	504F = 6D	2	F (MOON)

L MEASUREMENT INCORPORATION

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P0001 INCORP1--PERFORMS THE SIX DIMENSIONAL STATE VECTOR DEVIATION FOR POSITI
 R0002 ON AND VELOCITY OR THE NINE DIMENSIONAL DEVIATION OF POSITION, VELOCITY, A
 R0003 ND RADAR OR LANDMARK BIAS. THE OUTPUT OF THE BVECTOR ROUTINE ALONG WITH T
 R0004 HE ERROR TRANSITION MATRIX(W) ARE USED AS INPUT TO THE ROUTINE. THE DEVIA
 R0005 TION IS OBTAINED BY COMPUTING AN ESTIMATED TRACKING MEASUREMENT FROM THE
 R0006 CURRENT STATE VECTOR AND COMPARING IT WITH AN ACTUAL TRACKING MEASUREMEN
 R0007 T AND APPLYING A STATISTICAL WEIGHTING VECTOR.

R0008 INPUT

R0009 DMENFLG = 0 6DIMENSIONAL BVECTOR 1= 9DIMENSIONAL

R0010 W = ERROR TRANSITION MATRIX 6X6 OR 9X9

R0011 VARIANCE = VARIANCE (SCALAR)

R0012 DELTAQ = MEASURED DEVIATION (SCALAR)

R0013 BVECTOR = 6 OR 9 DIMENSIONAL BVECTOR

R0014 OUTPUT

R0015 DELTAX = STATE VECTOR DEVIATIONS 6 OR 9 DIMENSIONAL

R0016 ZI = VECTOR USED FOR THE INCORPORATION 6 OR 9 DIMENSIONAL

R0017 GAMMA = SCALAR

R0018 OMEGA = OMEGA WEIGHTING VECTOR 6 OR 9 DIMENSIONAL

R0019 CALLING SEQUENCE

R0020 L CALL INCORP1

R0021 NORMAL EXIT

R0022 L+1 OF CALLING SEQUENCE

0023		37,3655	BANK 37
0024	REF 1	23,2000	SETLOC MEASINC
0025		23,2531	BANK

0026	REF 1		COUNT* \$\$/INCOR
------	-------	--	-------------------

0027	REF 18 LAST 610	E5,1400	EBANK= W
------	-----------------	---------	----------

0028		23,2531	77620 0	INCORP1	STQ	
0029	REF 2 LAST 126	23,2532	02772 1		EGRESS	
0030		23,2533	66370 0	AXT,1	SSP	
0031		23,2534	00066 1		54D	
0032	REF 14 LAST 1148	23,2535	00051 0		S1	
0033		23,2536	00022 1		18D	IX1 = 54 S1= 18
0034		23,2537	66374 1	AXT,2	SSP	
0035		23,2540	00022 1		18D	
0036	REF 14 LAST 1148	23,2541	00052 0		S2	
0037		23,2542	00006 1		6	IX2 = 18 S2=6
0038		23,2543	63775 1	Z123	VLOAD	MXV*
0039	REF 22 LAST 582	23,2544	03525 0		BVECTOR	BVECTOR (0)
0040	REF 19 LAST 1149	23,2545	02467 0		W +54D,1	
0041	REF 2 LAST 126	23,2546	12665 1	STORE	ZI +18D,2	
0042		23,2547	77775 1	VLOAD		
0043	REF 23 LAST 1149	23,2550	03533 1		BVECTOR +6	BVECTOR (1)

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0044			23,2551	52717-1	MXV*	VAD*	
0045	REF	20	LAST 1149	23,2552	02555-0	W +108D.1	
0046	REF	3	LAST 1149	23,2553	75112-1	ZI +18D.2	
0047	REF	4	LAST 1150	23,2554	12665-1	STORE ZI +18D.2	
0048				23,2555	77775-1	VLOAD	
0049	REF	24	LAST 1149	23,2556	03541-1	BVECTOR +12D	BVECTOR (2)
0050				23,2557	52717-1	MXV*	VAD*
0051	REF	21	LAST 1150	23,2560	02643-1	W +162D.1	
0052	REF	5	LAST 1150	23,2561	75112-1	ZI +18D.2	B(0)*W+B(1)*(W+54)+B(2)*(W+108)FIRST-PAS
0053	REF	6	LAST 1150	23,2562	12665-1	STORE ZI +18D.2	ZI THEN Z2 THEN Z3
0054				23,2563	77700-0	TIX,1	
0055	REF	1		23,2564	46565-0	INCOR1	
0056				23,2565	43104-0	INCOR1 TIX,2	BOV
0057	REF	1		23,2566	46543-1	Z123	LOOP FOR Z1,Z2,Z3
0058	REF	3	LAST 583	23,2567	02706-1	DMENFLG	
0059	REF	1		23,2570	46574-0	INCOR1A	
0060				23,2571	77775-1	VLOAD	
0061	REF	17	LAST 920	23,2572	06512-1	ZEROVECS	
0062	REF	7	LAST 1150	23,2573	02657-1	STORE ZI +12D	
0063				23,2574	77201-1	INCOR1A SETPD	VLOAD
0064				23,2575	00001-0	0	
0065	REF	8	LAST 1150	23,2576	02643-1	ZI	
0066				23,2577	47036-1	VSQ	RTB
0067	REF	6	LAST 582	23,2600	21633-1	TPMODE	
0068				23,2601	47515-0	PDVL	VSQ
0069	REF	9	LAST 1150	23,2602	02651-1	ZI +6	
0070				23,2603	76234-0	RTB	TAD
0071	REF	7	LAST 1150	23,2604	21633-1	TPMODE	
0072				23,2605	47515-0	PDVL	VSQ
0073	REF	10	LAST 1150	23,2606	02657-1	ZI +12D	
0074				23,2607	76234-0	RTB	TAD
0075	REF	8	LAST 1150	23,2610	21633-1	TPMODE	
0076				23,2611	77171-0	TAD	AXT,2
0077	REF	11	LAST 582	23,2612	02707-0	VARIANCE	
0078				23,2613	00000-1	0	
0079	REF	2	LAST 126	23,2614	02665-0	STORE TRIPA	ZI*2 + Z2*2 + Z3*2 + VARIANCE
0080				23,2615	40151-0	TLOAD	BOV
0081	REF	12	LAST 1150	23,2616	02707-0	VARIANCE	CLEAR OVFINO
0082				23,2617	46620-1	+1	
0083	REF	1		23,2620	02670-1	STORE TEMPVAR	TEMP STORAGE FOR VARIANCE
0084				23,2621	77654-0	BZE	
0085	REF	1		23,2622	46631-1	INCOR1C	
0086				23,2623	40112-1	INCOR1B SL2	BOV
0087	REF	2	LAST 1150	23,2624	46631-1	INCOR1C	
0088	REF	2	LAST 1150	23,2625	02670-1	STORE TEMPVAR	
0089				23,2626	52114-1	INCR,2	GOTO
0090				23,2627	00001-0	DEC	1
0091	REF	1		23,2630	46623-1	INCOR1B	
0092				23,2631	61551-1	INCOR1C TLOAD	ROUND
0093	REF	3	LAST 1150	23,2632	02665-0	TRIPA	

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0094			23,2633	75405 1	DMP	SQRT	
0095	REF	3	LAST 1150	23,2634		TEMPVAR	
0096				23,2635	SL*	TAD	
0097				23,2636		0.2	
0098	REF	4	LAST 1150	23,2637		TRIPA	
0099				23,2640	NORM	INCR,2	
0100	REF	19	LAST 1016	23,2641		X2	
0101				23,2642	DEC	-2	
0102				23,2643	SXA,2	AXT,2	
0103	REF	2	LAST 114	23,2644		NORMGAM	NORMALIZATION COUNT -2 FOR GAMMA
0104				23,2645		162D	
0105				23,2646	BDDV	SETPD	
0106	REF	6	LAST 920	23,2647		DP1/4TH	
0107				23,2650		0	
0108	REF	2	LAST 145	23,2651	STORE	GAMMA	
0109				23,2652	TLOAD	NORM	
0110	REF	5	LAST 1151	23,2653		TRIPA	
0111	REF	36	LAST 1088	23,2654		X1	
0112				23,2655	DLOAD	PDDL	PD 0-1 = NORM (A)
0113	REF	727	LAST 1145	23,2656		MPAC	
0114	REF	8	LAST 582	23,2657		DELTAQ	
0115				23,2660	NORM		
0116	REF	15	LAST 1149	23,2661		S1	
0117				23,2662	XSU,1	SR1	
0118	REF	16	LAST 1151	23,2663		S1	
0119				23,2664	DDV	PUSH	PD 0-1 = DELTAQ/A
01193				23,2665	GOTO		
01196	REF	1		23,2666		NEWZCOMP	
0120				23,2667	-3 SSP		
0121	REF	15	LAST 1149	23,2670		S2	
0122				23,2671		54D	
0123				23,2672	INCOR2 VLOAD	VXM*	COMPUTE OMEGA1,2,3
0124	REF	11	LAST 1150	23,2673		ZI	
0125	REF	22	LAST 1150	23,2674		W +162D,2	
0126				23,2675	PUSH	VLOAD	
0127	REF	12	LAST 1151	23,2676		ZI +6	
0128				23,2677	VXM*	VAD	
0129	REF	23	LAST 1151	23,2700		W +180D,2	
0130				23,2701	PUSH	VLOAD	
0131	REF	13	LAST 1151	23,2702		ZI +12D	
0132				23,2703	VXM*	VAD	
0133	REF	24	LAST 1151	23,2704		W +198D,2	
0134				23,2705	PUSH	TIX,2	PD 2-7=OMEGA1,8-13=OMEGA2,14-19=OMEGA3
0135	REF	1		23,2706		INCOR2	
0136				23,2707	VLOAD	STADR	
0137	REF	2	LAST 145	23,2710	STORE	OMEGA +12D	
0138				23,2711	VLOAD	STADR	
0139	REF	3	LAST 1151	23,2712	STORE	OMEGA +6	
0140				23,2713	VLOAD	STADR	
0141	REF	4	LAST 1151	23,2714	STORE	OMEGA	

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0142			23,2715	77214 0	BON	VLOAD	
0143	REF	4	LAST 1150	23,2716	02706 1	DMENFLG	
0144	REF	1		23,2717	46722 1	INCOR2AB	
0145	REF	18	LAST 1150	23,2720	06522 1	ZEROVECS	
0146	REF	5	LAST 1151	23,2721	03517 1	STORE	OMEGA +120
0147				23,2722	66374 1	INCOR2AB	AXT,2
0148				23,2723	00022 1		180
0149	REF	16	LAST 1151	23,2724	00052 0		S2
0150				23,2725	00006 1		6
0151				23,2726	77772 1	INCOR3	VLOAD*
0152	REF	6	LAST 1152	23,2727	74252 1		OMEGA +180.2
0153				23,2730	53761 1	VXSC	VSL*
0154				23,2731	00001 0		0
0155				23,2732	20201 0		0.1
0156	REF	5	LAST 586	23,2733	12707 1	STORE	DELTAX +180.2
0157				23,2734	77304 0	TIX,2	VLOAD
0158	REF	1		23,2735	46726 0		INCOR3
0159	REF	6	LAST 1152	23,2736	02673 1		DELTAX +6
0160				23,2737	77732 1	VSL3	
0161	REF	7	LAST 1152	23,2740	02673 1	STORE	DELTAX +6
0162				23,2741	77650 1	GOTO	
0163	REF	3	LAST 1149	23,2742	02772 1		EGRESS

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P0154 INCORP2 -INCORPORATES THE COMPUTED STATE VECTOR DEVIATIONS INTO THE
 R0165 ESTIMATED STATE VECTOR. THE STATE VECTOR UPDATED MAY BE FOR EITHER THE
 R0166 LEM OR THE CSM.DETERMINED BY FLAG VEHUPFLG.(ZERO = LEM) (1 = CSM)
 R0167 INPUT

R0168 PERMANENT STATE VECTOR FOR EITHER THE LEM OR CSM

R0169 VEHUPFLG = UPDATE VEHICLE 0=LEM 1=CSM

R0170 W = ERROR-TRANSITION-MATRIX

R0171 DELTAX = COMPUTED STATE VECTOR DEVIATIONS

R0172 DMENFLG = SIZE OF W MATRIX (ZERO = 6X6) (1=9X9)

R0173 GAMMA = SCALAR FOR INCORPORATION

R0174 ZI = VECTOR-USED IN INCORPORATION

R0175 OMEGA = WEIGHTING-VECTOR

R0176 OUTPUT

R0177 UPDATED PERMANENT STATE VECTOR

R0178 CALLING-SEQUENCE

R0179 L CALL INCORP2

R0180 NORMAL EXIT

R0181 L+1 OF CALLING-SEQUENCE

0182 REF 1 23,2000 SETLOC MEASINCL
 0183 23,2743 BANK

0184 REF 2 LAST 1149 TO 1153: 138 138* COUNT* \$\$/INCOR

0185			23,2743	45020 1	INCORP2	STQ	CALL	
0186	REF 4	LAST 1152	23,2744	02772 1			EGRESS	
0187	REF 27	LAST 787	23,2745	27414 0			INTSTALL	
0188			23,2746	74375 0		VLOAD	VXSC	CALC. GAMMA * OMEGA1,2,3
0189	REF 7	LAST 1152	23,2747	03503 1			OMEGA	
0190	REF 3	LAST 1151	23,2750	03500 1			GAMMA	
0191	REF 2	LAST 126	23,2751	26713 0		STOVL	OMEGAM1	
0192	REF 8	LAST 1153	23,2752	03511 1			OMEGA +6	
0193			23,2753	77761 1		VXSC		
0194	REF 4	LAST 1153	23,2754	03500 1			GAMMA	
0195	REF 2	LAST 126	23,2755	26721 1		STOVL	OMEGAM2	
0196	REF 9	LAST 1153	23,2756	03517 1			OMEGA +12D	
0197			23,2757	77761 1		VXSC		
0198	REF 5	LAST 1153	23,2760	03500 1			GAMMA	
0199	REF 2	LAST 126	23,2761	02727 1		STORE	OMEGAM3	
0200			23,2762	77776 1		EXIT		
0201	REF 1		23,2763	3 3244 0		CAF	5400	INITIAL IX-1 SETTING FOR W MATRIX
0202	REF 1		23,2764	55'320 0		TS	WIXA	
0203	REF 1		23,2765	55'321 1		TS	WIXB	
0204	REF 227	LAST 1128	23,2766	3 4755 1		CAF	ZERO	
0205	REF 1		23,2767	55'322 1		TS	ZIXA	INITIAL IX-2 SETTING FOR Z-COMPONENT
0206	REF 1		23,2770	55'323 0		TS	ZIXB	
0207	REF 104	LAST 980	23,2771	0 5353 1	FAZA	TC	PHASCHNG	

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0208			23,2772	04022 0	OCT	04022	
0209	REF 66	LAST 983	23,2773	0 5504 0	TC	UPFLAG	
0210	REF 2	LAST 711	23,2774	00236 0	ADRES	REINTFLG	
0212	REF 2	LAST 1153	23,2775	3 1321 0	CA	WIXA	START FIRST PHASE OF INCORP2
0213	REF 2	LAST 1153	23,2776	55'320 0	TS	WIXA	TO UPDATE 6 OR 9 DIM. W MATRIX IN TEMP
0214	REF 2	LAST 1153	23,2777	3 1323 1	CA	ZIXB	
0215	REF 2	LAST 1153	23,3000	55'322 1	TS	ZIXA	
0216	REF 224	LAST 1023	23,3001	0 6037 0	TC	INTPRET	
0217			23,3002	73150 1	LXA,1	LXA,2	
0218	REF 3	LAST 1154	23,3003	01320 1		WIXA	
0219	REF 3	LAST 1154	23,3004	01322 0		ZIXA	
0220			23,3005	70731 0	SSP	DLOAD*	
0221	REF 17	LAST 1151	23,3006	00051 0		S1	
0222			23,3007	00006 1		6	
0223	REF 14	LAST 1151	23,3010	75134 0		ZI,2	
0224			23,3011	60276 1	DCOMP	NORM	CALC UPPER 3X9 PARTITION OF W MATRIX
0225	REF 17	LAST 1152	23,3012	00052 0		S2	
0226			23,3013	65161 1	VXSC	XCHX,2	
0227	REF 3	LAST 1153	23,3014	02713 0		OMEGAM1	
0228	REF 18	LAST 1154	23,3015	00051 0		S2	
0229			23,3016	57144 1	LXC,2	XAD,2	
0230	REF 20	LAST 1151	23,3017	00047 1		X2	
0231	REF 3	LAST 1151	23,3020	02103 1		NORMGAM	
0232			23,3021	65057 0	VSL*	XCHX,2	
0233			23,3022	57576 1		0,2	
0234	REF 19	LAST 1154	23,3023	00051 0		S2	
0235			23,3024	77653 1	VAD*		
0236	REF 25	LAST 1151	23,3025	02467 0		W +540,1	
0237	REF 2	LAST 126	23,3026	02735 1	STORE	HOLDW	
0238			23,3027	57543 1	DLOAD*	DCOMP	CALC MIDDLE 3X9 PARTITION OF W MATRIX
0239	REF 15	LAST 1154	23,3030	75134 0		ZI,2	
0240			23,3031	74301 0	NORM	VXSC	
0241	REF 20	LAST 1154	23,3032	00052 0		S2	
0242	REF 3	LAST 1153	23,3033	02721 1		OMEGAM2	
0243			23,3034	71124 0	XCHX,2	LXC,2	
0244	REF 21	LAST 1154	23,3035	00051 0		S2	
0245	REF 21	LAST 1154	23,3036	00047 1		X2	
0246			23,3037	53674 1	XAD,2	VSL*	
0247	REF 4	LAST 1154	23,3040	02103 1		NORMGAM	
0248			23,3041	57576 1		0,2	
0249			23,3042	52724 1	XCHX,2	VAD*	
0250	REF 22	LAST 1154	23,3043	00051 0		S2	
0251	REF 26	LAST 1154	23,3044	02555 0		W +1080,1	
0252	REF 3	LAST 1154	23,3045	02743 0	STORE	HOLDW +6	
0253			23,3046	77614 1	BOFF		
0254	REF 5	LAST 1152	23,3047	02746 0		DMENFLG	BRANCH IF 6 DIMENSIONAL
0255	REF 1		23,3050	47070 0		FAZB	
0256			23,3051	57543 1	DLOAD*	DCOMP	CALC LOWER 3X9 PARTITION OF W MATRIX
0257	REF 16	LAST 1154	23,3052	75134 0		ZI,2	
0258			23,3053	74301 0	NORM	VXSC	

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0259	REF	23	LAST 1154	23,3054	00052-0		S2	
0260	REF	3	LAST 1153	23,3055	02727-1		OMEGAM3	
0261				23,3056	71124-0	XCHX,2	LXC,2	
0262	REF	24	LAST 1155	23,3057	00051-0		S2	
0263	REF	22	LAST 1154	23,3060	00047-1		X2	
0264				23,3061	53674-1	XAD,2	VSL*	
0265	REF	5	LAST 1154	23,3062	02103-1		NORMGAM	
0266				23,3063	57576-1		0,2	
0267				23,3064	52724-1	XCHX,2	VAD*	
0268	REF	25	LAST 1155	23,3065	00051-0		S2	
0269	REF	27	LAST 1154	23,3066	02643-1		W +162D,1	
0270	REF	4	LAST 1154	23,3067	02751-0	STORE	HOLDW +12D	
0271				23,3070	77624-1	FAZB	CALL	
0272	REF	18	LAST 583	23,3071	11244-0		GRP2PC	
0273				23,3072	77776-1		EXIT	
0274	REF	4	LAST 1154	23,3073	3 1320 1	FAZB1	CA	WIXA
0275	REF	1		23,3074	6 3245-1		AD	6DD
0276	REF	3	LAST 1154	23,3075	55 321-1		TS	WIXB
0277	REF	4	LAST 1154	23,3076	3 1322-0		CA	ZIXA
0278	REF	2	LAST 219	23,3077	6 7746-0		AD	MINUS2
0279	REF	3	LAST 1154	23,3100	55 323-0		TS	ZIXB
0280	REF	225	LAST 1154	23,3101	0 6037-0		TC	INTPRET
0281				23,3102	66350-1		LXA,1	SSP
0282	REF	5	LAST 1155	23,3103	01320-1			WIXA
0283	REF	18	LAST 1154	23,3104	00051-0			S1
0284				23,3105	00006-1			6
0285				23,3106	77775-1		VLOAD	
0286	REF	5	LAST 1155	23,3107	02735-1			HOLDW
0287	REF	28	LAST 1155	23,3110	06467-1		STORE	W +54D,1
0288				23,3111	77775-1		VLOAD	
0289	REF	6	LAST 1155	23,3112	02743-0			HOLDW +6
0290	REF	29	LAST 1155	23,3113	06555-1		STORE	W +108D,1
0291				23,3114	77214-0		BOFF	VLOAD
0292	REF	6	LAST 1154	23,3115	02746-0			DMENFLG
0293	REF	1		23,3116	47126-1			FAZB5
0294	REF	7	LAST 1155	23,3117	02751-0			HOLDW +12D
0295	REF	30	LAST 1155	23,3120	06643-0		STORE	W +162D,1
0296				23,3121	52100-1	FAZB2	TIX,1	GOTO
0297				23,3122	47124-0			+2
0298	REF	1		23,3123	47134-1			FAZC
0299				23,3124	77634-0		RTB	
0300	REF	1		23,3125	46771-1			FAZA
0301				23,3126	43335-0	FAZB5	SLOAD	DAD
0302	REF	4	LAST 1155	23,3127	01324-0			ZIXB
0303	REF	1		23,3130	07247-1			12DD
0304				23,3131	52030-0		BHIZ	GOTO
0305	REF	2	LAST 1155	23,3132	47134-1			FAZC
0306	REF	1		23,3133	47121-0			FAZB2
0307				23,3134	77624-1	FAZC	CALL	
0308	REF	19	LAST 1155	23,3135	11244-0			GRP2PC

START 2ND PHASE OF INCORP2 TO TRANSFER
TEMP-REG-TO-PERM-W-MATRIX--

DONE WITH W-MATRIX. UPDATE STATE VECTOR

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0309				23,3136	53375-0	VLOAD	VAD	START 3RD PHASE OF INCORP2
0310	REF	4	LAST	582	23,3137		X789	7TH,8TH,9TH, COMPONENT OF STATE VECTOR
0311	REF	8	LAST	1152	23,3140		DELTAX +120	INCORPORATION FOR X789
0312	REF	2	LAST	145	23,3141	STORE	TX789	
0313				23,3142	47014-1	BON	RTB	
0314	REF	12	LAST	581	23,3143		VEHUPFLG	
0315	REF	1			23,3144		DOCSM	
0316	REF	1			23,3145		MOVEPLEM	
0317				23,3146	77004-0	FAZAB	BOVB	AXT,2
0318	REF	2	LAST	565	23,3147		TGDANZIG	
0319				23,3150	00000-1		0	
0320				23,3151	77014-1	BOFF	AXT,2	
0321	REF	5	LAST	717	23,3152		MOONTHIS	
0322				23,3153	47155-0		+2	
0323				23,3154	00002-0		2	
0324				23,3155	53775-1	VLOAD	VSR*	
0325	REF	9	LAST	1156	23,3156		DELTAX	B27 IF MOON ORBIT, B29 IF EARTH
0326				23,3157	57205-1		0 -7.2	
0327				23,3160	40055-0	VAD	BOV	
0328	REF	4	LAST	321	23,3161		TDELTAV	
0329	REF	1			23,3162		FAZAB1	
0330	REF	5	LAST	1156	23,3163	STOVL	TDELTAV	
0331	REF	10	LAST	1156	23,3164		DELTAX +6	B5 IF MOON ORBIT, B7 IF EARTH
0332				23,3165	53257-1	VSR*	VAD	
0333				23,3166	57202-0		0 -4.2	
0334	REF	4	LAST	321	23,3167		TNUV	
0335				23,3170	77600-1	BOV		
0336	REF	1			23,3171		FAZAB2	
0337	REF	5	LAST	1156	23,3172	STCALL	TNUV	
0338	REF	1			23,3173		FAZAB3	
0339				23,3174	53375-0	FAZAB1	VLOAD	VAD
0340	REF	13	LAST	788	23,3175		RCV	
0341	REF	11	LAST	1156	23,3176		DELTAX	
0342	REF	14	LAST	1156	23,3177		STORE	RCV
0343				23,3200	53375-0	FAZAB2	VLOAD	VAD
0344	REF	11	LAST	788	23,3201		VCV	
0345	REF	12	LAST	1156	23,3202		DELTAX +6	
0346	REF	12	LAST	1156	23,3203		STORE	VCV
0347				23,3204	45134-0	SXA,2	CALL	
0348	REF	3	LAST	297	23,3205		PBODY	
0349	REF	1			23,3206		RECTIFY	
03491				23,3207	77624-1	FAZAB3	CALL	
03492	REF	20	LAST	1155	23,3210		GNP2PC	
0350				23,3211	47014-1	BON	RTB	
0351	REF	13	LAST	1156	23,3212		VEHUPFLG	
0352	REF	1			23,3213		DOCSM1	
0353	REF	2	LAST	37	23,3214		MOVEALEM	
0354				23,3215	77624-1	CALL		
0355	REF	1			23,3216		SVDWN2	STORE DOWNLINK STATE VECTOR
0356				23,3217	77624-1	FAZAB4	CALL	

L MEASUREMENT INCORPORATION

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0357	REF	21	LAST 1156	23,3220	11244 0		GRP2PC	PHASE CHANGE
0358				23,3221	77214 0	BOFF	VLOAD	
0359	REF	7	LAST 1155	23,3222	02746 0		DMENFLG	
0360	REF	1		23,3223	47226 1		FAZAB5	6 DIMENSIONAL
0361	REF	3	LAST 1156	23,3224	03472 0		TX789	9 DIMENSIONAL
0362	REF	5	LAST 1156	23,3225	01701 0	STORE	X789	
0363				23,3226	66150 0	FAZAB5	LXA,1	SXA,1
0364	REF	5	LAST 1153	23,3227	02772 1		EGRESS	
0365	REF	13	LAST 1091	23,3230	00052 0		QPRET	
0366				23,3231	77776 1	EXIT		
0367	REF	54	LAST 867	23,3232	0 4635 0	TC	POSTJUMP	EXIT
0368	REF	3	LAST 611	23,3233	27425 1	CADR	INTWAKE	
0369				23,3234	52034 1	DOCSM	RTB	GOTO
0370	REF	1		23,3235	26723 0		MOVEPCSM	
0371	REF	1		23,3236	47146 1		FAZAB	
0372				23,3237	45034 1	DOCSM1	RTB	CALL
0373	REF	1		23,3240	26674 0		MOVEACSM	
0374	REF	2	LAST 297	23,3241	26114 1		SVDWN1	STORE DOWNLINK STATE VECTOR
0375				23,3242	77650 1	GOTO		
0376	REF	1		23,3243	47217 0		FAZAB4	
0377	REF	19	LAST 1152	23,2521		ZERO0	=	ZEROVECS
0378				23,3244	00066 1	54DD	DEC	54
0379				23,3245	77771 0	6DD	DEC	-6
0380				23,3246	00014 1	12DD	DEC	12
0400	REF	1		22,2000			SETLOC	RENDEZ
0401				22,3711			BANK	
0402	REF	1					COUNT*	\$/INCOR
0403				22,3711	51575 1	NEWZCOMP	VLOAD	ABVAL
0404	REF	17	LAST 1154	22,3712	02643 1		ZI	
0405	REF	1		22,3713	24045 0	STOVL	NORMZI	
0406	REF	18	LAST 1157	22,3714	02651 1		ZI +6	
0407				22,3715	41446 1	ABVAL	PUSH	
0408				22,3716	50025 0	DSU	BMN	
0409	REF	2	LAST 1157	22,3717	00045 0		NORMZI	
0410				22,3720	45723 0		+3	
0411				22,3721	45545 1	DLOAD	STADR	
0412	REF	3	LAST 1157	22,3722	77732 1	STORE	NORMZI	
0413				22,3723	51575 1	VLOAD	ABVAL	
0414	REF	19	LAST 1157	22,3724	02657 1		ZI +120	
0415				22,3725	45206 1	PUSH	DSU	
0416	REF	4	LAST 1157	22,3726	00045 0		NORMZI	
0417				22,3727	71240 1	BMN	DLOAD	
0418				22,3730	45733 1		+3	
0419				22,3731	77626 0	STADR		
0420	REF	5	LAST 1157	22,3732	77732 1	STORE	NORMZI	LARGEST ABVAL
0421				22,3733	66145 1	DLOAD	SXA,1	
0422	REF	6	LAST 1157	22,3734	00045 0		NORMZI	
0423	REF	7	LAST 1157	22,3735	00044 1		NORMZI	SAVE X1
0424				22,3736	62101 0	NORM	INCR,1	

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0425	REF	37	LAST 1151	22,3737	00047 1		X1	
0426				22,3740	00002 0	DEC	2	
0427				22,3741	53775 1	VLOAD	VSL*	
0428	REF	20	LAST 1157	22,3742	02643 1		ZI	
0429				22,3743	20201 0		0,1	
0430	REF	21	LAST 1158	22,3744	26643 1	STOVL	ZI	
0431	REF	22	LAST 1158	22,3745	02651 1		ZI +6	
0432				22,3746	77657 0	VSL*		
0433				22,3747	20201 0		0,1	
0434	REF	23	LAST 1158	22,3750	26651 1	STOVL	ZI +6	
0435	REF	24	LAST 1158	22,3751	02657 1		ZI +12D	
0436				22,3752	66057 0	VSL*	SXA, 1	
0437				22,3753	20201 0		0,1	
0438	REF	8	LAST 1157	22,3754	00045 0		NORMZI +1	SAVE SHIFT
0439	REF	25	LAST 1158	22,3755	02657 1	STORE	ZI +12D	
0440				22,3756	54150 1	LXA, 1	XSU, 1	
0441	REF	6	LAST 1155	22,3757	02103 1		NORMGAM	
0442	REF	9	LAST 1158	22,3760	00045 0		NORMZI +1	
0443				22,3761	77660 1	XSU, 1		
0444	REF	10	LAST 1158	22,3762	00045 0		NORMZI +1	
0445				22,3763	70130 1	SXA, 1	LXC, 1	
0446	REF	7	LAST 1158	22,3764	02103 1		NORMGAM	
0447	REF	11	LAST 1158	22,3765	00045 0		NORMZI +1	
0448				22,3766	40270 0	XAD, 1	SETPD	
0449	REF	12	LAST 1158	22,3767	00044 1		NORMZI	
0450				22,3770	00003 1		2D	
0451				22,3771	77650 1	GOTO		
0452	REF	2	LAST 1151	22,3772	46667 1		INCOR2 -3	
0453				0044		NORMZI =	36D	

L CONIC SUBROUTINES

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PC001 PROGRAM DESCRIPTION - ENTIRE CONIC SUBROUTINE LOG SECTION
R0003 MOD NO. - 0
R0005 MOD BY KRAUSE
R0007

DATE - 1 SEPTEMBER 1967
LOG SECTION - CONIC SUBROUTINES
ASSEMBLY - COLOSSUS REVISION 88

R0008 FUNCTIONAL DESCRIPTION -

R0009 THE FOLLOWING SET OF SUBROUTINES SOLVE VARIOUS PROBLEMS INVOLVING THE TRAJECTORY PRODUCED BY A CENTRAL
R0011 INVERSE-SQUARE FORCE ACTING ON A POINT MASS, AS OUTLINED IN THE CMC AND LGC LUNAR LANDING MISSION GSOP. SECTION
R0013 5.5.1.2. A GENERAL USAGE POINT-OF-VIEW WAS TAKEN IN FORMULATING, MECHANIZING, AND SCALING THE SUBROUTINES,
R0015 RATHER THAN OPTIMIZING EACH FOR A PARTICULAR USE. THEREFORE, MULTIPLE USAGE CAN BE MADE OF THE SUBROUTINES
R0017 INVOLVING ANY REALISTIC SET OF CONSTRAINTS. IT SHOULD BE NOTED THAT ONLY ONE SET OF CODING IS USED, WHETHER THE
R0019 EARTH, MOON, OR ANY OTHER CELESTIAL BODY IS SPECIFIED AS THE CENTRAL BODY OF THE PROBLEM, PROVIDED ONE OBSERVES
R0021 THE INHERENT SCALE CHANGE REQUIRED IN POSITION, VELOCITY, MU, AND TIME, AS OUTLINED IN MISSION PROGRAMMING
R0023 DEFINITION MEMO NO. 10. THIS CAN BE ACCOMPLISHED BY SIMPLY ADDING TO THE MUTABLE AND INITIALIZING THE SUBROU-
R0025 TINES APPROPRIATELY.
R0026 DUE TO THE UNIFORMITY OF THE EQUATIONS INVOLVED, CODING WAS MINIMIZED BY TREATING INDIVIDUAL EQUATIONS AND
R0028 BLOCKS OF EQUATIONS AS SUBROUTINES OF LOWER RANK WHENEVER POSSIBLE. AS A RESULT, THREE BY-PRODUCTS SUBROUTINES,
R0030 DIRECTLY USABLE AS INDEPENDENT SUBROUTINES, WERE GENERATED.

R0031 RESTRICTIONS -

R0032 THE ONLY LIMITATION IN THE SCOPE OF PROBLEM WHICH CAN BE SOLVED BY A PARTICULAR SUBROUTINE IS THE SCALING
R0034 LIMIT OF EACH PARAMETER AS SPECIFIED IN THE GSOP. THESE SCALING LIMITS WERE CHOSEN SO THAT ALL FEASIBLE TRAJEC-
R0036 TORIES COULD BE HANDLED.
R0037 SINCE THE SUBROUTINES (EXCEPT KEPLER) USE COMMON SUBROUTINES OF LOWER RANK WHICH USE ERASABLE OTHER THAN
R0039 THE PUSHLIST (DUE TO ITS LIMITED SIZE) AND COMMON INTERPRETIVE SWITCHES, THE CONIC SUBROUTINES CANNOT BE ALLOWED
R0041 TO INTERRUPT EACH OTHER. IT IS UP TO THE USER TO GUARANTEE THIS CONDITION.
R0043

L CONIC SUBROUTINES

USER'S PAGE NO. 2 EC 51

P0044 PROGRAM DESCRIPTION - KEPLER SUBROUTINE

DATE - 11 OCTOBER 1967

R0046 MOD NO. -1

LOG SECTION - CONIC SUBROUTINES

R0048 MOD BY KRAUSE

ASSEMBLY - COLOSSUS 103 AND SUNDANCE 222

R0050 MOD NO. - 2 (AUGUST 1968) BY ROBERTSON: TO PERMIT BACKDATING BY MORE THAN ONE ORBITAL PERIOD.

R00502 MOD NO. - 3 (DEC 1968) BY ROBERTSON: SUPPRESSION OF X-MODULO-ING

R00503 MOD. NO. - 4 (JAN 1969) BY ROBERTSON: CLEAR OVFINO AT KEPLER ENTRY

R0051 FUNCTIONAL DESCRIPTION -

R0052 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND THE DESIRED TRANSFER TIME THROUGH WHICH THE STATE IS TO
R0054 BE UPDATED ALONG A CONIC TRAJECTORY, COMPUTES THE NEW, UPDATED STATE VECTOR. THE TRAJECTORY MAY BE ANY CONIC
R0056 SECTION - CIRCULAR, ELLIPTIC, PARABOLIC, HYPERBOLIC, OR RECTILINEAR WITH RESPECT TO THE EARTH OR THE MOON. THE
R0058 USE OF THE SUBROUTINE CAN BE EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT
R0060 INTRODUCING ANY CODING CHANGES, ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY. AN ITERA-
R0062 TION TECHNIQUE IS UTILIZED IN THE COMPUTATION.

R0063 IF A NEGATIVE TIME-OF-FLIGHT IS INPUT, THE PROGRAM WILL SOLVE FOR THE STATE WHICH WOULD BE PRODUCED BY
R0065 EXTRAPOLATING THE POSITION BACKWARD IN TIME.

R00651 IF THE ABSOLUTE VALUE OF THE DESIRED TRANSFER TIME EXCEEDS THE ORBITAL PERIOD, THE SUBROUTINE, THROUGH A
R00653 MODULAR TECHNIQUE, WILL COMPUTE THE STATE CORRESPONDING TO THE DESIRED TIME (WHETHER POSITIVE OR NEGATIVE).

R0066

R0067 THE RESTRICTIONS ARE -

- R0068 1. (PREVIOUS RESTRICTION ON THE NEGATIVE DESIRED TRANSFER TIME IS NOW DELETED.)
R0071 2. THE PARAMETERS IN THE PROBLEM CANNOT EXCEED THEIR SCALING LIMITS AS SPECIFIED IN THE GSOP. IF
R0073 ANY OF THESE LIMITS ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
R0075

R0076 THE NUMBER OF ITERATIONS AND, THEREFORE, THE COMPUTATION SPEED IS DEPENDENT ON THE ACCURACY OF THE
R0078 GUESS, XKEPNEW. THE AGC COMPUTATION TIME IS APPROXIMATELY .061 SECONDS FOR INITIALIZATION, .065 SECONDS FOR THE
R0080 FINAL COMPUTATIONS, PLUS .083 SECONDS FOR EACH ITERATION.

R0081

R0082 REFERENCES -

R0083 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP, SECTION 5.5, SGA

R0085 MEMO 67-4.

R0086

R0087 INPUT - ERASABLE INITIALIZATION REQUIRED

R0088 * SCALE FACTOR *

R0089 VARIABLE*IN POWERS OF 2*

DESCRIPTION AND REMARKS

R0090 *-----*

R0091 RECT * +29 FOR EARTH*DP INITIAL POSITION VECTOR IN METERS

R0092 * +27 FOR MOON *

L CONIC SUBROUTINES

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R0092 VRECT * +7 FOR EARTH *DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND
 R0094 * +5 FOR MOON *
 R0095 X1 (38D) * NONE * INDEX REGISTER SET TO -2D OR -10D ACCORDING TO WHETHER THE EARTH OR MOON,
 R0097 * * RESPECTIVELY, IS THE CENTRAL BODY
 R0098 TAU. * +28 * DESIRED TRANSFER TIME IN CENTISECONDS (DP)
 R00987 * * MAY BE POS OR NEG AND ABSOLUTE VALUE MAY BE GREATER OR LESS THAN ONE ORBITAL PERIOD.
 R0099 XKEPNEW * +17 FOR EARTH *DP GUESS OF ROOT X OF KEPLERS EQN IN SQRT(METERS). SIGN SHOULD AGREE WITH THAT OF TAU.
 R0100 * +16 FOR MOON * AND ABS VALUE SHOULD BE LESS THAN THAT CORRESPONDING TO A PERIOD, VIZ, $2\pi \sqrt{\text{SEMI-MAJOR AXIS}}$, FOR SPEED OF CONVERGENCE, BUT IF EITHER CONDITION FAILS, XKEPNEW IS RESET
 R0101 * * BY KEPLER TO A POOR BUT VALID GUESS.
 R01017 * *
 R0102 TC * +28 *DP PPREV. VALUE OF TIME IN CENTISECS. MUST BE LESS THAN ONE ORBITAL PERIOD.
 R0103 XPREV * +17 FOR EARTH *DP PREV. VALUE OF X IN SQRT(METERS). MUST BE LESS THAN AN X CORRESPONDING TO ONE
 R0105 * +16 FOR MOON * ORBITAL PERIOD, VIZ, $2\pi \sqrt{\text{SEMI-MAJOR AXIS}}$
 R0106

R0107 SUBROUTINES CALLED -
 R0108 DELTIME
 R0109

R0110 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0111 KEPRTN-2 GOTO MUST BE IN INTERPRETIVE MODE BUT DVFIND ARBITRARY.
 R0113 KEPRTN-1 KEPLER RETURNS WITH XPREV IN MPAC. PL IS AT 0.
 R0114 KEPRTN ... CONTINUE

R0115 KEPLER MUST NOT BE CALLED DIRECTLY SINCE AN INTERRUPTION OF IT WOULD DESTROY THE ERASABLES IT NEEDS TO COMPLETE
 R0117 THE INTERRUPTED JOB. THEREFORE THE USER MUST CALL CSMCONIC OR LEMCONIC WHICH GUARANTEES NO INTERRUPTS AND WHICH
 R0119 ALSO CALLS KEPPREP TO COMPUTE A GUESS OF XKEPNEW.
 R0120

R0121 ABORT EXIT MODES -
 R0122 NONE
 R0123

R0124 OUTPUT -

Variable	Scale Factor	Description and Remarks
R0125	* SCALE FACTOR *	
R0126	VARIABLE* IN POWERS OF 2*	
R0127	-----*	-----
R0128	RCV * +29 FOR EARTH *DP	TERMINAL POSITION VECTOR IN METERS
R0129	* +27 FOR MOON *	
R0130	VCV * +7 FOR EARTH *DP	TERMINAL VELOCITY VECTOR IN METERS/CENTISEC
R0131	* +5 FOR MOON *	
R0132	TC * +28	*DP TRANSFER TIME IN CENTISECS TO WHICH KEPLER CONVERGED. ALWAYS LESS THAN ONE PERIOD.
R0134	XPREV * +17 FOR EARTH *DP	VALUE OF X IN SQRT(METERS) TO WHICH KEPLER CONVERGED. ALWAYS LESS THAN THE X
R0136	* +16 FOR MOON *	CORRESPONDING TO ONE PERIOD.

L CONIC SUBROUTINES

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R0137 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.

R0138

R0139 DEBRIS -

R0140 PARAMETERS WHICH MAY BE OF USE -

R0141 * SCALE FACTOR *

R0142 VARIABLE* IN POWERS OF 2*

DESCRIPTION AND REMARKS

R0143 *-----*

R0144 URRECT * +1 *DP UNIT VECTOR OF INITIAL POSITION

R0145 R1 * +29 FOR EARTH*DP MAGNITUDE OF INITIAL POSITION IN METERS

R0146 * +27 FOR MOON *

R0147 ALPHA * -22 FOR EARTH*DP INVERSE OF SEMIMAJOR AXIS IN 1/METERS

R0148 * -20 FOR MOON *

R01481 TMODULO * +28 *DP INTEGRAL NUMBER OF PERIODS IN CENTISECS. WHICH WAS SUBTRACTED FROM TAU. TO PRODUCE A

R01483 * *TAU. OF LESS THAN ONE PERIOD.

R0149 PARAMETERS OF NO USE -

R0150 DP PARAMETERS - EPSILON, DELX, DELT, RCNORM, XMODULO, PLUS PUSHLIST REGISTERS 0 THROUGH 390.

R0152

L CONIC SUBROUTINES

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R0153 PROGRAM DESCRIPTION - LAMBERT SUBROUTINE

DATE - 1 SEPTEMBER 1967

R0155 MOD NO. - 0

LOG SECTION - CONIC SUBROUTINES

R0157 MOD BY KRAUSE

ASSEMBLY - COLOSSUS REVISION 88

R0159

R0160 FUNCTIONAL DESCRIPTION -

R0161 THIS SUBROUTINE CALCULATES THE INITIAL VELOCITY REQUIRED TO TRANSFER A POINT-MASS ALONG A CONIC TRAJECTORY
 R0163 FROM AN INITIAL POSITION TO A TERMINAL POSITION IN A PRESCRIBED TIME INTERVAL. THE RESULTING TRAJECTORY MAY BE
 R0165 A SECTION OF A CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE
 R0167 SUBROUTINE CAN BE EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY
 R0169 CODING CHANGES, ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY. AN ITERATION TECHNIQUE IS
 R0171 UTILIZED IN THE COMPUTATION.
 R0172

R0173 THE RESTRICTIONS ARE -

R0174 1. RECTILINEAR TRAJECTORIES CANNOT BE COMPUTED.
 R0175 2. AN ACCURACY DEGRADATION OCCURS AS THE COSINE OF THE TRUE ANOMALY DIFFERENCE APPROACHES +1.0.
 R0177 3. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
 R0179 AND LESS THAN 178 DEGREES 12.5 MINUTES.
 R0180 4. NEGATIVE TRANSFER TIME IS AMBIGUOUS AND WILL RESULT IN NO SOLUTION.
 R0182 5. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE
 R0184 LIMITS ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
 R0185 THE NUMBER OF ITERATIONS AND, THEREFORE, THE COMPUTATIONS SPEED IS DEPENDENT ON THE ACCURACY OF THE FIRST
 R0187 GUESS OF THE INDEPENDENT VARIABLE, COGA. THE AGC COMPUTATION TIME IS APPROXIMATE-
 R0189 LY .105 SECONDS FOR INITIALIZATION, .069 SECONDS FOR FINAL COMPUTATIONS, PLUS .205 SECONDS FOR EACH ITERATION.
 R0191

R0192 REFERENCES -

R0193 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 67-8.
 R0195 SGA MEMO 67-4.
 R0196

R0197 INPUT - ERASABLE INITIALIZATION REQUIRED

Variable	Scale Factor	Description and Remarks
R0198	* SCALE FACTOR *	
R0199	VARIABLE*IN POWERS OF 2*	
R0200	*-----*	
R0201	P1VEC * +29 FOR EARTH*DP	INITIAL POSITION VECTOR IN METERS
R0202	* +27 FOR MOON *	
R0203	R2VEC * +29 FOR EARTH*DP	TARGET OR TERMINAL POSITION VECTOR IN METERS
R0204	* +27 FOR MOON *	
R0205	TDESIRED* +28	*DP DESIRED TRANSFER TIME IN CENTISECONDS
R0206	X1 (38D)* NONE	*INDEX REGISTER SET TO -2D OR -10D ACCORDING TO WHETHER THE EARTH OR MOON,
R0208	*	*RESPECTIVELY, IS THE CENTRAL BODY
R0209	GEOMSGN * NONE	*SP +.5 IF DESIRED TRANSFER ANGLE IS LESS THAN 180 DEGREES, -.5 IF GREATER THAN 180 DEG.
R0211	GUESSW * NONE	*AN INTERPRETER SWITCH TO BE SET IF NO GUESS OF COGA IS AVAILABLE, CLEAR IF A GUESS OF

L CONIC SUBROUTINES

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R0213 * *COGA IS TO BE USED BY LAMBERT
 R0214 COGA * +5 *DP GUESS OF COTANGENT OF FLIGHT PATH ANGLE (MEASURED FROM VERTICAL). THIS WILL BE
 R0216 * IGNORED IF GUESSW IS SET.
 R0217 NORMSW * NONE *AN INTERPRETER SWITCH TO BE SET IF UN IS TO BE AN INPUT TO THE SUBROUTINE, CLEAR IF
 R0219 * *LAMBERT IS TO COMPUTE ITS OWN NORMAL (UN).
 R0220 UN * +1 *DP UNIT NORMAL TO THE DESIRED ORBIT PLANE IN THE DIRECTION OF THE RESULTING ANGULAR
 R0222 * *MOMENTUM VECTOR. THIS WILL BE IGNORED IF NORMSW IS CLEAR.
 R0224 VTARGET* NONE *A S.P. TAG TO BE SET TO ZERO IF LAMBERT IS TO COMPUTE THE VELOCITY AT R2VEC AS WELL AS
 R0226 * *AT R1VEC.
 R0227 ITERCTR * NONE *A S.P. COUNTER WHICH SPECIFIES THE MAXIMUM NUMBER OF ITERATIONS ALLOWABLE.
 R02271 * *(AN ITERATION MEANS A PASS THRU KEPLER EQN (DELTIME). AT LEAST ONE OF THESE MUST
 R02272 * *ALWAYS OCCUR, EVEN IF COGA CORRESPONDING TO SOLUTION WERE INPUT AS A GUESS.)
 R02273 * *TWENTY ITERATIONS ARE SUFFICIENT TO SOLVE ALL PROBLEMS INCLUDING THOSE WITHOUT GUESS.
 R02274

R0228 SUBROUTINES CALLED -

R0229 GEOM, GETX, DELTIME, ITERATOR, LAMENTER (PART OF NEWSTATE)

R0230

R0231 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0232 L CALL MUST BE IN INTERPRETIVE MODE BUT OVFIND ARBITRARY.
 R0234 L+1 LAMBERT RETURNS WITH PL AT 0 AND WITH VVEC IN MPAC IF VTARGET WAS NON-ZERO OR VTARGET
 R0236 IN MPAC IF VTARGET WAS ZERO
 R0237 L+2 BON CONTINUE IF SOLNSW CLEAR SINCE SOLUTION IS ACCEPTABLE
 R0239 L+3 SOLNSW
 R0240 L+4 LAMABORT
 R0241 IF A LAMBERT RESULT IS TO BE A FIRST GUESS FOR THE NEXT LAMBERT CALCULATION, COGA MUST BE PRESERVED AND
 R0243 GUESSW MUST BE CLEAR FOR EACH SUCCEEDING LAMBERT CALL.
 R0244

R0245 ABORT EXIT MODES -

R0246 IF SOLNSW WAS SET UPON EXITING, EITHER LAMBERT WAS ASKED TO COMPUTE A TRANSFER TOO NEAR 360 DEG, OR T
 R0248 WAS TOO SMALL TO PRODUCE A REALISTIC TRANSFER BETWEEN R1VEC AND R2VEC. IN EITHER CASE THE FIX MUST BE MADE
 R0250 ACCORDING TO THE NEEDS OF THE PARTICULAR USER. THE ABORT EXIT MODE MAY BE CODED AS ...
 R0252 LAMABORT DLOAD ABS A MEASURE OF PROXIMITY TO 0 OR
 R0253 1-CSTH 360 DEGREES.
 R0254 DSU BMN
 R0255 ONEBIT
 R0256 CHANGER2 CHANGE R2VEC DIRECTION SLIGHTLY.
 R0257 DLOAD DAD
 R0258 TDESIRED
 R0259 SOMETIME
 R0260 STCALL TDESIRED INCREASE TDESIRED
 R0261 LAMBERT
 R0262

L CONIC SUBROUTINES

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R0263 OUTPUT -
R0264 * SCALE FACTOR *
R0265 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
R0266 -----*-----*
R0267 VVEC * +7 FOR EARTH *DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND REQUIRED TO SATISFY THE BOUNDARY VALUE
R0269 * +5 FOR MOON *PROBLEM.
R0270 VTARGET * +7 FOR EARTH *DP RESULTANT VELOCITY VECTOR AT +2VEC IN METERS/CENTISECOND.
R0272 * +5 FOR MOON *
R0273 SOLNSW * NONE *INTERPRETER SWITCH WHICH IS SET IF THE SUBROUTINE CANNOT SOLVE THE PROBLEM, CLEAR IF THE
R0275 * *SOLUTION EXISTS.
R0276 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
R0277

R0278 DEBRIS -
R0279 PARAMETERS WHICH MAY BE OF USE -

R0280 * SCALE FACTOR *
R0281 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
R0282 -----*-----*
R0283 SNTH * +1 *DP SIN OF ANGLE BETWEEN R1VEC AND R2VEC
R0284 Csth * +1 *DP COSINE OF ANGLE
R0285 1-CSTH * +2 *DP 1-CSTH
R0286 COGA * +5 *DP COTAN OF INITIAL REQUIRED FLIGHT PATH ANGLE MEASURED FROM VERTICAL
R0289 P * +4 *DP PATIU OF SEMILATUS RECTUM TO INITIAL RADIUS
R0290 R1A * +6 *DP RATIO OF INITIAL RADIUS TO SEMIMAJOR AXIS
R0291 R1 (32D)* +29 FOR EARTH*DP INITIAL RADIUS IN METERS
R0292 * +27 FOR MOON *
R0293 UR1 * +1 *DP UNIT VECTOR OF R1VEC
R0294 U2 * +1 *DP UNIT VECTOR OF R2VEC

R0295 PARAMETERS OF NO USE
R0296 DP PARAMETERS - EPSILONL, Csth-RHO, TPREV, TERRLAMB, R2, RTNLAMB (SP), PLUS PUSHLIST REGISTER 0 THROUGH 43D
R0298 ADDITIONAL INTERPRETIVE SWITCHES USED - INFINFLG, 360SW, SLOPESW, ORDERSW
R0300

L CONIC SUBROUTINES

USER'S PAGE NO. 8 EO-S3

R0301 PROGRAM DESCRIPTION - TIME-THETA SUBROUTINE
R0303 MOD NO. - 0
R0305 MOD BY KRAUSE
R0307-

DATE - 1 SEPTEMBER 1967
LOG SECTION - CONIC SUBROUTINES
ASSEMBLY--COLOSSUS REVISION 88

R0308 FUNCTIONAL DESCRIPTION -

R0309 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND A DESIRED TRUE-ANOMALY-DIFFERENCE THROUGH WHICH THE
R0311 STATE IS TO BE UPDATED ALONG A CONIC TRAJECTORY, CALCULATES THE CORRESPONDING TIME-OF-FLIGHT AND, IN ADDITION,
R0313 PROVIDES THE OPTION OF COMPUTING THE NEW UPDATED STATE VECTOR. THE RESULTING TRAJECTORY MAY BE A SECTION OF A
R0315 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINE CAN BE
R0317 EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES,
R0319 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.
R0320

R0321 THE RESTRICTIONS ARE -

R0322 1. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
R0324 AND LESS THAN 178 DEGREES 12.5 MINUTES.
R0325 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE LIMITS
R0327 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.

R0328 THE AGC COMPUTATION TIME IS APPROXIMATELY .292 SECONDS.
R0329

R0330 REFERENCES -

R0331 R-479. MISSION PROGRAMMING DEFINITION MEMO NO. 10. LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 67-8.
R0333

R0334 INPUT - ERASABLE INITIALIZATION REQUIRED

R0335 * SCALE FACTOR *

R0336 VARIABLE*IN POWERS OF 2*

DESCRIPTION AND REMARKS

R0337 *-----*

R0338 RVEC * +29 FOR EARTH*DP INITIAL POSITION VECTOR IN METERS

R0339 * +27 FOR MOON *

R0340 VVEC * +7 FOR EARTH *DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND

R0341 * +5 FOR MOON *

R0342 SNTH * +1 *DP SINE OF TRUE-ANOMALY-DIFFERENCE THROUGH WHICH THE STATE IS TO BE UPDATED

R0344 Csth * +1 *DP COSINE OF THE ANGLE

R0345 RVSW * NONE *AN INTERPRETIVE SWITCH TO BE SET IF ONLY TIME IS TO BE AN OUTPUT. CLEAR IF THE NEW STATE

R0347 * *IS TO BE COMPUTED ALSO.

R0348 X1 (38D)*NONE *INDEX REGISTER TO BE SET TO -20 OR -100 ACCORDING TO WHETHER THE EARTH OR MOON,

R0350 * *RESPECTIVELY, IS THE CENTRAL BODY.

R0351

R0352 SUBROUTINES CALLED -

L CONIC SUBROUTINES

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R0355 PARAM, GEOM, GETX, DELTIME, NEWSTATE
 R0354

R0355 CALLING SEQUENCE AND NORMAL EXIT MODES --

R0356 IF ONLY TIME IS DESIRED AS OUTPUT --

R0357 L SET CALL MUST BE IN INTERPRETIVE MODE BUT OVFIND ARBITRARY.

R0359 L+1 RVSW

R0360 L+2 TIMETHET RETURN WITH PL AT 0 AND T IN MPAC

R0361 L+3 ... CONTINUE

R0362

R0363 IF THE UPDATE STATE VECTOR IS DESIRED AS WELL --

R0364 L CLEAR CALL MUST BE IN INTERPRETIVE MODE BUT OVFIND ARBITRARY.

R0366 L+1 RVSW

R0367 L+2 TIMETHET RETURNS WITH PL AT 6. THE INITIAL POSITION VECTOR IS IN OD OF THE PUSHLIST AND THE INITIAL VELOCITY VECTOR IN MPAC.

R0369

R0370 L+3 STOVL NEWVVEC

R0371 L+4 STADR

R0372 L+5 STORE NEWRVEC

R0374 L+6 ...

R0375

NEWVVEC AND NEWRVEC ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS.
 CONTINUE

R0376 ABORT EXIT MODES --

R0377 IF COGAFLAG AND/OR INFINFLG IS SET AT THE EXIT TO TIME-THETA, TIME-THETA WILL TRANSFER TO P0000 WITH
 R0379 AN ALARM CODE (ORIGINALLY 00607). AND NOT RETURN TO THE CALLING PROGRAM. (PCR 692 AND 721).
 R0386

R0387 OUTPUT --

R0388 * SCALE FACTOR *

R0389 VARIABLE* IN POWERS OF 2*

DESCRIPTION AND REMARKS

R0390 -----*-----*

R0391 T (300) * +28 *DP TRANSFER TIME IN CENTISECONDS

R0392 INFINFLG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF THE TRANSFER ANGLE REQUIRES CLOSURE THROUGH

R0394 * *INFINITY (NO SOLUTION). CLEAR IF A PHYSICAL SOLUTION IS POSSIBLE.

R0396 COGAFLAG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RESTRICTION 1 HAS BEEN VIOLATED (NO SOLUTION).

R0398 * *CLEAR IF NOT.

R0399 IN ADDITION, IF RVSW IS CLEAR, THE FOLLOWING ARE OUTPUT--

R0400 MPAC - * +7 FOR EARTH *DP TERMINAL VELOCITY VECTOR IN METERS/CENTISEC.

R0401 MPAC +5* +5 FOR MOON *

R0402 OD - 50 * +29 FOR EARTH*DP TERMINAL POSITION VECTOR IN METERS (PL AT 60)

R0403 - * +27 FOR MOON *

R0404 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.

R0405

L CONIC SUBROUTINES

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R0406 DEBRIS -

R0407 PARAMETERS WHICH MAY BE OF USE -

R0408 * SCALE FACTOR *

R0409 VARIABLE* IN POWERS OF 2*

DESCRIPTION AND REMARKS

R0410 *-----*

R0411 R1 (320)* +29 FOR EARTH*DP MAGNITUDE OF INITIAL POSITION VECTOR, RVEC, IN METERS

R0413 * +27 FOR MOON *

R0414 R1A * +6 *DP RATIO OF R1 TO SEMIMAJOR AXIS (INLG. FOR HYPERBOLIC TRAJECTORIES)

R0416 P * +4 *DP RATIO OF SEMILATUS RECTUM TO R1

R0417 COGA * +5 *DP COTAN OF ANGLE BETWEEN RVEC AND VVEC

R0419 UR1 * +1 *DP UNIT VECTOR OF RVEC

R0420 U2 * +1 *DP UNIT VECTOR OF VVEC

R0421 UN * +1 *DP UNIT VECTOR OF UR1*U2

R0422

R0423 PARAMETERS OF NO USE -

R0424 SP PARAMETERS - RTNT, GEOMSGN, RTNPRM, MAGVEC2=R2 (DP), PLUS PUSHLIST LOCATIONS 0-110, 140-210, 240-390, 410

R0426 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW, 360SW

R0427

L CONIC SUBROUTINES

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R0428 PROGRAM DESCRIPTION - TIME-RADIUS SUBROUTINE
 R0430 MOD NO. -1
 R0432 MOD BY KRAUSE
 R0434

DATE - 11 OCTOBER 1967
 LOG SECTION - CONIC SUBROUTINES
 ASSEMBLY - COLOSSUS REVISION-88

R0435 FUNCTIONAL DESCRIPTION -

R0436 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND A DESIRED RADIUS TO WHICH THE
 R0438 STATE IS TO BE UPDATED ALONG A CONIC TRAJECTORY, CALCULATES THE CORRESPONDING TIME-OF-FLIGHT AND, IN ADDITION,
 R0440 PROVIDES THE OPTION OF COMPUTING THE NEW UPDATED STATE VECTOR. THE RESULTING TRAJECTORY MAY BE A SECTION OF A
 R0442 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINE CAN BE
 R0444 EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES,
 R0446 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.
 R0447 IF THE DESIRED RADIUS IS BEYOND THE RADIUS OF APOCENTER OF THE CONIC OR BELOW THE RADIUS OF PERICENTER,
 R0449 APSESW WILL BE SET AND THE SUBROUTINE WILL RETURN THE APOCENTER OR PERICENTER SOLUTION, RESPECTIVELY.

R0451

R0452 THE RESTRICTIONS ARE -

R0453 1. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
 R0455 AND LESS THAN 178 DEGREES 12.5 MINUTES.
 R0456 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE LIMITS
 R0458 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
 R04581 3. AN ACCURACY DEGRADATION OCCURS AS THE SENSITIVITIES OF TIME AND UPDATED STATE VECTOR TO CHANGES IN
 R04583 RDESIRED INCREASE. THIS WILL OCCUR NEAR EITHER APSIS OF THE CONIC AND WHEN THE CONIC IS NEARLY CIRCULAR. IN
 R04585 PARTICULAR, IF THE CONIC IS AN EXACT CIRCLE, THE PROBLEM IS UNDEFINED AND THE SUBROUTINE WILL ABORT.

R04587

R0459 THE AGC COMPUTATION TIME IS APPROXIMATELY .363 SECONDS

R0460

R0461 REFERENCES -

R0462 R-472, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 67-8.
 R0464

R0465 INPUT - ERASABLE INITIALIZATION REQUIRED

	* SCALE FACTOR *	DESCRIPTION AND REMARKS
R0466	VARIABLE*IN POWERS OF 2*	
R0467	-----*-----*	
R0468		
R0469	RVEC * +29 FOR EARTH*DP	INITIAL POSITION VECTOR IN METERS
R0470	* +27 FOR MOON *	
R0471	VVEC * +7 FOR EARTH *DP	INITIAL VELOCITY VECTOR IN METERS/CENTISECOND
R0472	* +5 FOR MOON *	
R0473	RDESIRED* +29 FOR EARTH*DP	TERMINAL RADIAL DISTANCE ON CONIC TRAJECTORY FOR WHICH TRANSFER TIME IS TO BE
R0475	* +27 FOR MOON *	COMPUTED.
R0476	SGNRDOT * NONE	*SP TAG SET TO +.5 OR -.5 ACCORDING TO WHETHER THE RADIAL VELOCITY AT RDESIRED IS TO BE
R0478	*	*POSITIVE OR NEGATIVE, RESPECTIVELY. THIS TAG REDUCES THE DOUBLE-VALUED PROBLEM TO A

L CONIC SUBROUTINES

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R0480 * *SINGLE-VALUED PROBLEM.
 R0481 X1 (380)*NONE *INDEX REGISTER TO BE SET TO -20 OR -100 ACCORDING TO WHETHER THE EARTH OR MOON,
 R0483 * *RESPECTIVELY, IS THE CENTRAL BODY.
 R0484 RVSW * NONE *AN INTERPRETIVE SWITCH TO BE SET IF ONLY TIME IS TO BE AN OUTPUT. CLEAR IF THE NEW STATE
 R0486 * *IS TO BE COMPUTED ALSO.
 R0487

R0488 SUBROUTINES CALLED --
 R0489 PARAM, GEOM, GETX, DELTIME, NEWSTATE
 R0490

R0491 CALLING SEQUENCE AND NORMAL EXIT MODES --

R0492 IF ONLY TIME IS DESIRED AS OUTPUT --
 R0493 L SET CALL MUST BE IN INTERPRETIVE MODE BUT OVFIND ARBITRARY.
 R0495 L+1 RVSW
 R0496 L+2 TIMERAD RETURN WITH PL AT 0 AND T IN MPAC
 R0497 L+3 ... CONTINUE
 R0498

R0499 IF THE UPDATE STATE VECTOR IS DESIRED AS WELL --
 R0500 L CLEAR CALL MUST BE IN INTERPRETIVE MODE BUT OVFIND ARBITRARY.
 R0502 L+1 RVSW
 R0503 L+2 TIMERAD RETURNS WITH PL AT 0. THE INITIAL POSITION VECTOR IS IN 00 OF THE PUSHLIST AND
 R0505 THE INITIAL VELOCITY VECTOR IN MPAC.
 R0506 L+3 STOVL NEWVVEC
 R0507 L+4 STADR
 R0508 L+5 STORE NEWRVEC NEWVVEC AND NEWRVEC ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS.
 R0510 L+6 ... CONTINUE
 R0511

R0512 ABORT EXIT MODES --

R0513 IF SOLNSW AND/OR COGAFLAG AND/OR INFINFLG IS SET AT THE EXIT TO TIME-RADIUS. TIME-RADIUS WILL TRANSFER
 R0515 TO PD0000 WITH AN ALARM CODE (ORIGINALLY 00607), AND NOT RETURN TO THE CALLING PROGRAM. (PCR 692 & 721)
 R0522

R0523 OUTPUT --

R0524 * SCALE FACTOR *
 R0525 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
 R0526 * *
 R0527 T (300) * +28 *DP TRANSFER TIME IN CENTISECONDS
 R0528 INFINFLG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RDESIRED AND SGNRDOT REQUIRE CLOSURE THROUGH
 R0530 * *INFINITY (NO SOLUTION), CLEAR IF A PHYSICAL SOLUTION IS POSSIBLE.
 R0532 COGAFLAG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RESTRICTION 1 HAS BEEN VIOLATED (NO SOLUTION),
 R0534 * *CLEAR IF NOT.
 R0535 APSESW * NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RDESIRED WAS GREATER THAN RADIUS OF APOCENTER OR

L CONIC SUBROUTINES

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R0537 * *LESS THAN RADIUS OF PERICENTER. THE APOCENTER OR PERICENTER SOLUTION, RESPECTIVELY.
 R0539 * *WILL THEN BE RETURNED. THE SWITCH IS CLEAR IF RDESIRED WAS BETWEEN PERICENTER AND
 R0541 * *APOCENTER.
 R05411 SOLNSW * NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF THE CONIC IS SO CLOSE TO A CIRCLE THAT THE TERMIN
 R05413 *POINT IS AMBIGUOUS, VIOLATING RESTRICTION 3. IF ECCENTRICITY IS GREATER THAN 2-TO-THE-
 R05415 *MINUS-18, THE SWITCH IS CLEAR.
 R0542

R0543 IN ADDITION, IF RVSW IS CLEAR, THE FOLLOWING ARE OUTPUT-

R0544 MPAC - * +7 FOR EARTH *DP TERMINAL VELOCITY VECTOR IN METERS/CENTISEC.
 R0545 MPAC +5* +5 FOR MOON *
 R0546 OD - 50 * +29 FOR EARTH *DP TERMINAL POSITION VECTOR IN METERS (PL AT 6D)
 R0547 * +27 FOR MOON *

R0548 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
 R0549

R0550 DEBRIS -

R0551 PARAMETERS WHICH MAY BE OF USE -

R0552	* SCALE FACTOR *		
R0553	VARIABLE*IN POWERS OF 2*		DESCRIPTION AND REMARKS
R0554	-----*-----*		
R0555	R1 (320)* +29 FOR EARTH*DP	MAGNITUDE OF INITIAL POSITION VECTOR, RVEC, IN METERS	
R0557	* +27 FOR MOON *		
R0558	R1A * +6	*DP RATIO OF R1 TO SEMIMAJOR AXIS (NEG. FOR HYPERBOLIC TRAJECTORIES)	
R0560	P * +4	*DP RATIO OF SEMILATUS RECTUM TO R1	
R0561	COGA * +5	*DP COTAN OF ANGLE BETWEEN RVEC AND VVEC	
R0563	UR1 * +1	*DP UNIT VECTOR OF RVEC	
R0564	U2 * +1	*DP UNIT VECTOR OF VVEC	
R0565	UN * +1	*DP UNIT VECTOR OF UR1*U2	
R0566	CSTH * +1	*DP COSINE OF TRUE ANOMALY DIFFERENCE BETWEEN RVEC AND RDESIRED.	
R0568	SNTH * +1	*DP SINE OF TRUE ANOMALY DIFFERENCE.	
R0569			

R0570 PARAMETERS OF NO USE -

R0571 SP PARAMETERS - RTNTT, GEOMSGN, RTNPRM, MAGVEC2=R2 (DP), PLUS PUSHLIST LOCATIONS 0-110, 140-210, 240-390, 410
 R0573 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW, 360SW
 R0574

L CONIC SUBROUTINES

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P0575 PROGRAM DESCRIPTION - APSIDES SUBROUTINE

DATE - 1 SEPTEMBER 1967

R0577 MOD NO. - 0

LOG SECTION - CONIC SUBROUTINES

R0579 MOD BY KRAUSE

ASSEMBLY - COLOSSUS REVISION 88

R0581

R0582 FUNCTIONAL DESCRIPTION

R0583 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR CALCULATES THE RADIUS OF PERICENTER AND OF APOCENTER AND THE

R0585 ECCENTRICITY OF THE RESULTING CONIC TRAJECTORY, WHICH MAY BE A STRAIGHT LINE,

R0587 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINE CAN BE

R0589 EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES.

R0591 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.

R0592

R0593 THE RESTRICTIONS ARE

R0594 1. IF APOCENTER IS BEYOND THE SCALING OF POSITION, THE SCALE FACTOR LIMIT (536,870,910 METERS WITH RESPECT

R0596 TO THE EARTH OR 134,217,727.5 METERS WITH RESPECT TO THE MOON) WILL BE RETURNED.

R0598 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE LIMITS

R0600 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.

R0601 THE AGC COMPUTATION TIME IS APPROXIMATELY .103 SECONDS.

R0602

R0603 REFERENCES

R0604 MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5

R0606

R0607 INPUT - ERASABLE INITIALIZATION REQUIRED

R0608 * SCALE FACTOR *

R0609 VARIABLE IN POWERS OF 2

DESCRIPTION AND REMARKS

R0610 * * *

R0611 RVEC * +29 FOR EARTH * DP INITIAL POSITION VECTOR IN METERS

R0612 * +27 FOR MOON *

R0613 VVEC * +7 FOR EARTH * DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND

R0614 * +5 FOR MOON *

R0615 X1 (38D) * NONE * INDEX REGISTER TO BE SET TO -20 OR -100 ACCORDING TO WHETHER THE EARTH OR MOON.

R0617 * * * RESPECTIVELY, IS THE CENTRAL BODY.

R0618

R0619 SUBROUTINES CALLED

R0620 PARAM. GEOM

R0621

R0622 CALLING SEQUENCE AND NORMAL EXIT MODES

L --- CONIC SUBROUTINES

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R0623 IF ONLY TIME IS DESIRED AS OUTPUT -
 R0624 L --- CALL --- MUST BE IN INTERPRETIVE MODE BUT OVFINO ARBITRARY.
 R0626 L+1 --- APSIDES RETURNS WITH PL AT 0, RADIUS OF APOCENTER IN MPAC AND RADIUS OF PERICENTER IN OD
 R0628 L+2 --- STODL APOAPSE
 R0629 L+3 --- OD
 R0630 L+4 --- STORE PERIAPSE APOAPSE AND PERIAPSE ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS
 R0632 L+5 --- ... CONTINUE
 R0633

R0634 OUTPUT -
 R0635 * SCALE FACTOR *
 R0636 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
 R0637 *-----*
 R0638 MPAC * +29 FOR EARTH*DP RADIUS OF APOCENTER IN METERS
 R0639 * +27 FOR MOON *
 R0640 OD-1D * +29 FOR EARTH*DP RADIUS OF PERICENTER IN METERS
 R0641 * +27 FOR MOON *
 R0642 ECC * +3 *DP ECCENTRICITY OF CONIC TRAJECTORY.

R0643 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
 R0644

R0645 DEBRIS -

R0646 PARAMETERS WHICH MAY BE OF USE -

R0647 * SCALE FACTOR *
 R0648 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
 R0649 *-----*
 R0650 R1 (32D) * +29 FOR EARTH*DP MAGNITUDE OF INITIAL POSITION VECTOR, RVEC, IN METERS
 R0652 * +27 FOR MOON *
 R0653 R1A * +6 *DP RATIO OF R1 TO SEMIMAJOR AXIS (NEG. FOR HYPERBOLIC TRAJECTORIES)
 R0655 P * +4 *DP RATIO OF SEMILATUS RECTUM TO R1
 R0656 COGA * +5 *DP COTAN OF ANGLE BETWEEN RVEC AND VVEC
 R0658 UR1 * +1 *DP UNIT VECTOR OF RVEC
 R0659 U2 * +1 *DP UNIT VECTOR OF VVEC
 R0660 UN * +1 *DP UNIT VECTOR OF UR1*U2
 R0661 MAGVEC2 * +7 FOR EARTH *DP MAGNITUDE OF VVEC
 R0662 * +5 FOR MOON *
 R0663

R0664 PARAMETERS OF NO USE -
 R0665 SP PARAMETERS - RTNAPSE, GEOYSGN, RTNPRM, PLUS PUSHLIST LOCATIONS 0-5, 10D-11D, 14D-21D, 31D-38D.
 R0667 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW
 R0668

L CONIC SUBROUTINES

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Address	Label	Value	Comment	Bank
0670		12,2023		BANK
0671	REF 1		COUNT* \$\$/CONIC	
0672	REF 2 LAST 125	E5,1721	EBANK= UR1	
0678		12,2023 40001-1	KEPLERN SETPD BOV	
0679		12,2024 00001-0	0	
0680		12,2025 24026-0	+1	
0681		12,2026 77773-1	VLOAD*	
0683	REF 4 LAST 693	12,2027 10005-0	MUTABLE.1	
0684		12,2030 24017-1	STOVL 140	
0685	REF 4 LAST 710	12,2031 01503-0	RRECT	
0686		12,2032 66256-0	UNIT SSP	
0687	REF 1	12,2033 00027-1	ITERCTR	
0688		12,2034 00024-1	200	
0689	REF 2 LAST 125	12,2035 16647-0	STODL URRECT	
0690		12,2036 00045-0	330	
0691	REF 5 LAST 690	12,2037 24041-1	STOVL R1	
0692	REF 5 LAST 1174	12,2040 01503-0	RRECT	
0693		12,2041 76441-1	DOT SL1R	
0694	REF 3 LAST 495	12,2042 01511-0	VRECT	
0695		12,2043 76405-1	DMP SL1R	
0696	REF 1	12,2044 00023-0	1/ROOTMU	1/ROOTMU (-17 OR -14)
0697	REF 1	12,2045 24043-0	STOVL KEPC1	C1=R.V/ROOTMU (+17 OR +16)
0698	REF 4 LAST 1174	12,2046 01511-0	VRECT	
0699		12,2047 57236-1	VSQ DMPR	
0700	REF 1	12,2050 00017-1	1/MU	-1/MU (-34 OR -38)
0701		12,2051 52405-1	DMP SL3	
0702	REF 6 LAST 1174	12,2052 00041-1	R1	
0703		12,2053 61425-0	DSU ROUND	
0704	REF 1	12,2054 11035-1	D1/64	
0705	REF 1	12,2055 00045-0	STORE KEPC2	C2=RV.V/MU -1 (+6)
0706		12,2056 74421-0	BDSU SR1R	
0707	REF 2 LAST 1174	12,2057 11035-1	D1/64	
0708		12,2060 77671-1	DDV	
0709	REF 7 LAST 1174	12,2061 00041-1	R1	
0710	REF 1	12,2062 00011-1	STORE ALPHA	ALPHA=(1-C2)/P1 (-22 OR -20)
0711		12,2063 71244-0	BPL DLOAD	MAXIMUM-X-DEPENDS-ON-TYPE-OF-CONIC
0712	REF 1	12,2064 24073-0	IREV	
0713	REF 1	12,2065 11053-1	-50SC	-50SC (+12)
0714		12,2066 40071-0	DDV BOV	
0715	REF 2 LAST 1174	12,2067 00011-1	ALPHA	
0716	REF 1	12,2070 24077-1	STOREMAX	
0717		12,2071 52166-1	SQRT GOTO	
0718	REF 2 LAST 1174	12,2072 24077-1	STOREMAX	
0719		12,2073 55366-1	IREV SQRT BDDV	

L CONIC SUBROUTINES

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0720	REF	1	12,2074	11055 1	2PISC	2PISC (+6)
0721			12,2075	77600 1	BOV	
0722	REF	3 LAST 1174	12,2076	24077 1		STOREMAX
0723	REF	1	12,2077	00013 0	STOREMAX	STORE XMAX
0724			12,2100	65205 0	DMP	PDDL
0725	REF	2 LAST 1174	12,2101	00023 0		1/ROOTMU
0726	REF	3 LAST 1174	12,2102	00011 1		ALPHA
0727			12,2103	65301 0	NORM	PDDL
0728	REF	38 LAST 1158	12,2104	00047 1		X1
0729			12,2105	56257 1	SL*	DDV
0730			12,2106	20173 0		0 -6,1
0731			12,2107	50000 1	BOV	BMN
0732	REF	1	12,2110	24124 0		MODDONE
0733	REF	2 LAST 1175	12,2111	24124 0		MODDONE
0734			12,2112	51525 1	PERIODCH	PDDL ABS
0735	REF	2 LAST 114	12,2113	02074 0		TAU.
0736			12,2114	50025 0	DSU	BMN
0737			12,2115	00001 0		OD
0738	REF	3 LAST 1175	12,2116	24124 0		MODDONE
0739			12,2117	77765 0	SIGN	
0740	REF	3 LAST 1175	12,2120	02074 0		TAU.
0741	REF	4 LAST 1175	12,2121	16074 0	STODL	TAU.
0750			12,2122	77650 1	GOTO	
0751	REF	1	12,2123	24112 0		PERIODCH
0752			12,2124	71201 1	MODDONE	SETPD DLOAD
0753			12,2125	00001 0		0
0754	REF	2 LAST 114	12,2126	02130 1		XKEPNEW
0755	REF	1	12,2127	00025 0	STORE	X
07555			12,2130	53165 0	SIGN	BZE
0756	REF	5 LAST 1175	12,2131	02074 0		TAU.
07565	REF	1	12,2132	24302 0		BADX
0757			12,2133	51440 0	BMN	ABS
07575	REF	2 LAST 1175	12,2134	24302 0		BADX
0758			12,2135	51025 1	DSU	BPL
07585	REF	2 LAST 1175	12,2136	00013 0		XMAX
0759	REF	3 LAST 1175	12,2137	24302 0		BADX
07595			12,2140	51145 0	STORBNDS	DLOAD BPL
0760	REF	6 LAST 1175	12,2141	02074 0		TAU.
07605	REF	1	12,2142	24152 1		STOREMIN
0761			12,2143	57545 1	DLOAD	DCOMP
07615	REF	3 LAST 1175	12,2144	00013 0		XMAX
0762	REF	1	12,2145	14015 0	STODL	XMIN
07625	REF	1	12,2146	24007 0		KEPZERO
0763	REF	4 LAST 1175	12,2147	00013 0	STORE	XMAX
07635			12,2150	77650 1	GOTO	
0764	REF	1	12,2151	24155 0		DXCOMP
07645			12,2152	77745 1	STOREMIN	DLOAD
0765	REF	2 LAST 1175	12,2153	24007 0		KEPZERO
07655	REF	2 LAST 1175	12,2154	00015 0	STORE	XMIN
0766			12,2155	57345 1	DXCOMP	DLOAD DMPR

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0767	REF	7	LAST 1175	12,2156	02074 0		TAU.		
0768	REF	1		12,2157	11046 0		BEE22		
07685				12,2160	77646 0		ABS		
0769	REF	1		12,2161	16177 1		STODL	EPSILON	
0770	REF	1		12,2162	01553 0			XPREV	
0779				12,2163	77621 1	XDIFF	BDSU		
0780	REF	2	LAST 1175	12,2164	00025 0			X	
0781	REF	2	LAST 125	12,2165	02643 1		STORE	DELX	
0782				12,2166	63545 0	KEPLOOP	DLOAD	DSQ	
0783	REF	3	LAST 1176	12,2167	00025 0			X	X=XKEP
0784				12,2170	41501 0		NORM	PUSH	OD=XSQ (+34 OR +32 -N1) PL AT 2
0785	REF	39	LAST 1175	12,2171	00047 1			X1	
0786				12,2172	53605 1		DMP	SRR*	
0787	REF	4	LAST 1175	12,2173	00011 1			ALPHA	
0788				12,2174	21573 0			0 -6,1	
0789	REF	1		12,2175	34031 1		STCALL	XI	XI=ALPHA XSQ (+6)
0790	REF	1		12,2176	24421 0			DELTIME	
0791				12,2177	44200 0		BOV	BDSU	
0792	REF	1		12,2200	24311 1			TIMEOVFL	UNLIKELY
0793	REF	8	LAST 1176	12,2201	02074 0			TAU.	
0794	REF	2	LAST 125	12,2202	02645 1		STORE	DELT	DELT=DELINDEP
0795				12,2203	44246 1		ABS	BDSU	
0796	REF	2	LAST 1176	12,2204	02177 1			EPSILON	
0797				12,2205	71244 0		BPL	DLOAD	
0798	REF	1		12,2206	24333 1			KEPCONVG	
0799	REF	5	LAST 729	12,2207	00037 0			T	
0800				12,2210	60225 1		DSU	NORM	
0801	REF	2	LAST 110	12,2211	01551 1			TC	
0802	REF	40	LAST 1176	12,2212	00047 1			X1	
0803				12,2213	60325 0		PDDL	NORM	
0804	REF	3	LAST 1176	12,2214	02643 1			DELX	
0805	REF	23	LAST 1155	12,2215	00050 1			X	
0806				12,2216	41260 0		XSU,1	DMP	
0807	REF	24	LAST 1176	12,2217	00047 1			X2	
0808	REF	3	LAST 1176	12,2220	02645 1			DELT	
0809				12,2221	56257 1		SLR*	DDV	
0810				12,2222	21202 1			1,1	
0811				12,2223	41542 1		SRI	PUSH	OD=TRIAL DELX PL AT 2
0812				12,2224	71244 0		BPL	DLOAD	
0813	REF	1		12,2225	24246 1			POSDELX	
0814	REF	4	LAST 1176	12,2226	00025 0			X	
0815	REF	5	LAST 1175	12,2227	00013 0		STOKE	XMAX	MOVE MAX BOUND IN
0816				12,2230	45221 1		BDSU	DSU	PL AT 0
0817	REF	3	LAST 1175	12,2231	00015 0			XMIN	
0818				12,2232	51000 0		BOV	BPL	
0819	REF	1		12,2233	24240 1			NDXCHNGE	
0820	REF	2	LAST 1176	12,2234	24240 1			NDXCHNGE	
0821				12,2235	52145 0		DLOAD	GOTO	

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0822				12,2236	00001-0		OD	
0823	REF	1		12,2237	24260-0		NEWDELX	
0824				12,2240	45345-1	NDXCHNGE	DLOAD	DSU
0825	REF	4	LAST 1176	12,2241	00015-0			XMIN
0826	REF	5	LAST 1176	12,2242	00025-0			X
0827				12,2243	52075-1	DMPR	GOTO	TO FORCE MPAC +2 TO ZERO
0828	REF	1		12,2244	11051-0			DP9/10
0829	REF	2	LAST 1177	12,2245	24260-0			NEWDELX
0830				12,2246	77745-1	POSDELX	DLOAD	
0831	REF	6	LAST 1177	12,2247	00025-0			X
0832	REF	5	LAST 1177	12,2250	00015-0		STORE	XMIN MOVE MIN BOUND IN
0833				12,2251	45221-1		BDSU	DSU PL AT 0
0834	REF	6	LAST 1176	12,2252	00013-0			XMAX
0835				12,2253	50000-1		BDV	BMN
0836	REF	1		12,2254	24274-0			PDXCHNGE
0837	REF	2	LAST 1177	12,2255	24274-0			PDXCHNGE
0838				12,2256	77745-1		DLOAD	
0839				12,2257	00001-0			OD
0840	REF	4	LAST 1176	12,2260	02643-1	NEWDELX	STORE	DELX
0841				12,2261	43254-0		BZE	DAD
0842	REF	2	LAST 1176	12,2262	24333-1			KEPCONVG
0843	REF	7	LAST 1177	12,2263	00025-0			X
0844	REF	8	LAST 1177	12,2264	14025-0		STODL	X
0845	REF	6	LAST 1176	12,2265	00037-0			T
0846	REF	3	LAST 1176	12,2266	01551-1		STORE	TC
0847				12,2267	46034-1	BRNCHCTP	RTB	BHIZ
0848	REF	1		12,2270	24644-1			CHECKCTR
0849	REF	3	LAST 1177	12,2271	24333-1			KEPCONVG
0850				12,2272	77650-1		GOTO	
0851	REF	1		12,2273	24166-0			KEPLOOP ITERATE
0852				12,2274	45345-1	PDXCHNGE	DLOAD	DSU
0853	REF	7	LAST 1177	12,2275	00013-0			XMAX
0854	REF	9	LAST 1177	12,2276	00025-0			X
0855				12,2277	52075-1	DMPR	GOTO	TO FORCE MPAC +2 TO ZERO
0856	REF	2	LAST 1177	12,2300	11051-0			DP9/10
0857	REF	3	LAST 1177	12,2301	24260-0			NEWDELX
0858				12,2302	70545-1	BADX	DLOAD	SRI
0859	REF	8	LAST 1177	12,2303	00013-0			XMAX
0860				12,2304	77765-0		SIGN	
0861	REF	9	LAST 1176	12,2305	02074-0			TAU.
0862	REF	10	LAST 1177	12,2306	00025-0		STORE	X
0863				12,2307	77650-1		GOTO	

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0864	REF	1	12,2310	24140 1	STORBNDS	
0879			12,2311	50145-1	TIMEOVFL DLOAD	BMN X WAS TOO BIG
0880	REF	11	12,2312	00025-0		X
08805	REF	1	12,2313	24330 1		NEGTOVFL
0861	REF	9	12,2314	00013 0	STORE	X MAX
0882			12,2315	70545-1	CMNTOVFL DLOAD	SR1
0883	REF	5	12,2316	02643-1		DELX
0884	REF	6	12,2317	02643-1	STORE	DELX
0885			12,2320	44254 1	BZE	BDSU
08855	REF	1	12,2321	02112 1		KEPRTN
0886	REF	12	12,2322	00025-0		X
0887	REF	13	12,2323	14025-0	STODL	X
0888	REF	4	12,2324	01551 1		TC
0889	REF	7	12,2325	00037-0	STORE	T
0890			12,2326	77650 1	GOTO	
0891	REF	1	12,2327	24267 1		BRNCHCTR
08911	REF	6	12,2330	00015-0	NEGTOVFL STORE	X MIN
08912			12,2331	77650 1	GOTO	
08913	REF	1	12,2332	24315-0		CMNTOVFL
0892			12,2333	44545-0	KEPCONVG DLOAD	SR4R
0893	REF	8	12,2334	00041 1		R1
0894			12,2335	74225 1	DSU	VXSC
0895	REF	1	12,2336	00035-1		XSQC(XI)
0896	REF	3	12,2337	02647-0		URRECT
0897			12,2340	65372-1	VSL1	PDDL OD=(R1-XSQC(XI))URRECT (+33-OR +31)
0898	REF	14	12,2341	00025-0		X
0899			12,2342	60316-0	DSQ	NORM
0900	REF	41	12,2343	00047 1		X1
0901			12,2344	57275-0	DMPR	DMPR
0902	REF	3	12,2345	00023-0		1/ROOTMU
0903	REF	15	12,2346	00025 0		X
0904			12,2347	53605-1	DMP	SRR*
0905	REF	1	12,2350	00033 1		S(XI)
0906			12,2351	21572 1		0 -7,1
0907			12,2352	77621-1	BDSU	
0908	REF	8	12,2353	00037-0		T
0909			12,2354	74352-0	SL1	VXSC
0910	REF	5	12,2355	01511-0		VRECT
0911			12,2356	53372 1	VSL1	VAD PL AT-0
0912			12,2357	77712-0	VSL4	
0913	REF	15	12,2360	01535-0	STORE	RCV RCV (+29-OR +27)
0914			12,2361	60246 1	ABVAL	NORM
0915	REF	25	12,2362	00050-1		X2
0916	REF	1	12,2363	14043 0	STODL	RCNORM
0917	REF	2	12,2364	00031-0		X1
0918			12,2365	45275-0	DMPR	DSU
0919	REF	2	12,2366	00033-1		S(XI)
0920	REF	1	12,2367	11033-1		D1/128

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0921			12,2370	76405 1	DMP	SLIR	
0922	REF	1	12,2371	00021 1		ROOTMU	
0923			12,2372	53605 1	DMP	SLR*	
0924	REF	16	12,2373	00025 0		X	
0925			12,2374	56601 0		0 -3,2	
0926			12,2375	74271 0	DDV	VXSC	
0927	REF	2	12,2376	00043 0		RCNORM	
0928	REF	4	12,2377	02647 0		URRECT	
0929			12,2400	65372 1	VSL1	PDOL	OD=URRECT(XI S(XI)-1)X ROOTMU/PCV (+15
0930	REF	2	12,2401	00035 1		XSQC(XI)	OR +13) PL AT 6
0931			12,2402	56257 1	SLR*	DDV	
0932			12,2403	56602 0		0 -4,2	
0933	REF	3	12,2404	00043 0		RCNORM	
0934			12,2405	74221 0	BDSU	VXSC	
0935	REF	1	12,2406	11047 1		D1/256	
0936	REF	6	12,2407	01511 0		VRECT	
0937			12,2410	42455 0	VAD	VSL8	PL-AT-0
0938			12,2411	77626 0	STADR		
0939	REF	13	12,2412	62234 0	STODL	VCV	VCV (+7 OR +5)
0940	REF	9	12,2413	00037 0		T	
0941	REF	5	12,2414	15551 1	STODL	TC	
0944	REF	17	12,2415	00025 0		X	
0947	REF	2	12,2416	01553 0	STORE	XPREV	
0948			12,2417	77650 1	GOTU		
0949	REF	2	12,2420	02112 1		KEPRTN	

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0950		12,2421	77776-1	DELTIME	EXIT	MPAC=XI (+6), -OD=XSQ (+34 OR +32 -N1)
0951	REF 4 LAST 1085	12,2422	0 7222 1		TC POLY	
0952		12,2423	00010-0		DEC 8	
0953		12,2424	02525-1		2DEC .083333334	
0953		12,2425	12526-0			
0954		12,2426	67356-0		2DEC -.266666684	
0954		12,2427	75666-0			
0955		12,2430	15001-1		2DEC .406349155	
0955		12,2431	23771-1			
0956		12,2432	64342-0		2DEC -.361198675	
0956		12,2433	43674-0			
0957		12,2434	06563-1		2DEC .210153242	
0957		12,2435	04645-1			
0958		12,2436	75173-0		2DEC -.086221951	
0958		12,2437	52672-0			
0959		12,2440	00656-1		2DEC .026268812	
0959		12,2441	14331-0			
0960		12,2442	77633-1		2DEC -.006163316	
0960		12,2443	40512-0			
0961		12,2444	00023-0		2DEC .001177342	
0961		12,2445	11210-1			
0962		12,2446	77774-0		2DEC -.000199055	
0962		12,2447	67506-0			
0963	REF 226 LAST 1155	12,2450	0 6037-0		TC INTERPRET	
0964	REF 3 LAST 1178	12,2451	14033-1		STODL S(XI)	
0965	REF 3 LAST 1178	12,2452	00031-0		XI	
0966		12,2453	77776-1		EXIT	
0967	REF 5 LAST 1180	12,2454	0 7222 1		TC POLY	
0968		12,2455	00010-0		DEC 8	
0969		12,2456	01000-0		2DEC .031250001	
0969		12,2457	00000-1			
0970		12,2460	72525-0		2DEC -.166666719	
0970		12,2461	52506-0			
0971		12,2462	13301-1		2DEC .355555413	
0971		12,2463	15337-1			
0972		12,2464	62776-0		2DEC -.406347410	
0972		12,2465	54733-1			
0973		12,2466	11176-1		2DEC .288962094	
0973		12,2467	13267-0			
0974		12,2470	73410-0		2DEC -.140117894	
0974		12,2471	51674-0			
0975		12,2472	01446-0		2DEC .049247387	
0975		12,2473	33641-1			
0976		12,2474	77451-1		2DEC -.013081923	
0976		12,2475	65233-0			
0977		12,2476	00055-1		2DEC .002806389	
0977		12,2477	37266-1			
0978		12,2500	77767-1		2DEC -.000529414	
0978		12,2501	52336-0			
0979	REF 227 LAST 1180	12,2502	0 6037-0		TC INTERPRET	

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0980			12,2503	53605-1	DMP	SRR*		PL AT 0
0981			12,2504	00001-0		OD		
0982			12,2505	21574-1		0-5,1		
0983	REF	3	LAST 1179	12,2506	00035-1	STORE	XSQC(XI)	XSQC(XI) (+33 OR +31)
0984			12,2507	72405-0	DMP	SL1		
0985	REF	2	LAST 1174	12,2510	00043-0		KEPC1	
0986			12,2511	65234-1	RTB	PDDL		XCH WITH PL. OD=C1 XSQ C(XI) (+49 OR +46
0987	REF	9	LAST 1150	12,2512	21633-1		TPMODE	PL AT 0.3
0988			12,2513	53605-1	DMP	SRR*		
0989	REF	4	LAST 1160	12,2514	00033-1		S(XI)	
0990			12,2515	21574-1		0-5,1		
0991			12,2516	72405-0	DMP	SL1		
0992	REF	2	LAST 1174	12,2517	00045-0		KEPC2	
0993			12,2520	65234-1	RTB	PDDL		3D=C2 XSQ S(XI) (+35 OR +33) PL AT 6
0994	REF	10	LAST 1181	12,2521	21633-1		TPMODE	
0995	REF	9	LAST 1178	12,2522	00041-1		R1	
0996			12,2523	76261-0	SR	TAD		PL AT 3
0997			12,2524	20607-1		6		
0998			12,2525	41301-0	NORM	DMP		TO PRESEPV SIGNIF.
0999	REF	42	LAST 1178	12,2526	00047-1		X1	
1000	REF	18	LAST 1179	12,2527	00025-0		X	
1001			12,2530	76257-0	SR*	TAD		X(C2 XSQ S(XI) +R1) (+49 OR +46) PL AT 5
1002			12,2531	20576-1		0-3,1		
1003			12,2532	57232-0	SL4R	DMPR		
1004	REF	4	LAST 1178	12,2533	00023-0		1/ROOTMU	
1005	REF	10	LAST 1179	12,2534	00037-0	STORE	T	
1006			12,2535	77616-0	RVQ			

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1007			12,2536	71214 0	ITERATOR BONCLR	DLOAD		
1008	REF	1	12,2537	00614 1		SLOPESW		
1009	REF	1	12,2540	24606 1		FIRSTIME		
1010	REF	1	12,2541	00037 0		DEP		
1011			12,2542	60225 1	DSU	NORM		
1012	REF	3 LAST 125	12,2543	02762 0		DEPREV		
1013	REF	43 LAST 1181	12,2544	00047 1		X1		
1014			12,2545	60325 0	PDDL	NORM		
1015	REF	1	12,2546	00015 0		DELINDEP		
1016	REF	26 LAST 1178	12,2547	00050 1		X2		
1017			12,2550	41260 0	XSU,1	DMP		
1018	REF	27 LAST 1182	12,2551	00047 1		X2		
1019	REF	3 LAST 125	12,2552	02760 1		DELDEP		
1020			12,2553	56257 1	SLR*	DDV		PL UP 2
1021			12,2554	21202 1		1,1		
1022			12,2555	43142 1	SR1	BOFF		
1023	REF	1	12,2556	04351 1		ORDERSW		
1024	REF	1	12,2557	24562 0		SGNCHECK		
1025			12,2560	75246 0	ABS	SIGN		IN CASE 2ND DERIV. CHANGED SIGN, MUST
1026	REF	4 LAST 1182	12,2561	02760 1		DELDEP		DISREGARD IT TO FIND MIN.
1027			12,2562	51006 0	SGNCHECK PUSH	BPL		TRIAL DELINDEP PL DOWN 2
1028	REF	1	12,2563	24620 0		PJSDEL		
1029			12,2564	43145 0	DLOAD	BON		
1030	REF	1	12,2565	02766 1		INDEP		
1031	REF	2 LAST 1182	12,2566	04311 0		ORDERSW		
1032	REF	1	12,2567	24571 1		MINCHECK		
1033	REF	1	12,2570	00017 1	STORE	MAX		IF NOT 2ND ORDER, CAN MOVE MAX BOUND IN.
1034			12,2571	45221 1	MINCHECK BDSU	DSU		
1035	REF	1	12,2572	00011 1		MIN		
1036			12,2573	51000 0	BOV	BPL		
1037	REF	1	12,2574	24600 1		MODNGDEL		
1038	REF	2 LAST 1182	12,2575	24600 1		MODNGDEL		
1039			12,2576	77650 1	GOTO			
1040	REF	1	12,2577	24632 0		DELOK		
1041			12,2600	45345 1	MODNGDEL DLOAD	DSU		TRIAL DELINDEP WOULD EXCEED MIN BOUND
1042	REF	2 LAST 1182	12,2601	00011 1		MIN		
1043	REF	2 LAST 1182	12,2602	02766 1		INDEP		
1044			12,2603	52005 0	DMP	GOTO		
1045	REF	3 LAST 1177	12,2604	11051 0		DP9/10		
1046	REF	1	12,2605	24634 0		NEWDEL		
1047			12,2606	41345 0	FIRSTIME DLOAD	DMP		
1048	REF	3 LAST 1182	12,2607	00011 1		MIN		
1049	REF	1	12,2610	00051 0		TWEEKIT		DLOAD TWEEKIT(400) SENSITIVE TO CHANGE.
1050			12,2611	41325 0	PDDL	DMP		S2(410) SHOULDN'T CONTAIN HI-ORDER ONES

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1051	REF	2	LAST 1182	12,2612	00017-1		MAX
1052	REF	2	LAST 1182	12,2613	00051-0		TWEEKIT
1053				12,2614	77625-0	DSU	
1054				12,2615	52165-1	SIGN	GOTO
1055	REF	5	LAST 1182	12,2616	02760-1		DELDEP
1056	REF	2	LAST 1182	12,2617	24562-0		SGNCHECK

1057				12,2620	43145-0	POSDEL	DLOAD	BON	
1058	REF	3	LAST 1182	12,2621	02766-1			INDEP	
1059	REF	3	LAST 1182	12,2622	04311-0			ORDERSW	
1060	REF	1		12,2623	24625-0			MAXCHECK	
1061	REF	4	LAST 1182	12,2624	00011-1		STORE	MIN	IF NOT 2ND ORDER, CAN MOVE MIN BOUND IN.

1062				12,2625	45221-1	MAXCHECK	BDSU	DSU	
1063	REF	3	LAST 1183	12,2626	00017-1			MAX	
1064				12,2627	50000-1		BOV	BMN	
1065	REF	1		12,2630	24636-1			MODPSDEL	
1066	REF	2	LAST 1183	12,2631	24636-1			MODPSDEL	
1067				12,2632	77745-1	DELOK	DLOAD		
1068				12,2633	00001-0			OD	
1069	REF	2	LAST 1182	12,2634	00015-0	NEWDEL	STORE	DELINDEP	
1070				12,2635	77616-0		RVQ		

1071				12,2636	45345-1	MODPSDEL	DLOAD	DSU	
1072	REF	4	LAST 1183	12,2637	00017-1			MAX	
1073	REF	4	LAST 1183	12,2640	02766-1			INDEP	
1074				12,2641	52005-0		DMP	GOTO	
1075	REF	4	LAST 1182	12,2642	11051-0			DP9/10	
1076	REF	2	LAST 1182	12,2643	24634-0			NEWDEL	

1077	REF	126	LAST 1127	12,2644	4 4753-0	CHECKCTR	CS	ONE	
1078	REF	50	LAST 1108	12,2645	50 120-1		INDEX	FIXLOC	
1079	REF	2	LAST 1174	12,2646	6 0026-0		AD	ITERCTR	
1080	REF	57	LAST 1183	12,2647	50 120-1		INDEX	FIXLOC	
1081	REF	3	LAST 1183	12,2650	54 026-1		TS	ITERCTR	
1082	REF	728	LAST 1151	12,2651	54 154-0		TS	MPAC	
1083	REF	55	LAST 1094	12,2652	0 6061-0		TC	DANZIG	

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1084			12,2653	44545-0	NEWSTATE DLOAD	SR4R	
1085	REF 10	LAST 1181	12,2654	00041-1		R1	
1089			12,2655	74225-1	DSU	VXSC	
1090	REF 4	LAST 1181	12,2656	00035-1		XSQC(XI)	
1091	REF 3	LAST 1174	12,2657	02722-1		UR1	
1092			12,2660	65372-1	VSL1	PDDL	OD=(R1-XSQC(XI))UR1 (+33 OR 31) PL AT 6
1093	REF 19	LAST 1181	12,2661	00025-0		X	
1094			12,2662	60316-0	DSQ	NORM	
1095	REF 44	LAST 1182	12,2663	00047-1		X1	
1096			12,2664	57275-0	DMPR	DMPR	
1097	REF 5	LAST 1181	12,2665	00023-0		1/ROOTMU	
1098	REF 20	LAST 1184	12,2666	00025-0		X	
1099			12,2667	53605-1	DMP	SRR*	
1100	REF 5	LAST 1181	12,2670	00033-1		S(XI)	
1101			12,2671	21572-1		0 -7.1	
1102			12,2672	77621-1	BDSU		
1103	REF 11	LAST 1181	12,2673	00037-0		T	
1104			12,2674	74352-0	SL1	VXSC	
1105	REF 11	LAST 729	12,2675	02744-1		VVEC	
1106			12,2676	53372-1	VSL1	VAD	PL AT 0
1107			12,2677	41512-1	VSL4	PUSH	
1108			12,2700	77646-0	ABVAL		
1109			12,2701	77701-1	LAMENTER NORM		
1110	REF 45	LAST 1184	12,2702	00047-1		X1	
1111	REF 1		12,2703	16720-0	STODL	R2	
1112	REF 4	LAST 1180	12,2704	00031-0		XI	
1113			12,2705	45205-1	DMP	DSU	
1114	REF 6	LAST 1184	12,2706	00033-1		S(XI)	
1115	REF 2	LAST 1178	12,2707	11033-1		D1/128	
1116			12,2710	76405-1	DMP	SL1R	
1117	REF 2	LAST 1179	12,2711	00021-1		ROOTMU	
1118			12,2712	53605-1	DMP	SLR*	
1119	REF 21	LAST 1184	12,2713	00025-0		X	
1120			12,2714	21176-1		0 -3.1	
1121			12,2715	74271-0	DDV	VXSC	
1122	REF 2	LAST 1184	12,2716	02720-0		R2	
1123	REF 4	LAST 1184	12,2717	02722-1		UR1	
1124			12,2720	65372-1	VSL1	PDDL	6D=V2VEC PART (+15 OR 13) PL AT 12
1125	REF 5	LAST 1184	12,2721	00035-1		XSQC(XI)	
1126			12,2722	56257-1	SLR*	DDV	
1127			12,2723	21175-1		0 -4.1	
1128	REF 3	LAST 1184	12,2724	02720-0		R2	
1129			12,2725	77621-1	BDSU		
1130	REF 2	LAST 1179	12,2726	11047-1		D1/256	
1131			12,2727	53361-0	VXSC	VAD	PL AT 6
1132	REF 12	LAST 1184	12,2730	02744-1		VVEC	
1133			12,2731	43412-1	VSL8	RVQ	
R1134							

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1135	REF	3	LAST	45	04,2000	SETLOC CONICS1	
1136					04,3027	BANK	
1137	REF	2	LAST	45 TO	46:	16	16*
R1138	DO NOT DISTURB THE ORDER OF THESE CDS. OVERLAYS HAVE BEEN MADE.						
1139					04,3027	00000 1	BEE17 DEC 0
1140					04,3030	04000 0	D1/8 2DEC 1.0 B-3
1140					04,3031	00000 1	
1141					04,3032	00200 0	D1/128 2DEC 1.0 B-7
1141					04,3033	00000 1	
1142					04,3034	00400 0	D1/64 2DEC 1.0 B-6
1142					04,3035	00000 1	
1143					04,3036	10000 0	D1/4 2DEC 1.0 B-2
1143					04,3037	00000 1	
1144					04,3040	02000 0	D1/16 2DEC 1.0 B-4
1144					04,3041	00000 1	
1145					04,3042	01000 0	D1/32 2DEC 1.0 B-5
1145					04,3043	00000 1	
1146					04,3044	00020 0	D1/1024 2DEC 1.0 B-10
1146					04,3045	00000 1	
1147					04,3046	00100 0	D1/256 2DEC 1.0 B-8
1147					04,3047	00000 1	
1148					04,3050	34631 1	DP9/10 2DEC .9
1148					04,3051	23146 0	
1149	REF	5	LAST	1147	12,2006	KEPZERO	EQUALS LOGZEROS
1150					04,3052	77467 1	-50SC 2DEC -50.0 B-12
1150					04,3053	77777 0	
1151					04,3054	03110 1	2PISC 2DEC 6.28318530 B-6
1151					04,3055	17665 1	
1152	REF	1			04,3041	BEE19	EQUALS D1/32 -1 2DEC 1.0 B-19 (00000 01000)
1153	REF	3	LAST	1184	04,3045	BEE22	EQUALS D1/256 -1 2DEC 1.0 B-22 (00000 00100)
1154					04,3056	00000 1	ONEBIT 2DEC 1.0 B-28
1154					04,3057	00001 0	
1155					04,3060	37767 0	LOGUPLIM 2DEC .999511597
1155					04,3061	37737 0	
1156					04,3062	40010 1	LOGLOLIM 2DEC -.999511597
1156					04,3063	40040 1	
R1157							

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1158	REF	2	LAST 1173	12,2000		SETLOC CONICS		
1159				12,2732		BANK		
1160	REF	2	LAST 1174 TO	1185:	455 455*	COUNT*	\$5/CONIC	
1161				12,2732	40220 0	TIMETHET STQ	SETPD	PL AT 0
1162	REF	1		12,2733	02710 0		RTNTT	
1163				12,2734	00001 0		0	
11635				12,2735	77600 1	BOV		
11636				12,2736	24737 1		+	
1164				12,2737	63375 0	VLOAD	PDVL	SETUP FOR PARAM CALL PL AT 6
1165	REF	9	LAST 729	12,2740	02655 0		RVEC	
1166	REF	13	LAST 1184	12,2741	02744 1		VVEC	
1167				12,2742	77624 1	CALL		
1168	REF	1		12,2743	11064 0		PARAM	
1169				12,2744	45000 0	BOV	CALL	PL AT 0
1170	REF	1		12,2745	24764 1		COGAOVFL	
1171	REF	1		12,2746	24767 1		GETX	
1172				12,2747	43145 0	COMMOUT DLOAD	BON	
1173	REF	5	LAST 1184	12,2750	00031 0		XI	
1174	REF	1		12,2751	04310 1		INFINFLG	
1175	REF	1		12,2752	25742 1		ABTCONIC	
1176				12,2753	45014 0	CLEAR	CALL	
1177	REF	1		12,2754	04273 0		COGAFLAG	
1178	REF	2	LAST 1176	12,2755	24421 0		DELTIME	
1179				12,2756	45014 0	BON	CALL	
1180	REF	8	LAST 729	12,2757	03706 0		RVSX	
1181	REF	2	LAST 1186	12,2760	02710 0		RTNTT	
1182	REF	1		12,2761	24653 1		NEWSTATE	
1183				12,2762	77650 1	GOTO		
1184	REF	3	LAST 1186	12,2763	02710 0		RTNTT	
1185				12,2764	77614 1	COGAOVFL	SETGO	
1186	REF	2	LAST 1186	12,2765	04033 0		COGAFLAG	
1187	REF	2	LAST 1186	12,2766	25742 1		ABTCONIC	
11872				04,3064		BANK	4	
11874	REF	4	LAST 1185	04,2000		SETLOC CONICS1		
11876				04,3064		BANK		
11878	REF	3	LAST 1185 TO	1186:	29 45*	COUNT*	\$5/CONIC	
1188				04,3064	43020 1	PARAM	STQ	MPAC=VIVEC, OD=RIVEC PL AT 6
1189	REF	2	LAST 125	04,3065	02753 1		RTNPRM	
1190	REF	7	LAST 778	04,3066	03665 1		NORMSW	
11901				04,3067	77614 1	CLEAR		
11902	REF	3	LAST 1186	04,3070	04273 0		COGAFLAG	
1191				04,3071	45131 0	SSP	CALL	
1192	REF	7	LAST 779	04,3072	02673 1		GEOMSGN	
1193				04,3073	27777 0		37777	GAMMA ALWAYS LESS THAN 180DEG
1194	REF	1		04,3074	11130 0		GEOM	MPAC=SNCA (+1), OD=CSGA (+1) PL AT 2
1195				04,3075	14045 0	STODL	36D	36D=SIN GAMMA (+1) PL AT 0
1196				04,3076	56261 1	SR	DDV	

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1197			04,3077	20606 0	5		
1198			04,3100	00045 0	360		
1199	REF	2	LAST 125	04,3101	32766 1	STOVL*	COGA
1200	REF	5	LAST 1174	04,3102	10005 0		MUTABLE,1
1201	REF	2	LAST 1174	04,3103	14017 1	STOOL	1/MU
1202	REF	3	LAST 125	04,3104	02720 0		MAGVEC2
1203			04,3105	60316 0	DSQ	NORM	
1204	REF	46	LAST 1184	04,3106	00047 1		X1
1205			04,3107	41275 1	DMPR	DMP	
1206	REF	3	LAST 1187	04,3110	00017 1		1/MU
1207	REF	11	LAST 1184	04,3111	00041 1		R1
1208			04,3112	77657 0	SRR*		
1209			04,3113	21576 0		0 -3,1	
1210			04,3114	44206 0	PUSH	BDSU	OD=R1 VISQ/MU (+6) PL AT 2
1211	REF	2	LAST 1185	04,3115	11043 0		01/32
1212	REF	4	LAST 690	04,3116	16742 1	STOOL	R1A R1A (+6) PL AT 0
1213			04,3117	60205 0	DMP	NORM	
1214			04,3120	00045 0		360	
1215	REF	47	LAST 1187	04,3121	00047 1		X1
1216			04,3122	53605 1	DMP	SRR*	
1217			04,3123	00045 0		360	
1218			04,3124	20575 1		0 -4,1	
1219	REF	4	LAST 635	04,3125	02740 0	STORE	P P (+4)
1220			04,3126	77650 1	GOTO		
1221	REF	3	LAST 1186	04,3127	02753 1		RTNPRM

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1225			04,3130	77656-1	GEOM	UNIT	MPAC=V2VEC, OD=R1VEC	PL AT 6
1226	REF	2	LAST 125	04,3131	16712-1	STOVL U2	U2 (+1)	
1227				04,3132	00045-0	360		
1228	REF	4	LAST 1187	04,3133	26720-0	STOVL MAGVEC2		PL AT 0
1229				04,3134	77656-1	UNIT		
1230	REF	5	LAST 1184	04,3135	02722-1	STORE UR1	UR1 (+1)	
1231				04,3136	72441-0	DOT SL1		
1232	REF	3	LAST 1188	04,3137	02712-1	U2		
1233				04,3140	77725-1	PDDL	OD=CSTH (+1)	PL AT 2
1234				04,3141	00045-0	360		
1235	REF	12	LAST 1187	04,3142	24041-1	STOVL R1	R1 (+29 OR +27)	
1236	REF	6	LAST 1188	04,3143	02722-1	UR1		
1237				04,3144	76435-1	VXV VSL		
1238	REF	4	LAST 1188	04,3145	02712-1	U2		
1239				04,3146	75214-1	BON SIGN		
1240	REF	8	LAST 1186	04,3147	03705-0	NORMSW		
1241	REF	1		04,3150	11162-1	HAVENORM		
1242	REF	8	LAST 1186	04,3151	02673-1	GEOMSGN		
1243				04,3152	40056-0	UNIT BOV		
1244	REF	1		04,3153	11160-0	COLINEAR		
1245	REF	6	LAST 779	04,3154	16674-0	UNITNORM-STOVL UN	UN (+1)	
1246				04,3155	00045-0	360		
1247				04,3156	43565-0	SIGN RVQ	MPAC=SNTH (+1), 34D=SNTH.SNTH (+2)	
1248	REF	9	LAST 1188	04,3157	02673-1	GEOMSGN		
1249				04,3160	52162-0	COLINEAR VSR1	GOTO	
1250	REF	1		04,3161	11154-1	UNITNORM		
1251				04,3162	75246-0	HAVENORM ABVAL	SIGN	
1252	REF	10	LAST 1188	04,3163	02673-1	GEOMSGN		
1253				04,3164	77616-0	RVQ	MPAC=SNTH (+1), 34D=SNTH.SNTH (+2)	

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1254			12,2767		BANK	12	
1255	REF	3	LAST 1186	12,2000	SETLOC	CONICS	
1256			12,2767		BANK		
12565	REF	3	LAST 1186 TO 1186:	29 484*	COUNT*	\$/CONIC	
1257			12,2767	66374 1	GETX	AXT.2	SSP ASSUMES P (+4) IN HPAC
1258			12,2770	00003 1			3
1259	REF	26	LAST 1155	12,2771			S2
1260			12,2772	00001 0			1
1261			12,2773	77614 1	CLEAR		
1262	REF	1		12,2774			360SW
1263			12,2775	65366 1	SQRT	PDDL	OD=SQRT(P) PL AT 1
1264	REF	6	LAST 729	12,2776			CSTH
1265			12,2777	44342 1	SR1	BDSU	
1266	REF	2	LAST 37	12,3000			D1/4
1267			12,3001	54325 1	PDDL	SR4	PL AT 4D
1268	REF	8	LAST 729	12,3002			SNTH
1269			12,3003	21607 0			6
1270			12,3004	77671 1	DDV		PL AT 2
1271			12,3005	77600 1	BOV		
1272	REF	1		12,3006			360CHECK
1273			12,3007	41225 1	DSU	DMP	
1274	REF	3	LAST 1187	12,3010			COGA PL AT 0
1275			12,3011	40132 0	SL2R	BCV	
1276	REF	2	LAST 1189	12,3012			360CHECK
1277			12,3013	63406 0	WLOOP	PUSH	DSQ OD=W (+5) PL AT 2
1278			12,3014	65351 0		TLOAD	PDDL 2D=WSQ (+10) PL AT 5
1279	REF	729	LAST 1183	12,3015			HPAC
1280	REF	5	LAST 1187	12,3016			F1A
1281			12,3017	76202 0	SR4	TAD	PL AT 2
1282			12,3020	75440 0	BMN	SQRT	
1283	REF	1		12,3021			INFINITY
1284			12,3022	43306 0	ROUND	DAD	PL AT 0D
1285			12,3023	61000 0	BOV	TIX,2	
1286	REF	1		12,3024			RESETX2
1287	REF	1		12,3025			WLOOP
1288			12,3026	40065 0	BDDV	BOV	
1289	REF	5	LAST 1184	12,3027			D1/28
1290	REF	2	LAST 1189	12,3030			INFINITY
1291			12,3031	41440 1	POLYCOEF	BMN	PUSH OD=1/W (+2) OR 16/W (+6) PL AT 2
1292	REF	3	LAST 1189	12,3032			INFINITY
1293			12,3033	77716 1	DSQ		
1294			12,3034	41301 0	NORM	DMP	
1295	REF	48	LAST 1187	12,3035			X1
1296	REF	6	LAST 1189	12,3036			R1A
1297			12,3037	77457 1	SR4*	EXIT	
1298			12,3040	21567 0			0-10D,1
1299	REF	6	LAST 1180	12,3041		TC	POLY

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1300		12,3042	00005-1	DEC	5	
1301		12,3043	20000-0	2DEC	.5	
1301		12,3044	00000-1			
1302		12,3045	72525-0	2DEC	-.166666770	
1302		12,3046	52471-1			
1303		12,3047	03146-1	2DEC	.100000392	
1303		12,3050	15003-0			
1304		12,3051	75556-0	2DEC	-.071401086	
1304		12,3052	45210-0			
1305		12,3053	01615-1	2DEC	.055503292	
1305		12,3054	13553-0			
1306		12,3055	76371-0	2DEC	-.047264098	
1306		12,3056	63777-0			
1307		12,3057	01232-0	2DEC	.040694204	
1307		12,3060	27367-0			
1308	REF 228 LAST 1180	12,3061	0 6037 0	TC	INTPRET	
1309		12,3062	76405-1	DMP	SL1R	PL AT 00
1310		12,3063	43006 0	PUSH	BON	
1311	REF 2 LAST 1189	12,3064	04316-1		360SW	
1312	REF 1	12,3065	25172-1		TRUE360X	
1313		12,3066	60316 0	XCOMMON DSQ	NORM	
1314	REF 49 LAST 1189	12,3067	00047-1		X1	
1315		12,3070	53605-1	DMP	SRR*	
1316	REF 7 LAST 1189	12,3071	02742-1		R1A	
1317		12,3072	21565-1		0 -120,1	
1318	REF 6 LAST 1186	12,3073	14031 0	STODL	XI	XI (+6)
1319	REF 13 LAST 1188	12,3074	00041 1		R1	
1320		12,3075	75542-0	SR1	SQRT	
1321		12,3076	41306-1	ROUND	DMP	
1322		12,3077	77632-0	SL4R		PL AT 0
1323	REF 22 LAST 1184	12,3100	00025-0	STORE	X	X (+17 OR +16)
1324		12,3101	60316-0	DSQ	NORM	
1325	REF 50 LAST 1190	12,3102	00047 1		X1 1	
1326		12,3103	41325-0	PDDL	DMP	OD=XSQ (+34 OR +32 -N1) PL AT 2
1327	REF 5 LAST 1187	12,3104	02740 0		P	
1328	REF 14 LAST 1190	12,3105	00041 1		R1	
1329		12,3106	75452-0	SL3	SQRT	
1330		12,3107	56405-0	DMP	SL3R	
1331	REF 4 LAST 1189	12,3110	02766-1		COGA	
1332	REF 3 LAST 1181	12,3111	14043-0	STODL	KEPC2	
1333	REF 8 LAST 1190	12,3112	02742-1		R1A	
1334		12,3113	43021-0	BDSU	GLEAR	
1335	REF 3 LAST 1174	12,3114	11035-1		DI/64	
1336	REF 2 LAST 1186	12,3115	04270-0		INFINFLG	
1337	REF 3 LAST 1181	12,3116	00045-0	STORE	KEPC2	
1338		12,3117	77616-0	RVQ		

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1339		12,3120	77774 0	RESETX2	AXT,2		
1340		12,3121	00003 1				
1341		12,3122	51001 1	360CHECK	SETPD	BPL	
1342		12,3123	00001 0			OD	
1343	REF 1	12,3124	25127 1			INVRSEQN	
1344		12,3125	77614 1	SET			
1345	REF 3 LAST 1190	12,3126	04076 1			360SW	
1346		12,3127	75545 1	INVRSEQN	DLOAD	SQRT	
1347	REF 6 LAST 1190	12,3130	02740 0			P	
1348		12,3131	41325 0	PDDL	DMP	OD=SQRT(P) (+2)	PL AT 2
1349	REF 9 LAST 1189	12,3132	02730 1			SNTH	
1350	REF 5 LAST 1190	12,3133	02766 1			COGA	
1351		12,3134	65352 0	SL1	PDDL	2D=SNTH-COGA (+5)	PL AT 4
1352	REF 7 LAST 1189	12,3135	02732 0			CSTH	
1353		12,3136	43202 0	SR4	DAD		
1354	REF 3 LAST 1187	12,3137	11043 0			D1/32	
1355		12,3140	41225 1	DSU	DMP		PL AT 2.0
1356		12,3141	55301 0	NORM	BDDV		
1357	REF 51 LAST 1190	12,3142	00047 1			X1	
1358	REF 10 LAST 1191	12,3143	02730 1			SNTH	
1359		12,3144	51457 0	SLR*	ABS	NOTE: NEAR 360 CASE TREATED DIFFERENTLY	
1360		12,3145	21174 0			0 -5,1	
1361		12,3146	63406 0	PUSH	DSQ	OD=1/W (-1)	PL AT 2
1362		12,3147	14043 0	STOOL	34D		
1363	REF 1	12,3150	11041 1			D1/16	
1364		12,3151	63406 0	1/WLOOP	PUSH	DSQ	2D=G (+4)
1365		12,3152	65234 1	RTB	PDDL		PL AT 7
1366	REF 11 LAST 1181	12,3153	21633 1			TPMODE	
1367	REF 9 LAST 1190	12,3154	02742 1			R1A	
1368		12,3155	40405 1	DMP	SR4		
1369		12,3156	00043 0			34D	
1370		12,3157	77771 0	TAD			PL AT 4
1371		12,3160	75440 0	BMN	SQRT		
1372	REF 4 LAST 1189	12,3161	25205 1			INFINITY	
1373		12,3162	77615 0	DAD			PL AT 2
1374		12,3163	60304 0	TIX,2	NORM		
1375	REF 1	12,3164	25151 0			1/WLOOP	
1376	REF 52 LAST 1191	12,3165	00047 1			X1	
1377		12,3166	77665 1	BDDV			PL AT 0
1378		12,3167	52057 1	SLR*	GOTO		
1379		12,3170	21172 0			0 -7,1	
1380	REF 1	12,3171	25031 1			POLYCOEF	
1381		12,3172	50145 1	TRUE360X	DLOAD	BMN	
1382	REF 10 LAST 1191	12,3173	02742 1			R1A	

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1383	REF	5	LAST 1191	12,3174	25205 1		INFINITY		
1384				12,3175	60366 1	SQRT	NORM		
1385	REF	53	LAST 1191	12,3176	00047 1		X1		
1386				12,3177	53665 1	BDDV	SL*		
1387	REF	2	LAST 1175	12,3200	11055 1		2PISC		
1388				12,3201	20176 0		0 -3,1		
1389				12,3202	41425 1	DSU	PUSH	OD=2PI/SQRT(.1A) -X	PL AT 0,2
1390				12,3203	77650 1	GOTO			
1391	REF	1		12,3204	25066 0		XCOMMON		
1392				12,3205	40001 1	INFINITY SETPD	BOV	NO SOLUTION EXISTS SINCE CLOSURE THROUGH	
1393				12,3206	00001 0			INFINITY IS REQUIRED	
1394	REF	1		12,3207	25210 0		OVFLCLR		
1395				12,3210	43414 1	OVFLCLR SET	RVQ		
1396	REF	3	LAST 1190	12,3211	04070 1		INFINFLG		

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1397			12,3212	40220 0	LAMBERT	STQ	SETPD		
1398	REF	5	LAST 125	12,3213			RTNLAMB		
1399				12,3214			OD		
13995				12,3215		BOV			
13996				12,3216			+1		
1400				12,3217		CLEAR	VLOAD		
1401	REF	1		12,3220			SOLNSW		
1403	REF	6	LAST 1187	12,3221			MUTABLE,1		
1404	REF	4	LAST 1187	12,3222		STOOL	1/MU		
1405	REF	3	LAST 687	12,3223			TDESIRE		
1406				12,3224		DMPR			
1407	REF	1		12,3225			BEE19		
1408	REF	2	LAST 125	12,3226		STORE	EPSILON		
1409				12,3227		SET	VLOAD		
1410	REF	2	LAST 1182	12,3230			SLOPESW		
1411	REF	6	LAST 689	12,3231			R1VEC		
1412				12,3232		PDVL	CALL	OD=R1VEC (+29 OR +27)	PL AT 6
1413	REF	10	LAST 689	12,3233			R2VEC	MPAC=R2VEC (+29 OR +27)	
1414	REF	2	LAST 1186	12,3234			GEOM		
1415	REF	11	LAST 1191	12,3235		STOOL	SMTH	CD=CSTH (+1)	PL AT 2
1416	REF	5	LAST 1188	12,3236			MAGVEC2		
1417				12,3237		NORM	PDOL		PL AT 4
1418	REF	54	LAST 1192	12,3240			X1		
1419	REF	15	LAST 1190	12,3241			R1		
1420				12,3242		SR1	DDV		PL AT 2
1421				12,3243		SL*	PDOL	DXCH WITH OD, OD=R1/R2 (+7)	PL AT 0,2
1422				12,3244			0 -6,1		
1423				12,3245		STADR			
1424	REF	8	LAST 1191	12,3246		STORE	CSTH	CSTH (+1)	
1425				12,3247		SR1	BDSU		
1426	REF	3	LAST 1189	12,3250			D1/4		
1427	REF	2	LAST 125	12,3251		STORE	1-CSTH	1-CSTH (+2)	
1428				12,3252		ROUND	BZE		
1429	REF	1		12,3253			360LAMB		
1430				12,3254		NORM	PDOL		PL AT 4
1431	REF	55	LAST 1193	12,3255			X1		
1432				12,3256			OD		
1433				12,3257		SR1	DDV		PL AT 2
1434				12,3260		SL*	SQRT		
1435				12,3261			0 -3,1		
1436				12,3262		PDOL	SR	2D=SQRT(2R1/R2(1-CSTH)) (+5)	PL AT 4
1437	REF	12	LAST 1193	12,3263			SMTH		
1438				12,3264			6		
1439				12,3265		DDV	DAD		PL AT 2
1440	REF	3	LAST 1193	12,3266			1-CSTH		
14401				12,3267		STADR			
14402	REF	1		12,3270		STORE	COGAMAX		
1441				12,3271		BOV	OD	IF OVFL, COGAMAX=COGUPLIM	
1442	REF	1		12,3272			UPLIM	IF NEG, USE EVEN IF LT COGLOLIM, SINCE	

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14421	REF	1	12,3273	25302-1		MAXCOGA		THIS WOULD BE RESET IN LAMBLOOP
14422			12,3274	50025 0	DSU	BMN		IF COGAMAX GT COGUPLIM, COGAMAX=COGUPLIM
14423	REF	1	12,3275	11061-0		COGUPLIM		
14424	REF	2	12,3276	25302 1		MAXCOGA		OTHERWISE OK, SO GO TO MAXCOGA
14425			12,3277	77745 1	UPLIM	DLOAD		
14426	REF	2	12,3300	11061 0		COGUPLIM		COGUPLIM=.999511597 = MAX VALUE OF COGA
14427	REF	2	12,3301	00017 1		STORE	COGAMAX	NOT CAUSING OVFL IN R1A CALCULATION
1443			12,3302	77745-1	MAXCOGA	DLOAD		
1444	REF	9	12,3303	02732 0		GSTH		
1445			12,3304	45261 0	SR	DSU		PL AT 0
1446			12,3305	20607-1		6		
1447			12,3306	77626 0	STADR			
1448	REF	2	12,3307	61041 0	STODL	GSTH-RHO		
1449	REF	11	12,3310	02673 1		GEDMSGN		
1450			12,3311	71240-1	BMN	DLOAD		
1451	REF	1	12,3312	25503 0		LOLIM		
1452	REF	3	12,3313	02736-1		GSTH-RHO		
1453			12,3314	56352-0	SL1	DDV		
1454	REF	13	12,3315	02730-1		SNTH		
1455			12,3316	77600-1	BDV			
1456	REF	2	12,3317	25503-0		LOLIM		
1457	REF	1	12,3320	00011 1	MINCOGA	STORE	COGAMIN	COGAMIN (+5)
1458			12,3321	66214 0	BDN	SSP		
1459	REF	3	12,3322	00715-1		GUESSW		
1460	REF	1	12,3323	25467-0		NOGUESS		
1461	REF	3	12,3324	00051 0		TWEEKIT		
1462			12,3325	00001 0		00001		
1463			12,3326	77745 1	DLOAD			
1464	REF	6	12,3327	02766-1		COGA		
1465			12,3330	77605-1	LAMBLOOP	DMP		
1466	REF	14	12,3331	02730-1		SNTH		
1467			12,3332	45342 0	SR1	DSU		
1468	REF	4	12,3333	02736 1		GSTH-RHO		
1469			12,3334	65301 0	NORM	PDDL		OD=SNTH COGA-(GSTH-RHO) (+7+C(X1)) PL=2
1470	REF	56	12,3335	00047-1		X1		
1471	REF	4	12,3336	02734 0		1=GSTH		
1472			12,3337	56257-1	SL*	DDV	1-CSTH (+2)	PL AT 0-
1473			12,3340	20170 0		0-9D,1		
1474			12,3341	53040 0	BMN	BZE		
1475	REF	1	12,3342	25417-1		NEGP		
1476	REF	2	12,3343	25417 1		NEGP		
1477	REF	7	12,3344	16740 0	STODL	P		P=(1-CSTH)/(SNTH COGA-(GSTH-RHO)) (+4)
1478	REF	7	12,3345	02766-1		COGA		
1479			12,3346	43316-1	DSQ	DAD		
1480	REF	1	12,3347	11045-0		D1/1024		
1481			12,3350	41301 0	NORM	DMP		
1482	REF	57	12,3351	00047-1		X1		
1483	REF	8	12,3352	02740 0		P		

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1484			12,3353	44257 1	SR*	BDSU	
1485			12,3354	20571 0		0 -8D,1	
1486	REF	4	LAST 1191	12,3355		01/32	
1487	REF	11	LAST 1191	12,3356	STODL	RIA	RIA=2-P(1+COGA COGA) (+6)
1488	REF	9	LAST 1194	12,3357		P	
1489			12,3360	45000 0	BOV	CALL	
1490	REF	1		12,3361		HIENERGY	
1491	REF	2	LAST 1186	12,3362		GETX	
1492			12,3363	77745 1	DLOAD		
1493	REF	12	LAST 1184	12,3364		T	
1494	REF	1		12,3365	STODL	TPREV	
1495	REF	7	LAST 1190	12,3366		XI	
1496			12,3367	45014 0	BON	CALL	
1497	REF	4	LAST 1192	12,3370		INFINFLG	
1498	REF	3	LAST 1194	12,3371		NEGP	HAVE EXCEEDED THEORETICAL BOUNDS
1499	REF	3	LAST 1186	12,3372		DELTIME	
1500			12,3373	44200 0	BOV	BDSU	
1501	REF	1		12,3374		BIGTIME	
1502	REF	4	LAST 1193	12,3375		TDESIRE	
1503	REF	1		12,3376	STORE	TERRLAMB	
1504			12,3377	44246 1	ABS	BDSU	
1505	REF	3	LAST 1193	12,3400		EPSILONL	
1506			12,3401	47044 1	BPL	RTB	
1507	REF	1		12,3402		INITV	
1508	REF	2	LAST 1177	12,3403		CHECKCTR	
1509			12,3404	45030 0	BHIZ	CALL	
1510	REF	1		12,3405		SUFFCHEK	
1511	REF	1		12,3406		ITERATOR	
1512			12,3407	53145 1	DLOAD	BZE	
1513	REF	730	LAST 1189	12,3410		MPAC	
1514	REF	2	LAST 1195	12,3411		SUFFCHEK	
1515			12,3412	77615 0	DAD		
1516	REF	8	LAST 1194	12,3413		COGA	
1517	REF	9	LAST 1195	12,3414	STORE	COGA	
1518			12,3415	77650 1	GOTO		
1519	REF	1		12,3416		LAMBLOOP	
1520			12,3417	51145 0	NEGP	DLOAD	IMPOSSIBLE TRAJECTORY DUE TO INACCURATE
1521	REF	1		12,3420		DCOGA	BOUND CALCULATION. TRY NEW COGA.
1522	REF	1		12,3421		LOENERGY	
1523			12,3422	71201 1	HIENERGY	SETPD	DLOAD
1524			12,3423	00001 0			
1525	REF	10	LAST 1195	12,3424		COGA	HIGH ENERGY TRAJECTORY RESULTED
1526	REF	2	LAST 1194	12,3425	STORE	COGAMIN	IN OVFL OF P OR R1A, OR XI EXCEEDING 50.
1527			12,3426	70545 1	COMMONLM	DLOAD	THIS IS THE NEW BOUND.
1528	REF	2	LAST 1195	12,3427		DCOGA	

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1529	REF	3	LAST 1195	12,3430	00015 0	STORE	DCOGA	USE DCOGA/2 AS DECREMENT
1530				12,3431	44254 1	BZE	BDSU	
15301	REF	3	LAST 1195	12,3432	25450 1		SUFFCHEK	
1531	REF	11	LAST 1195	12,3433	02766 1		COGA	
1532	REF	12	LAST 1196	12,3434	02766 1	STORE	COGA	
1533				12,3435	77650 1	GOTO		RESTART THIS LOOP
1534	REF	2	LAST 1195	12,3436	25330 0		LAMBLOOP	
1535				12,3437	77745 1	BIGTIME	DLOAD	
1536	REF	2	LAST 1195	12,3440	02762 0		TPREV	
1537	REF	13	LAST 1195	12,3441	00037 0	STORE	T	
1538				12,3442	71201 1	LOENERGY	SETPD	DLOAD
1539				12,3443	00001 0			LOW ENERGY TRAJECTORY RESULTED
1540	REF	13	LAST 1196	12,3444	02766 1		COGA	IN OVERFLOW OF TIME.
1541	REF	3	LAST 1194	12,3445	00017 1	STORE	COGAMAX	THIS IS THE NEW BOUND.
1542				12,3446	77650 1	GOTO		
1543	REF	1		12,3447	25426 0		COMMONLM	
1544				12,3450	51545 1	SUFFCHEK	DLOAD	ABS
1545	REF	2	LAST 1195	12,3451	02760 1		TERRLAMB	
1546				12,3452	41325 0	PDDL	DMP	PL AT 2D
1547	REF	5	LAST 1195	12,3453	02671 0		TDESIRED	
1548	REF	1		12,3454	11030 1		BEE17	
1549				12,3455	45215 0	DAD	DSU	PL AT 0D
1550	REF	1		12,3456	11057 0		ONEBIT	
1551				12,3457	43044 0	BPL	SETGO	
1552	REF	2	LAST 1195	12,3460	25506 0		INITV	
1553	REF	2	LAST 1193	12,3461	02434 0		SOLNSW	
1554	REF	3	LAST 1196	12,3462	25506 0		INITV	
1555				12,3463	43001 1	360LAMB	SETPD	SETGO
1556				12,3464	00001 0			LAMBERT CANNOT HANDLE GSTH=1
1557	REF	3	LAST 1196	12,3465	02434 0		SOLNSW	
1558	REF	6	LAST 1193	12,3466	02710 0		RTNLAMB	
1559				12,3467	71331 0	NOGUESS	SSP	DLOAD
1560	REF	4	LAST 1194	12,3470	00051 0		TWEETKIT	
1561				12,3471	10000 0		20000	
1562	REF	3	LAST 1195	12,3472	00011 1		COGAMIN	
1563				12,3473	65342 1	SR1	PDDL	PL AT 2
1564	REF	4	LAST 1196	12,3474	00017 1		COGAMAX	
1565				12,3475	43342 0	SR1	DAD	
1566				12,3476	77626 0	STADR		PL AT 0
1567	REF	14	LAST 1196	12,3477	75011 0	STORE	COGA	
1568	REF	4	LAST 1196	12,3500	00015 0	STORE	DCOGA	
1569				12,3501	77650 1	GOTO		

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1570	REF	3	LAST 1196	12,3502	25330 0		LAMBLOOP	
1574				12,3503	52145 0	LOLIM	DLOAD	GOTO
1575	REF	1		12,3504	11063 1			COGLOLIM
1576	REF	1		12,3505	25320 1			MINCOGA
COGLOLIM=-.999511597								
1577				12,3506	60345 0	INITV	DLOAD	NGRM
1578	REF	16	LAST 1193	12,3507	00041 1			R1
1579	REF	58	LAST 1194	12,3510	00047 1			X1
1580				12,3511	70525 1		PDDL	SR1
1581	REF	10	LAST 1195	12,3512	02740 0			P
1582				12,3513	77671 1		DDV	
1583				12,3514	75457 0		SL*	SQRT
1584				12,3515	20175 0			0-4,1
1585				12,3516	72405 0		DMP	SL1
1586	REF	3	LAST 1184	12,3517	00021 1			ROOTMU
1587				12,3520	41206 0		PUSH	D-P
1588	REF	15	LAST 1196	12,3521	02766 1			UD=VTAN (+7)
1589				12,3522	74261 1		SL	VXSC
1590				12,3523	20206 1			5
1591	REF	7	LAST 1188	12,3524	02722 1			UP1
1592				12,3525	77725 1		PDDL	
1593				12,3526	76561 1		VXSC	VSL1
1594	REF	7	LAST 1188	12,3527	02674 0			UR
1595				12,3530	53235 0		VXV	VAD
1596	REF	8	LAST 1197	12,3531	02722 1			UR1
1597				12,3532	77772 0		VSL1	
1599	REF	14	LAST 1186	12,3533	02744 1		STORE	VVEC
1600				12,3534	53135 0		SLOAD	BZE
1601	REF	5	LAST 689	12,3535	02702 0			VTARGETAG
1602	REF	1		12,3536	25541 0			TARGETV
1603				12,3537	77650 1		GOTO	
1604	REF	7	LAST 1196	12,3540	02710 0			RTNLAMB
1605				12,3541	45145 0	TARGETV	DLOAD	CALL
1606	REF	6	LAST 1193	12,3542	02720 0			MAGVEC2
1607	REF	1		12,3543	24701 1			LAMENTER
1608	REF	4	LAST 690	12,3544	02703 1		STORE	VTARGET
1609				12,3545	77650 1		GOTO	
1610	REF	8	LAST 1197	12,3546	02710 0			RTNLAMB

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1611			12,3547	40220 0	TIMERAD	STQ	SETPD		PL AT 0
1612	REF	1	12,3550	02710 0			RTNTR		
1613			12,3551	00001 0			0		
16135			12,3552	77600 1		BOV			
16136			12,3553	25554 1			+1		
1614			12,3554	63375 0		VLOAD	PDVL		PL AT 6
1615	REF	10	12,3555	02655 0			RVEC		
1616	REF	15	12,3556	02744 1			VVEC		
1617			12,3557	77624 1		CALL			
1618	REF	2	12,3560	11064 0			PARAM		
1619			12,3561	71200 0		BOV	DLOAD		PL AT 0
1620	REF	2	12,3562	24764 1			COGAOVFL		
1621	REF	5	12,3563	11043 0			D1/32		
1622			12,3564	41225 1		DSU	DMP		
1623	REF	12	12,3565	02742 1			P1A		
1624	REF	11	12,3566	02740 0			P		
1625			12,3567	41366 1		SQRT	DMP		
1626	REF	16	12,3570	02766 1			COGA		
1627			12,3571	74212 0		SL4	VXSC		
1628	REF	5	12,3572	02712 1			U2		
1629			12,3573	45325 1		PDDL	DSU		PL AT 6
1630	REF	4	12,3574	11035 1			D1/64		
1631	REF	13	12,3575	02742 1			R1A		
1632			12,3576	52361 1		VXSC	VSU		PL AT 0
1633	REF	9	12,3577	02722 1			U1		
1634			12,3600	53512 1		VSL4	UNIT		
16345			12,3601	77600 1		BOV			
16346	REF	1	12,3602	25660 0			CIRCULAR		
1635			12,3603	60325 0		PDDL	NORM	GD=UNIT(ECC) (+3)	PL AT 6
1636	REF	3	12,3604	02756 1			DESIED	36D=ECC (+3)	
1637	REF	59	12,3605	00047 1			X1		
1638			12,3606	41325 0		PDDL	DMP		PL AT 8
1639	REF	17	12,3607	00041 1			R1		
1640	REF	12	12,3610	02740 0			P		
1641			12,3611	56257 1		SL*	DDV		PL AT 6
1642			12,3612	20201 0			0,1		
1643			12,3613	56225 1		DSU	DDV		
1644	REF	2	12,3614	11041 1			D1/16		
1645			12,3615	00045 0			36D	36D=ECC (+3)	
1646	REF	1	12,3616	00031 0		STORE	CCSF		
1647			12,3617	63400 0		BOV	DSQ		
1648	REF	1	12,3620	25664 1			BADR2		
1649			12,3621	50021 1		BDSU	BMN		
1650	REF	4	12,3622	11037 0			D1/4		
16505	REF	2	12,3623	25664 1			BADR2		
1651			12,3624	75366 0		SQRT	SIGN		
1652	REF	2	12,3625	02755 1			SGNRDOT		
16525			12,3626	77614 1		CLEAR			
1653	REF	1	12,3627	04272 1			APSESW		

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1654				12,3630	76561 1	TERMNVEC	VXSC	VSL1		
1655	REF	8	LAST 1197	12,3631	02674 0			UN		
1656				12,3632	63235 0		VXV	PDVL	VXCH WITH OD	PL AT 0,6
1657				12,3633	00001 0			OD		
1658				12,3634	53361 0		VXSC	VAD		PL AT 0
1659	REF	2	LAST 1198	12,3635	00031 0			COSF		
1660				12,3636	41572 1		VSL1	PUSH	OD=02	PL AT 6
1661				12,3637	56241 0		DOT	DDV	LIMITS RESULT TO POSMAX OR NEGMAX	
1662	REF	10	LAST 1198	12,3640	02722 1			UP1		
16622	REF	1		12,3641	25756 1			DP1/4		
16624				12,3642	40142 1		SR1	BOV	SCALE BACK DOWN TO NORMAL	
16625				12,3643	25644 0			+1	CLEAR OV FIND IF SET	
1663	REF	10	LAST 1194	12,3644	26732 0		STOVL	CSTH	CSTH (+1)	
1664	REF	11	LAST 1199	12,3645	02722 1			UR1		
1665				12,3646	76435 1		VXV	VSL1		
1666				12,3647	72441 0		DOT	SL1		
1667	REF	9	LAST 1199	12,3650	02674 0			UN		
1668	REF	15	LAST 1194	12,3651	16730 1		STODL	SNTH	SNTH (+1)	
1669	REF	13	LAST 1198	12,3652	02740 0			P		
1670				12,3653	77624 1		CALL			
1671	REF	3	LAST 1195	12,3654	24767 1			GETX		
1672				12,3655	77614 1		CLRG0			
16725	REF	4	LAST 1196	12,3656	02634 1			SOLNSW		
1673	REF	1		12,3657	24747 0			COMMNOUT		
16734				12,3660	43001 1	CIRCULAR	SETPD	SETG0		
16735				12,3661	00001 0			0		
16736	REF	5	LAST 1199	12,3662	02434 0			SOLNSW		
16737	REF	3	LAST 1186	12,3663	25742 1			ABTCONIC		
1674				12,3664	75345 1	BADR2	DLOAD	SIGN		
16741	REF	3	LAST 323	12,3665	24005 1			LODPHALF		
16742	REF	3	LAST 1199	12,3666	00051 0			COSF		
16743	REF	4	LAST 1199	12,3667	14031 0		STODL	COSF		
1675	REF	3	LAST 1175	12,3670	24007 0			KEPZERO		
16755				12,3671	77614 1		SETG0			
1676	REF	2	LAST 1198	12,3672	04032 1			APSESW		
1677	REF	1		12,3673	25630 0			TERMNVEC		

L -CONIC SUBROUTINES -

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1678		12,3674	40220 0	APSIDES	STQ	SETPD		PL AT 0
1679	REF 1	12,3675	02710 0			RTNAPSE		
1680		12,3676	00001 0			OD		
16805		12,3677	77600 1		BOV			
16806		12,3700	25701 0			+1		
1681		12,3701	63375 0		VLOAD	PDVL		PL AT 6
1682	REF 11 LAST 1198	12,3702	02655 0			RVEC		
1683	REF 16 LAST 1198	12,3703	02744 1			VVEC		
1684		12,3704	77624 1		CALL			
1685	REF 3 LAST 1198	12,3705	11064 0			PARA4		
1686		12,3706	77600 1		BOV			PL AT 0
1687	REF 1	12,3707	25710 0			GETECC		
1688		12,3710	42405 0	GETECC	DMP	SL4		
1689	REF 14 LAST 1198	12,3711	02742 1			R1A		
1690		12,3712	75421 1		BDSU	SORT		
1691	REF 5 LAST 1198	12,3713	11035 1			D1/64		
1692	REF 3 LAST 635	12,3714	02752 0		STORE	ECC		
1693		12,3715	65215 1		DAD	PDOL		PL AT 2
1694	REF 1	12,3716	11031 0			D1/8		
1695	REF 18 LAST 1198	12,3717	00041 1			R1		
1696		12,3720	72405 0		DMP	SI1		
1697	REF 14 LAST 1199	12,3721	02740 0			P		
1698		12,3722	77671 1		DDV			PL AT 0
1699		12,3723	60325 0		PDOL	HORM	CD=RP (+29 OR +27)	PL AT 2
1700	REF 15 LAST 1200	12,3724	02742 1			R1A		
1701	REF 60 LAST 1198	12,3725	00047 1			X1		
1702		12,3726	53725 1		PDOL	SL*		PL AT 4
1703	REF 19 LAST 1200	12,3727	00041 1			R2		
1704		12,3730	20174 1			0 -5.1		
1705		12,3731	45271 1		DDV	DSU		PL AT 2.0
1706		12,3732	50000 1		BOV	BPN		
1707	REF 1	12,3733	25737 0			INFINAPO		
1708	REF 2 LAST 1200	12,3734	25737 0			INFINAPO		
1709		12,3735	77656 1		GOTO			
1710	REF 2 LAST 1200	12,3736	02710 0			RTNAPSE		
1711		12,3737	52145 0	INFINAPO	DLOAD	GOTO	RETURNS WITH APOAPSIS IN MPAC PERIAPSIS	
1712	REF 1	12,3740	24020 0			LDOSMAX		
1713	REF 3 LAST 1200	12,3741	02710 0			RTNAPSE	THAT PL IS AT 0.	

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17136		12,3742	77776 1	ABTCONIC EXIT	
17137	REF --- 5 LAST -826	12,3743	0-5652-0	TC	P00000
17138		12,3744	00607 0	OCT	00607

-L- CONIC SUBROUTINES

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1725 -REF- 3 -LAST- 702 12, 2017

-LDPOSMAX-EQUALS-LODPMAX-

-DPPOSMAX-IN-LOW MEMORY.-

-R1727- ERASABLE ASSIGNMENTS

R1728 KEPLER SUBROUTINE

R1729 INPUT -

R1730 RRECT ERASE +5

R1731 VRECT ERASE +5

R1732 TAU. ERASE +1

R1733 XKEP^{NEW} ERASE +1

R1734 TC ERASE +1

R1735 XPREV ERASE +1

1736 0016 1/MU EQUALS 140

1737 0020 ROOTMU EQUALS 160

1738 0022 1/ROOTMU EQUALS 180

R1739 OUTPUT -

R1740 RCV ERASE +5

R1741 VCV ERASE +5

R1742 TC ERASE +1

R1743 XPREV ERASE +1

R1744 DEBRIS -

1745 0010 ALPHA EQUALS 80

1746 0012 XMAX EQUALS 100

1747 0014 XMIN EQUALS 120

1748 0024 X EQUALS 200

1749 0030 XI EQUALS 240

1750 0032 S(XI) EQUALS 260

1751 0034 XSQC(XI) EQUALS 280

1752 0036 T EQUALS 300

1753 0040 R1 EQUALS 320

1754 0042 KEPC1 EQUALS 340

1755 0044 KEPC2 EQUALS 360

R1756 DELX ERASE +1

R1757 DELT ERASE +1

R1758 URRECT ERASE +5

R1759 RCNORM ERASE +1

R1760 XPREV EQUALS XKEP

R1761 LAMBERT SUBROUTINE

R1762 INPUT -

R1763 R1VEC ERASE +5

R1764 R2VEC ERASE +5

R1765 TDESIRED ERASE +1

R1766 GEOMSGN ERASE +0

R1767 GUESSW 0 IF CDGA GUESS AVAILABLE, 1 IF NOT

L CONIC SUBROUTINES

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R1768 COGA ERASE +1 INPUT ONLY IF GUESSW IS ZERO.
 R1769 NORMSW 0 IF UN TO BE COMPUTED, 1 IF UN INPUT
 R1770 UN ERASE +5 ONLY USED IF NORMSW IS 1
 R1771 VTARGET ERASE +0
 R1772 TWEKIT EQUALS 40D ONLY USED IF GUESSW IS 0

R1773 OUTPUT -
 R1774 VTARGET ERASE +5 AVAILABLE ONLY IF VTARGET IS ZERO.
 R1775 VIVEC EQUALS MPAC

R1776 DEBRIS -
 R1777 RTNLAMB ERASE +0
 R1778 U2 ERASE +5
 R1779 MAGVEC2 ERASE +1
 R1780 UR1 ERASE +5
 R1781 R1 EQUALS 31D 32D
 R1782 UN ERASE +5
 R1783 SNTH ERASE +1
 R1784 CSTD ERASE +1
 R1785 1-CSTD ERASE +1
 R1786 CSTD-RHO ERASE +1

1787 0016 COGAMAX EQUALS 14D GLOBBERS 1/MU
 1788 0010 COGAMIN EQUALS 8D
 1789 0014 DCOGA EQUALS 12D

R1790 TWEKIT EQUALS 40D
 R1791 P ERASE +1
 R1792 COGA ERASE +1
 R1793 R1A ERASE +1
 R1794 X EQUALS 20D
 R1795 XSQ EQUALS 22D
 R1796 XI EQUALS 24D
 R1797 S(XI) EQUALS 26D
 R1798 XSQC(XI) EQUALS 28D
 R1799 T EQUALS 30D
 R1800 KEPC1 EQUALS 34D
 R1801 KEPC2 EQUALS 36D
 R1802 SLOPESW
 R1803 SOLNSW
 R1804 OTHERS -

R1805 RVEC EQUALS R1VEC
 R1806 VVEC ERASE +5
 R1807 COGAFLAG
 R1808 RVSU
 R1809 INFINFLG
 R1810 APSESW
 R1811 360SW
 R1812 RTNTT EQUALS RTNLAMB
 R1813 ECC ERASE +1
 R1814 RTNTR EQUALS RTNLAMB

L CONIC SUBROUTINES

R1815 RTNAPSE EQUALS RTNLAMB
 R1816 R2 EQUALS MAGVEC2
 1817 0030 COSF EQUALS 240
 R1818 RTNPRM ERASE +0
 R1819 SGNRDOT ERASE +0
 R1820 RDESIRED ERASE +1

R1821 ITERATOR SUBROUTINE

R1822 ORDERSW
 1823 0016 MAX EQUALS 140 CLOBBERS 1/MU
 1824 0010 MIN EQUALS 80
 R1825 INDEP ERASE +1 ES,1765
 1826 0014 DELINDEP EQUALS 120
 1827 0026 ITERCTR EQUALS 220
 1828 0036 DEP EQUALS 300
 R1829 DELDEP ERASE +1 ES,1757
 R1830 DEPREV ERASE +1 ES,1761
 1831 0050 TWEEKIT EQUALS 400

R1832 MORE KEPLER

R1833 EPSILONL ERASE +1

R1834 MORE LAMBERT

R1835 TEKRLAMB EQUALS DELDEP
 R1836 TPREV EQUALS DEPREV

R1837 EPSILONL EQUALS EPSILONL +2 DOUBLE PRECISION WORD

L INTEGRATION-INITIALIZATION

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R0006 1.0 INTRODUCTION

R0007

R0008

R0009 FROM A USER'S POINT OF VIEW, ORBITAL INTEGRATION IS ESSENTIALLY THE SAME AS THE 278-INTEGRATION
R0011 PROGRAM. THE SAME ENTRANCES TO THE PROGRAM WILL BE MAINTAINED. THE SAME STALLING ROUTINE WILL BE USED AND
R0013 OUTPUT WILL STILL BE VIA THE PUSHLIST. THE PRIMARY DIFFERENCES TO A USER INVOLVE THE ADDED CAPABILITY OF
R0015 TERMINATING INTEGRATION AT A SPECIFIC FINAL RADIUS AND THE DIFFERENCE IN STATE VECTOR SCALING INSIDE AND OUT-
R0017 SIDE THE LUNAR SPHERE OF INFLUENCE.

R0018

R0019 IN ORDER TO MAKE THE CSM(LEM)PREC AND CSM(LEM)CONIC ENTRANCES SIMILAR TO FLIGHT 278, THE INTEGRATION PROGRAM
R0021 WILL ITSELF SET THE FINAL RADIUS (RFINAL) TO 0 SO THAT REACHING THE DESIRED TIME ONLY WILL TERMINATE
R0023 INTEGRATION. THE DP REGISTER RFINAL MUST BE SET BY USERS OF INTEGRVS AND INTEGRV, AND MUST BE DONE AFTER THE
R0025 CALL TO INTSTALL.

R0026

R0027 WHEN THE LM IS ON THE LUNAR SURFACE (INDICATED BY LUNAR SURFACE FLAG SET) CALLS TO LEMCONIC, LEMPREC, AND
R0029 INTEGRV WITH VINFLAG = 0 WILL RESULT IN THE USE OF THE PLANETARY INERTIAL ORIENTATION SUBROUTINES TO PROVIDE
R0031 BOTH THE LMS POSITION AND VELOCITY IN THE REFERENCE COORDINATE SYSTEM.
R0032 THE PROGRAM WILL PROVIDE OUTPUT AS IF INTEGRATION WAS USED. THAT IS, THE PUSHLIST WILL BE SET AS NOTED BELOW AND
R0034 THE PERMANENT STATE VECTOR UPDATED WHEN SPECIFIED BY AN INTEGRV CALL.

R0035

R0036 USERS OF INTEGRVS DESIRING INTEGRATION (INTYPELG = 0) SHOULD NOTE THAT THE OBLATENESS PERTURBATION COMPUTATION
R0038 IN LUNAR ORBIT IS TIME DEPENDENT. THEREFORE, THE USER SHOULD SUPPLY AN INITIAL STATE VECTOR VALID AT SOME REAL
R0040 TIME AND THE DESIRED TIME (TDEC1) ALSO AT SOME REAL TIME. FOR CONIC ..INTEGRATION.. THE USER MAY STILL USE ZERO
R0042 AS THE INITIAL TIME AND DELTA TIME AS THE DESIRED TIME.

R0043

R0044 2.0 GENERAL DESCRIPTION

R0045

R0046

R0047 THE INTEGRATION PROGRAM OPERATES AS A CLOSED INTERPRETIVE SUBROUTINE AND PERFORMS THESE FUNCTIONS---

R0049 1) INTEGRATES (PRECISION OR CONIC) EITHER CSM OR LM STATE VECTOR

R0050 2) INTEGRATES THE W-MATRIX

R0051 3) PERMANENT OR TEMPORARY UPDATE OF THE STATE VECTOR

R0052

R0053 THERE ARE SIX ENTRANCES TO THE INTEGRATION PROGRAM. FOUR OF THESE (CSMPREC, LEMPREC, CSMCONIC, LEMCONIC) SET
R0055 ALL THE FLAGS REQUIRED IN THE INTEGRATION PROGRAM ITSELF TO CAUSE THE PRECISION OR CONIC INTEGRATION (KEPLER) OF
R0057 THE LM OR CSM STATE VECTOR, AS THE NAMES SUGGEST. ONE ENTRANCE (INTEGRVS) PERMITS THE CALLING PROGRAM TO
R0059 PROVIDE A STATE VECTOR TO BE INTEGRATED. THE CALLING PROGRAM MUST SET THE FLAGS INDICATING (1) PRECISION OR
R0061 CONIC INTEGRATION, (2) IN OR OUT OF LUNAR SPHERE, (3) MIDCOURSE OR NOT, AND THE INTEGRATION PROGRAM COMPLETES
R0063 THE FLAG SETTING TO BYPASS W-MATRIX INTEGRATION. THE LAST ENTRANCE (INTEGRV, USED IN GENERAL BY THE
R0065 NAVIGATION PROGRAMS) PERMITS THE CALLER TO SET FIVE FLAGS (NOT MOONFLAG OR MIDFLAG) BUT NOT TO INPUT A STATE
R0067 VECTOR. ANY PROGRAM WHICH CALLS INTEGRVS OR INTEGRV MUST CALL INTSTALL BEFORE IT SETS THE INTEGRATION FLAGS
R0069 AND/OR STATE VECTOR.

R0070

R0071 THREE SETS OF 42 REGISTERS AND 2 FLAGS ARE USED FOR THE STATE VECTORS. TWO SETS, WHICH MAY NOT BE OVERLAYED, ARE
R0073 USED FOR THE PERMANENT STATE VECTORS FOR THE CSM AND LM. THE THIRD SET, WHICH MAY BE OVERLAYED WHEN INTEGRATION
R0075 IS NOT BEING DONE, IS USED IN THE COMPUTATIONS.

R0076

R0077 THE PERMANENT STATE VECTORS WILL BE PERIODICALLY UPDATED SO THAT THE VECTORS WILL NOT BE OLDER THAN 4 TIMESTEPS.
R0079 THE PERMANENT STATE VECTORS WILL ALSO BE UPDATED WHENEVER THE W-MATRIX IS INTEGRATED OR WHEN A CALLER OF INTEGRV
R0081 SETS STATEFLG (THE NAVIGATION PROGRAMS P20, P22.)

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R0082 APPENDIX B OF THE USERS GUIDE LISTS THE STATE VECTOR QUANTITIES.

R0083

R0084 2.1 RESTARTS

R0085

R0086 PHASE CHANGES WILL BE MADE IN THE INTEGRATION PROGRAM ONLY FOR THE INTEGRV ENTRANCE (I.E., WHEN THE W-MATRIX IS
R0088 INTEGRATED OR PERMANENT STATE VECTOR IS UPDATED.) THE GROUP NUMBER USED WILL BE THAT FOR THE P20-25 PROGRAMS

R0090 (I.E., GROUP2) SINCE THE INTEGRV ENTRANCE WILL ONLY BE USED BY THESE PROGRAMS. IF A RESTART OCCURS DURING AN

R0092 INTEGRATION OF THE STATE VECTOR ONLY, THE RECOVERY WILL BE TO THE LAST PHASE IN THE CALLING PROGRAM. CALLING

R0094 PROGRAMS WHICH USE THE INTEGRV OR INTEGRVS ENTRANCE OF INTEGRATION SHOULD ENSURE THAT IF PHASE CHANGING IS DONE

R0096 THAT IT IS PRIOR TO SETTING THE INTEGRATION INPUTS IN THE PUSHLIST.

R0097 THIS IS BECAUSE THE PUSHLIST IS LOST DURING A RESTART.

R0098

R0099 2.2 SCALING

R0100

R0101 THE INTEGRATION ROUTINE WILL MAINTAIN THE PERMANENT MEMORY STATE VECTORS IN THE SCALING AND UNITS DEFINED IN

R0103 APPENDIX B OF THE USERS GUIDE. THE SCALING OF THE OUTPUT POSITION VECTOR DEPENDS ON THE ORIGIN OF THE COORDINATE

R0105 SYSTEM AT THE DESIRED INTEGRATION TIME. THE COORDINATE SYSTEM TRANSFORMATION WILL BE DONE AUTOMATICALLY ON

R0107 MULTIPLE TIMESTEP ENCKE INTEGRATION ONLY. THUS IT IS POSSIBLE TO HAVE OUTPUT FROM SUCCESSIVE INTEGRATIONS IN

R0109 DIFFERENT SCALING.

R0110 HOWEVER, RATT, VATT WILL ALWAYS BE SCALED THE SAME.

R0111

R0112 3.0 INPUT/OUTPUT

R0113

R0114

R0115 PROGRAM INPUTS ARE THE FLAGS DESCRIBED IN APPENDIX A AND THE PERMANENT STATE VECTOR QUANTITIES DESCRIBED IN AP-
R0117 PENDIX B OF THE USERS GUIDE, PLUS THE DESIRED TIME TO INTEGRATE TO IN TDEC1 (A PUSH LIST LOCATION).

R0119 FOR INTEGRVS, THE RCV, VCV, TET OF THE TEMPORARY STATE VECTOR MUST BE SET, PLUS MOONFLAG AND MIDFLAG

R0121

R0122 FOR SIMULATION THE FOLLOWING QUANTITIES MUST BE PRESET ---

R0123

R0124

R0125 EARTH MOON

R0126 RRECTGSM(LEM) - RECTIFIED POSITION VECTOR METERS 2 2

R0127

R0128 7 5

R0129 VRECTGSM(LEM) - RECTIFIED VELOCITY VECTOR M/CSEC 2 2

R0130

R0131 28 28

R0132 TETGSM(LEM) - TIME STATE VECTOR IS VALID CSEC 2 2

R0133 CUSTOMARILY 0, BUT NOTE LUNAR

R0134 ORBIT DEPENDENCE ON REAL TIME.

R0135

R0136 22 18

R0137 DELTAVGSM(LEM) - POSITION DEVIATION METERS 2 2

R0138 0 IF TCCSM(LEM) = 0

R0139

R0140 3 -1

R0141 NUVCSSM(LEM) - VELOCITY DEVIATION M/CSEC 2 2

R0142 0 IF TCCSM(LEM) = 0

R0143

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R0144				29	27
R0145	RCVCSM(LEM)	- CONIC POSITION	METERS	2	2
R0146		EQUALS RRECTCSM(LEM) IF			
R0147		TCCSM(LEM) = 0			
R0148					
R0149				7	5
R0150	VCVCSM(LEM)	- CONIC VELOCITY	M/CSEC	2	2
R0151		EQUALS VRECTCSM(LEM) IF			
R0152		TCCSM(LEM) = 0			
R0153					
R0154				28	28
R0155	TCCSM(LEM)	- TIME SINCE RECTIFICATION	CSECS	2	2
R0156		CUSTOMARILY 0			
R0157					
R0158			1/2	17	16
R0159	XKEPCSM(LEM)	- ROOT OF KEPLERS EQUATION	¹⁴	2	2
R0160		0 IF TCCSM(LEM) = 0			
R0161					
R0162	CMOONFLG	- PERMANENT FLAGS CORRESPONDING		0	0
R0163	CMIDFLAG	TO MOONFLAG AND MIDFLAG		0.1	0.1
R0164	LMOONFLG	C = CSM, L = LM		0	0
R0165	LMIDFLG			0.1	0.1
R0166					
R0167	SURFFLAG	- LUNAR SURFACE FLAG		0.1	0.1
R0168					
R0169	IN ADDITION, IF (L)CMIDFLAG IS SET, THE INITIAL INPUT VALUES FOR LUNAR				
R0170	SOLAR EPHEMERIDES SUBROUTINE AND PLANETARY INERTIAL ORIENTATION SUB-				
R0171	ROUTINE MUST BE PRESET.				
R0172					
R0173	OUTPUT				
R0174	AFTER EVERY CALL TO INTEGRATION				
R0175				EARTH	MOON
R0176				29	29
R0177	0D	RATT	POSITION	METERS	2
R0178				7	7
R0179	6D	VATT	VELOCITY	M/CSEC	2
R0180				28	28
R0181	12D	TAT	TIME	2	2
R0182				29	27
R0183	14D	RATT1	POSITION	METERS	2
R0184				7	5
R0185	20D	VATT1	VELOCITY	M/CSEC	2
R0186				3	2
R0187	26D	MU(P)	MU	M/CS	2
R0188					
R0189	X1	MUTABLE ENTRY		-2	-100
R0190					
R0191	X2	COORDINT			
R0192	X2	COORDINATE SYSTEM ORIGIN		0	2
R0193		(THIS, NOT MOONFLAG, SHOULD BE			

L-----INTEGRATION-INITIALIZATION-----

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R0194-----USED TO DETERMINE ORIGIN.)
 R0195-----
 R0196 IN ADDITION TO THE ABOVE, THE PERMANENT STATE VECTOR IS UPDATED WHENEVER
 R0197 STATEFLG WAS SET AND WHENEVER A W-MATRIX IS TO BE INTEGRATED. THE PUSH
 R0198 COUNTER IS SET TO 0 AND OVERFLOW IS CLEARED BEFORE RETURNING TO THE
 R0199 CALLING PROGRAM.

R0200-----
 R0201 4.0 CALLING SEQUENCES AND SAMPLE CODE
 R0202-----

R0203-----
 R0204 A) PRECISION ORBITAL INTEGRATION. CSMPREC, LEMPREC ENTRANCES
 R0205 L-X STORE TIME TO 95T5791T5 T 95 PUS L9ST (T4531)
 R0206 L CALL
 R0207 L+1 CSMPREC (OR LEMPREC)
 R0208 L+2 RETURN

R0209 INPUT 28
 R0210 TDEC1 (PD 32D) TIME TO INTEGRATE TO...CENTISECONDS SCALED 2
 R0211 OUTPUT
 R0212 THE DATA LISTED IN SECTION 3.0 PLUS
 R0213 RQVV POSITION VECTOR OF VEHICLE WITH RESPECT TO SECONDARY
 R0214 BODY... METERS B-29 ONLY IF MIDFLAG = DIMOFLAG = 1

R0215 B) CONIC INTEGRATION. CSMCONIC, LEMCONIC ENTRANCES
 R0216 L-X STORE TIME IN PUSH LIST (TDEC1)
 R0217 L CALL
 R0218 L+1 CSMCONIC (OR LEMCONIC)

R0219 INPUT/OUTPUT
 R0220 SAME AS PRECISION INTEGRATION, EXCEPT RQVV NOT SET
 R0221 C) INTEGRATE GIVEN STATE VECTOR. INTEGRVS ENTRANCE

R0222 CALL
 R0223 INTSTALL
 R0224 VLOAD
 R0225 POSITION VECTOR
 R0226 STOVL RCV
 R0227 VELOCITY VECTOR
 R0228 STODL VCV
 R0229 TIME STATE VECTOR VALID
 R0230 STODL TET
 R0231 FINAL RADIUS
 R0232 STORE RFINAL
 R0233 SET(CLEAR) SET(CLEAR)
 R0234 INTYPFLAG
 R0235 MOONFLAG
 R0236 SET(CLEAR) DLOAD
 R0237 DESIRED TIME
 R0238 STCALL TDEC1
 R0239 INTEGRVS

R0240 INPUT
 R0241 RCV POSITION VECTOR METERS
 R0242 VCV VELOCITY VECTOR M/CSEC
 R0243 TET TIME OF STATE VECTOR(MAY = 0) CSEC B-28

L INTEGRATION INITIALIZATION

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R0244      TDEC1  TIME TO INTEGRATE TO      CSEC B-28 (PD 32D)
R0245      (MAY BE INCREMENT IF TET=0)
R0246      OUTPUT
R0247      SAME AS FOR PRECISION OR CONIC INTEGRATION,
R0248      DEPENDING ON INTYPFLG.
R0249      D) INTEGRATE STATE VECTOR. INTGRV ENTRANCE
R0250      L-X   STORE TIME IN PUSH LIST (TDEC1) (MAY BE DONE AFTER CALL TO INTSTALL)
R0252      L-8   CALL
R0253      L-7
R0254      L-6   SET(CLEAR) SET(CLEAR)
R0255      L-5   VINTFLAG 1=CSM, 0=LM
R0256      L-4   INTYPFLAG 1=CONIC, 0=PRECISION
R0257      L-3   SET(CLEAR) SET(CLEAR)
R0258      L-2   DIMOFLAG 1=W-MATRIX, 0=NO W-MATRIX
R0259      L-1   D6OR9FLG 1=9X9, 0=6X6
R0260      L     SET      DLOAD
R0261      L+1   STATEFLG  DESIRE PERMANENT UPDATE
R0262      L+2   FINAL RAD. OF STATE VECTOR
R0263      L+3   STCALL   RFINAL
R0264      L+4   INTEGRV
R0265      L     CALL     NORMAL USE-- WILL UPDATE STATE
R0266      L+1   INTEGRV  VECTOR IF DIMOFLAG=1. (STATEFLG IS
R0267      L+2   RETURN   ALWAYS RESET IN INTEGRATION AFTER
R0268                        IT IS USED.)
R0269      INPUT
R0270      TDEC1 (PD 32D) TIME TO INTEGRATE TO CSEC B-28
R0271      OUTPUT
R0272      SAME AS FOR PRECISION OR CONIC INTEGRATION
R0273      THE PROGRAM WILL SET MOONFLAG, MIDFLAG DEPENDING ON
R0274      THE PERMANENT STATE VECTOR REPRESENTATION.

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02741      11.2376      BANK 11
02742 REF 3 LAST 236 13,2000 SETLOC INTINIT
02743      13,2604      BANK
02744 REF 7 LAST 983 E3,1554 EBANK= RRECTCSM
02745 REF 3 LAST 236 TO 239: 34 36* COUNT* 55/INTIN
0275 REF 105 LAST 1153 13,2604 0 5353 1 STATEINT TC PHASCHNG
0276      13,2605 00052 0 OCT 00052
0277 REF 10 LAST 781 13,2606 3 5017 1 CAF PRI05
0278 REF 41 LAST 966 13,2607 0 5105 0 TC FINDVAC
0279 REF 8 LAST 1209 E3,1554 EBANK= RRECTCSM
0280 REF 2 LAST 240 13,2610 02613 1 2CADR STATINT1
0280      13,2611 26063 0
0281 REF 72 LAST 1132 13,2612 0 5261 1 TC TASKOVER
0282 REF 229 LAST 1190 13,2613 0 6037 0 STATINT1 TC INTPRET
0283      13,2614 47014 1 BON RTB
02831 REF 2 LAST 298 13,2615 04712 1 QUITFLAG KILL INTEGRATION UNTIL NEXT POJ.
02832 REF 1 13,2616 26653 0 NOINT
0284 REF 31 LAST 979 13,2617 21573 0 LOADTIME
0286 REF 55 LAST 976 13,2620 00041 1 STORE TDEC1

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L INTEGRATION INITIALIZATION

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0323			13,2621	77624-1	CALL	
0324	REF 28	LAST 1153	13,2622	27414-0	INTSTALL	
0325			13,2623	45014-0	SET	CALL
03251	REF 4	LAST 236	13,2624	01076-1	NODOFLAG	
0326	REF 7	LAST 583	13,2625	26644-0	SETIFLGS	
0327			13,2626	77650-1	GOTO	
0328	REF 1		13,2627	26026-1	STATEUP	
0356			13,2630	00003-1	600SECS 2DEC	60000
0356			13,2631	25140-0		
0404			13,2632	77414-0	ENDINT	CLEAR EXIT
0405	REF 4	LAST 583	13,2633	01672-0	STATEFLG	
0408	REF 106	LAST 1209	13,2634	0-5353-1	TC	PHASCHNG
0409			13,2635	20032-1	OCT	20032
0411			13,2636	0-0006-1	EXTEND	
0412	REF 2	LAST 239	13,2637	3-2631-1	DCA	600SECS
0413	REF 4	LAST 734	13,2640	0-5277-0	TC	LONGCALL
0414	REF 4	LAST 297	E3,1626		EBANK=	RRECTHIS
0415	REF 3	LAST 239	13,2641	02604-1	2CADR	STATEINT
0415			13,2642	26063-0		
0416	REF 144	LAST 975	13,2643	0-5155-0	TC	ENDOFJOB
0426			13,2644	43014-0	SETIFLGS SET	CLEAR
0427	REF 5	LAST 1210	13,2645	01472-1	STATEFLG	
0428	REF 15	LAST 787	13,2646	01673-1	INTYPFLG	
0429			13,2647	43014-0	CLEAR	CLEAR
0430	REF 14	LAST 656	13,2650	01676-1	DIMFLAG	
04301	REF 8	LAST 583	13,2651	01675-1	D6OR9FLG	
04302			13,2652	77616-0	RVQ	
04303			13,2653	77776-1	NOINT	EXIT
04304	REF 107	LAST 1210	13,2654	0-5353-1	TC	PHASCHNG
04305			13,2655	00002-0	OCT	00002
04306	REF 90	LAST 980	13,2656	0-5516-0	TC	DOWNFLAG
04307	REF 3	LAST 1209	13,2657	00221-0	ADRES	QUITFLAG
04308	REF 145	LAST 1210	13,2660	0-5155-0	TC	ENDOFJOB

R0431 ATOPCSM TRANSFERS RRECT TO RRECT +41 TO RRECTCSM TO RRECTCSM +41

R0432 CALLING SEQUENCE

R0433 L CALL

R0434 L+1 ATOPCSM

P0435 NORMAL EXIT AT L+2

0436			13,2661	47020-0	ATOPCSM	STQ	R18
0437	REF 27	LAST 1189	13,2662	00051-0			S2
0438	REF 2	LAST 1157	13,2663	26674-0			MOVEACSM
0439			13,2664	45014-0	SET	CALL	
0440	REF 7	LAST 711	13,2665	04063-0			CMOONFLG
0441	REF 3	LAST 1157	13,2666	26114-1			SVOWN1
0442			13,2667	43014-0	BON	CLRGO	

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0443	REF	14	LAST	787	13,2670	00303	1		MOONFLAG	
0444	REF	28	LAST	1210	13,2671	00051	0		S2	
0445	REF	8	LAST	1210	13,2672	04223	0		CMOONFLG	
0446	REF	29	LAST	1211	13,2673	00051	0		S2	
0447	REF	1			13,2674	0 3036	1	MOVEACSM	TC	SETBANK
0448	REF	2	LAST	110	13,2675	55'500	1		TS	DIFEQCNT INITIALIZE-INDEX
0449	REF	3	LAST	1211	13,2676	51'500	0		INDEX	DIFEQCNT
0450	REF	6	LAST	1174	13,2677	3 1502	1		CA	RRECT
0451	REF	4	LAST	1211	13,2700	51'500	0		INDEX	DIFEQCNT
0452	REF	9	LAST	1209	13,2701	55'554	0		TS	RRECTCSM
0453	REF	5	LAST	1211	13,2702	11'500	1		CCS	DIFEQCNT IS TRANSFER COMPLETE
0454	REF	3	LAST	1210	13,2703	1 2675	0		TCF	MOVEACSM +1 NO-LOOP
0455	REF	56	LAST	1183	13,2704	0 6061	0		TC	DANZIG COMPLETE- RETURN

R0456 PTOACSM TRANSFERS RRECTCSM TO RRECTCSM +41 TO RRECT TO RRECT +41

R0457 CALLING SEQUENCE

R0458 L CALL

R0459 PTOACSM

R0460 NORMAL EXIT AT L+2

0461					13,2705	43034	1	PTOACSM	RTB	BUN
0462	REF	2	LAST	1157	13,2706	26723	0			MOVEPCSM
0463	REF	9	LAST	1211	13,2707	04303	0			CMOONFLG
0464	REF	1			13,2710	26716	0			SETMOON
0465					13,2711	66214	0	CLRMOON	CLEAR	SSP
0466	REF	15	LAST	1211	13,2712	00263	0			MOONFLAG
0467	REF	4	LAST	1156	13,2713	02031	1			PBODY
0468					13,2714	00000	1			0
0469					13,2715	77616	0		RVQ	
0470					13,2716	66214	0	SETMOON	SET	SSP
0471	REF	16	LAST	1211	13,2717	00063	1			MOONFLAG
0472	REF	5	LAST	1211	13,2720	02031	1			PBODY
0473					13,2721	00002	0			2
0474					13,2722	77616	0		RVQ	
0475	REF	2	LAST	1211	13,2723	0 3036	1	MOVEPCSM	TC	SETBANK
0476	REF	6	LAST	1211	13,2724	55'500	1		TS	DIFEQCNT
0477	REF	7	LAST	1211	13,2725	51'500	0		INDEX	DIFEQCNT
0478	REF	10	LAST	1211	13,2726	3 1554	1		CA	RRECTCSM
0479	REF	8	LAST	1211	13,2727	51'500	0		INDEX	DIFEQCNT
0480	REF	7	LAST	1211	13,2730	55'502	0		TS	RRECT
0481	REF	9	LAST	1211	13,2731	11'500	1		CCS	DIFEQCNT
0482	REF	3	LAST	1211	13,2732	1 2724	0		TCF	MOVEPCSM +1
0483	REF	57	LAST	1211	13,2733	0 6061	0		TC	DANZIG

R0484 ATOPLEM TRANSFERS RRECT TO RRECT +41 TO RRECTLEM TO RRECTLEM +41

0485 13,2734 47020 0 ATOPLEM STQ RTB

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0486	REF	30	LAST	1211	13,2735	00051-0		S2
0487	REF	3	LAST	1156	13,2736	26747-1		MOVEALEM
0488					13,2737	45014-0	SET	CALL
0489	REF	3	LAST	576	13,2740	04064-1		LMOONFLG
0490	REF	2	LAST	1156	13,2741	26070-1		SVDWN2
0491					13,2742	43014-0	BON	CLRGO
0492	REF	17	LAST	1211	13,2743	00303-1		MOONFLAG
0493	REF	31	LAST	1212	13,2744	00051-0		S2
0494	REF	4	LAST	1212	13,2745	04224-1		LMOONFLG
0495	REF	32	LAST	1212	13,2746	00051-0		S2
0496	REF	3	LAST	1211	13,2747	0-3036-1	MOVEALEM TC	SETBANK
0497	REF	10	LAST	1211	13,2750	55'500-1	TS	DIFEQCNT
0498	REF	11	LAST	1212	13,2751	51'500-0	INDEX	DIFEQCNT
0499	REF	8	LAST	1211	13,2752	3-1502-1	CA	RRECT
0500	REF	12	LAST	1212	13,2753	51'500-0	INDEX	DIFEQCNT
0501	REF	2	LAST	111	13,2754	55'626-0	TS	RRECTLEM
0502	REF	13	LAST	1212	13,2755	11'500-1	CCS	DIFEQCNT
0503	REF	4	LAST	1212	13,2756	1-2750-0	TCF	MOVEALEM +1
0504	REF	58	LAST	1211	13,2757	0-6061-0	TC	DANZIG

R0505 PTOALEM TRANSFERS RRECTLEM TO RRECTLEM +41 TO PRECT TO RRECT +41

0506					13,2760	47014-1	PTOALEM BON	RTB
0507	REF	16	LAST	843	13,2761	04307-1		SURFFLAG
0508	REF	1			13,2762	27001-0		USEPIOS
0509	REF	2	LAST	1156	13,2763	26770-0		MOVEPLEM
0510					13,2764	52014-0	BON	GOTO
0511	REF	5	LAST	1212	13,2765	04304-1		LMOONFLG
0512	REF	2	LAST	1211	13,2766	26716-0		SETMOON
0513	REF	1			13,2767	26711-1		CLRMOON
0514	REF	4	LAST	1212	13,2770	0-3036-1	MOVEPLEM TC	SETBANK
0515	REF	14	LAST	1212	13,2771	55'500-1	TS	DIFEQCNT
0516	REF	15	LAST	1212	13,2772	51'500-0	INDEX	DIFEQCNT
0517	REF	3	LAST	1212	13,2773	3-1626-1	CA	RRECTLEM
0518	REF	16	LAST	1212	13,2774	51'500-0	INDEX	DIFEQCNT
0519	REF	9	LAST	1212	13,2775	55'502-0	TS	RRECT
0520	REF	17	LAST	1212	13,2776	11'500-1	CCS	DIFEQCNT
0521	REF	3	LAST	1212	13,2777	1-2771-0	TCF	MOVEPLEM +1
0522	REF	59	LAST	1212	13,3000	0-6061-0	TC	DANZIG

0523					13,3001	77201-1	USEPIOS SETPD	VLOAD
0524					13,3002	00001-0		0
0525	REF	15	LAST	1139	13,3003	02023-1		RLS
0526					13,3004	41525-0	PDDL	PUSH
0527	REF	56	LAST	1209	13,3005	00041-1		TDEC1
0528	REF	13	LAST	787	13,3006	15517-0	STODL	TET
0529	REF	1			13,3007	27712-0		5/8
0530					13,3010	77624-1	CALL	

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0531	REF	7	LAST	1135	13,3011	55716 1		RP-TO-R
0532	REF	16	LAST	1178	13,3012	25535 0	STOVL	KCV
0533	REF	2	LAST	37	13,3013	24001 0		ZUNIT
0534					13,3014	14001 0	STOVL	OD
0535	REF	14	LAST	1212	13,3015	01517 0		TET
0536					13,3016	14007 0	STOVL	6D
0537	REF	2	LAST	1212	13,3017	27712 0		5/8
0538					13,3020	45014 0	SET	CALL
								NEEDED FOR SETTING X1 ON EXIT
05381	REF	18	LAST	1212	13,3021	00063 1		MOONFLAG
0539	REF	8	LAST	1213	13,3022	55716 1		RP-TO-R
0540					13,3023	74235 0	VXV	VXSC
0541	REF	17	LAST	1213	13,3024	01535 0		KCV
0542	REF	1			13,3025	26001 1		OMEGMOON
0543	REF	14	LAST	1179	13,3026	25543 1	STOVL	KCV
0544	REF	9	LAST	1135	13,3027	24007 0		ZEROVEC
0545	REF	6	LAST	1156	13,3030	01521 0	STORE	TOELTAV
0546					13,3031	67174 1	AXT,2	SXA,2
0547					13,3032	00002 0		2
0548	REF	6	LAST	1211	13,3033	02030 0		PBODY
0549	REF	6	LAST	1156	13,3034	35527 1	STCALL	TNUV
0550	REF	1			13,3035	27157 1		A-PCHK
0552	REF	1			13,3036	3 3042 1	SETBANK	CAF
								INTBANK
0553	REF	39	LAST	1129	13,3037	54 006 0	TS	BBANK
0554	REF	1			13,3040	3 3452 1	CAF	FORTYONE
0555	REF	323	LAST	1131	13,3041	0 0002 0	TC	Q
0556	REF	11	LAST	1211	E3,1554		EBANK=	RRECTCSM
0557	REF	10	LAST	655	13,3042	26063 0	INTBANK	BBCON
								INTEGRV

R0558 SPECIAL PURPOSE ENTRIES TO ORBITAL INTEGRATION. THESE ROUTINES PROVIDE ENTRANCES TO INTEGRATION WITH
 R0560 APPROPRIATE SWITCHES SET OR CLEARED FOR THE DESIRED INTEGRATION.

R0561 CSMPREC AND LEMPREC PERFORM ORBIT INTEGRATION BY THE ENCKE METHOD TO THE TIME INDICATED IN TDEC1
 R0563 ACCELERATIONS DUE TO OBLATENESS ARE INCLUDED. NO W-MATRIX INT. IS DONE.
 R0564 THE PERMANENT STATE VECTOR IS NOT UPDATED.
 R0565 CSMCONIC AND LEMCONIC PERFORM ORBIT INTEG. BY KEPLER'S METHOD TO THE TIME INDICATED IN TDEC1
 R0567 NO DISTURBING ACCELERATIONS ARE INCLUDED. IN THE PROGRAM FLOW THE GIVEN
 R0568 STATE VECTOR IS RECTIFIED BEFORE SOLUTION OF KEPLER'S EQUATION

R0569 THE ROUTINES ASSUME THAT THE CSM (LEM) STATE VECTOR IN P-MEM IS VALID.
 R0570 SWITCHES SET PRIOR TO ENTRY TO THE MAIN INTEG. PROG ARE AS FOLLOWS
 R0571 CSMPREC CSMCONIC LEMPREC LEMCONIC
 R0572 VINTFLAG SET SET CLEAR CLEAR
 R0573 INTYPFLG CLEAR SET CLEAR SET
 R0574 DIMOFLAG CLEAR CLEAR CLEAR CLEAR

R0575 CALLING SEQUENCE
 R0576 L-X STORE TDEC1
 R0577 L CALL (STCALL TDEC1)

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R0578 L+1 CSMPREC (CSMCONIC, LEMPREC, LEMCONIC)

R0579 NORMAL EXIT TO L+2

R0580 SUBROUTINES CALLED

R0581 INTEGRV1

R0582 PRECOUT FOR CSMPREC AND LEMPREC

R0583 CONICOUT FOR CSMCONIC AND LEMCONIC

R0584 OUTPUT - SEE PAGE 2 OF THIS LOG SECTION

R0585 INPUT

R0586 TDEC1 TIME TO INTEGRATE TO . CSECS 8-28

0587			13,3043	45020 1	CSMPREC	STQ	CALL
0588	REF 61	LAST 1200	13,3044	00046 0			X1
0589	REF 29	LAST 1210	13,3045	27414 0			INTSTALL
0590			13,3046	43130 1		SXA,1	SET
0591	REF 2	LAST 114	13,3047	02102 0			IRETURN
0592	REF 19	LAST 655	13,3050	01474 1			VINTFLAG

0593			13,3051	43014 0	IFLAGP	SET	CLEAR
0594	REF 3	LAST 236	13,3052	01467 0			PRECIFLG
0595	REF 15	LAST 1210	13,3053	01676 1			DIMOFLEG
0596			13,3054	77614 1		CLRGD	
05961	REF 16	LAST 1210	13,3055	01633 0			INTYPFLG
05962	REF 1		13,3056	27136 0			INTEGRV1
0597			13,3057	45020 1	LEMPREC	STQ	CALL
0598	REF 62	LAST 1214	13,3060	00046 0			X1
0599	REF 30	LAST 1214	13,3061	27414 0			INTSTALL
0600			13,3062	43130 1		SXA,1	CLRGD
0601	REF 3	LAST 1214	13,3063	02102 0			IRETURN
0602	REF 20	LAST 1214	13,3064	01634 1			VINTFLAG
0603	REF 1		13,3065	27051 0			IFLAGP

0604			13,3066	45020 1	CSMCONIC	STQ	CALL
0605	REF 63	LAST 1214	13,3067	00046 0			X1
0606	REF 31	LAST 1214	13,3070	27414 0			INTSTALL
0607			13,3071	43130 1		SXA,1	SET
0608	REF 4	LAST 1214	13,3072	02102 0			IRETURN
0609	REF 21	LAST 1214	13,3073	01474 1			VINTFLAG
0610			13,3074	43014 0	IFLAGC	CLEAR	SETGD
0611	REF 16	LAST 1214	13,3075	01676 1			DIMOFLEG
0612	REF 17	LAST 1214	13,3076	01433 1			INTYPFLG
0613	REF 2	LAST 1214	13,3077	27136 0			INTEGRV1
0614			13,3100	45020 1	LEMCONIC	STQ	CALL
0615	REF 64	LAST 1214	13,3101	00046 0			X1
0616	REF 32	LAST 1214	13,3102	27414 0			INTSTALL
0617			13,3103	43130 1		SXA,1	CLRGD
0618	REF 5	LAST 1214	13,3104	02102 0			IRETURN

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0619	REF	22	LAST 1214	13,3105	01634-1	VINTFLAG
0620	REF	1		13,3106	27074-1	IFLAGC
0621				13,3107	66214 0	INTEGRVS SET
0622	REF	4	LAST 1214	13,3110	01467 0	SSP
0623	REF	7	LAST 1213	13,3111	02031-1	PRECIFLG
0624				13,3112	00000-1	PBODY
0625				13,3113	66214 0	0
0626	REF	19	LAST 1213	13,3114	00343 0	BOF SSP
0627				13,3115	27120-1	MOONFLAG
0628	REF	8	LAST 1215	13,3116	02031-1	+3
06281				13,3117	00002 0	PBODY
0629				13,3120	77220-1	2
0630	REF	6	LAST 1214	13,3121	02102 0	STQ VLOAD
0631	REF	10	LAST 1213	13,3122	24007 0	IRETURN
0632	REF	7	LAST 1213	13,3123	01521 0	ZEROVEC
0633	REF	7	LAST 1213	13,3124	35527 1	STORE TDELTA
0634	REF	2	LAST 1156	13,3125	23441 1	STCALL TNUV
0635				13,3126	43014 0	RECTIFY
0636	REF	17	LAST 1214	13,3127	01676-1	CLEAR SET
0637	REF	1		13,3130	04062-1	DIMOFLEG
06371				13,3131	77614 1	NEWIFLG
06372	REF	1		13,3132	04020 1	SETGO
0638	REF	1		13,3133	27150 0	RPQFLAG
						ALOADED

R0639 INTEGRV IS AN ENTRY TO ORBIT INTEGRATION WHICH PERMITS THE CALLER .
R0640 NORMALLY THE NAVIGATION PROGRAM ,TO SET THE INTEG. FLAGS. THE ROUTINE
R0641 IS ENTERED AT INTEGRV1 BY CSMPREC ET.AL. AND AT ALOADED BY INTEGRVS.
R0642 THE ROUTINE SETS UP A-MEMORY IF ENTERED AT INTEGRV.1 AND SETS THE INTEG.
R0643 PROGRAM FOR PRECISION OR CONIC

R0644 THE CALLER MUST FIRST CALL INTSTALL TO CHECK IF INTEG. IS IN USE BEFORE
R0645 SETTING ANY FLAGS.
R0646 THE FLAGS WHICH SHOULD BE SET OR CLEARED ARE
R0647 VINTFLAG (IGNORED WHEN ENTERED FROM INTEGRVS)
R0648 INTYPFLG
R0649 DIMOFLEG
R0650 D6DR9FLG
R0651 CALLING SEQUENCE
R0652 L-X CALL
R0653 L-Y INTSTALL
R0654 L-1 SET OR CLEAR ALL FOUR FLAGS. ALSO CAN SET STATEFLG IF DESIRED
R0655 AND DIMOFLEG IS CLEAR.
R0656 L CALL
R0657 L+1 INTEGRV
R0658 INITIALIZATION
R0659 FLAGS AS ABOVE
R0660 STORE TIME TO INTEGRATE TO IN TDEC1
R0661 OUTPUT
R0662 RATT AS
R0663 VATT DEFINED

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R0664 TAT BEFORE

0665				13,3134	77620 0	INTEGRV	STQ		
0666	REF	7	LAST 1215	13,3135	02102 0			IRETURN	
0667				13,3136	43014 0	INTEGRV1	SET	SET	
0668	REF	2	LAST 1215	13,3137	04060 0			RPOFLAG	
0669	REF	2	LAST 1215	13,3140	04062 1			RENIFLG	
0670				13,3141	77731 1	INTEGRV2	SSP		
0671	REF	14	LAST 1157	13,3142	00053 1			QPRET	
0672	REF	2	LAST 1215	13,3143	27150 0			ALOADED	
0673				13,3144	52014 0		BON	GOTO	
0674	REF	23	LAST 1215	13,3145	01714 1			VINTFLAG	
0675	REF	1		13,3146	26705 1			PTOACSM	
0676	REF	2	LAST 297	13,3147	26760 1			PTOALEM	
0677				13,3150	77745 1	ALOADED	DLOAD		
0678	REF	57	LAST 1212	13,3151	00041 1			TDEC1	
0679	REF	2	LAST 104	13,3152	01116 0		STORE	TDEC	
0680				13,3153	52014 0		BOFF	GOTO	
0681	REF	18	LAST 1214	13,3154	01753 1			INTYPFLG	
0682	REF	1		13,3155	27257 1			TESTLOOP	
0683	REF	1		13,3156	27243 1			RVCN	
0684				13,3157	77414 0	A-PCHK	BOF	EXIT	
0685	REF	6	LAST 1210	13,3160	01752 0			STATEFLG	
0686	REF	1		13,3161	27200 0			RECTOUT	
0687	REF	108	LAST 1210	13,3162	0 5353 1		TC	PHASCHNG	
0688				13,3163	04022 0		OCI	04022	
0689	REF	67	LAST 1154	13,3164	0 5504 0		TC	UPFLAG	PHASE CHANGE HAS OCCURRED BETWEEN
0690	REF	3	LAST 1154	13,3165	00236 0		ADRES	REINTFLG	INTSTALL AND INTWAKE
0692	REF	230	LAST 1209	13,3166	0 6037 0		TC	INTPRET	
0693				13,3167	77731 1		SSP		
0694	REF	15	LAST 1216	13,3170	00053 1			QPRET	
0695	REF	1		13,3171	27176 1			PHEXIT	
0696				13,3172	52014 0		BON	GOTO	
0697	REF	24	LAST 1216	13,3173	01714 1			VINTFLAG	
0698	REF	3	LAST 495	13,3174	26661 1			ATOPCSM	
0699	REF	2	LAST 37	13,3175	26734 0			ATOPLEM	
0700				13,3176	77624 1	PHEXIT	CALL		
0701	REF	22	LAST 1157	13,3177	11244 0			GRP2PC	
0702				13,3200	45001 1	RECTOUT	SETPD	CALL	
0703				13,3201	00001 0			0	
0704	REF	3	LAST 1215	13,3202	23441 1			RECTIFY	
0705				13,3203	53775 1		VLOAD	VSLT	
0706	REF	10	LAST 1212	13,3204	01503 0			RPECT	
0707				13,3205	57576 1			0,2	
0708				13,3206	53715 1		PDVL	VSLT	RATT TO PDG
0709	REF	7	LAST 1179	13,3207	01511 0			VRECT	
0710				13,3210	57576 1			0,2	
0711				13,3211	63325 0		PDDL	PDVL	VATT TO PD6 TAT TO PD12
0712	REF	15	LAST 1213	13,3212	01517 0			TET	

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0713	REF 11	LAST 1216	13,3213	01503 0		RRECT	
0714			13,3214	64715 0	PDVL	PDDL*	
0715	REF 8	LAST 1216	13,3215	01511 0		VRECT	
0716	REF 2	LAST 687	13,3216	51770 0		MUEARTH,2	
0717			13,3217	76006 0	PUSH	AXT,1	
0718			13,3220	77765 0	DEC	-10	
0719			13,3221	76014 0	BON	AXT,1	
0720	REF 20	LAST 1215	13,3222	00303 1		MOONFLAG	
0721			13,3223	27225 1		+2	
0722			13,3224	77775 1	DEC	-2	
0723			13,3225	40001 1	INTEXT SETPD	BOV	
0724			13,3226	00001 0		0	
0725			13,3227	27230 0		+1	
07251			13,3230	43014 0	CLEAR	CLEAR	
07252	REF 2	LAST 320	13,3231	04676 1		AVEMIDSW	ALLOW UPDATE OF DOWNLINK STATE VECTOR
07253	REF 5	LAST 1215	13,3232	01667 1		PRECIFLG	
07254			13,3233	77614 1	CLEAR		
07255	REF 7	LAST 1216	13,3234	01672 0		STATEFLG	
0726			13,3235	77535 1	SLOAD	EXIT	
0727	REF 8	LAST 1216	13,3236	02103 1		IRETURN	
0728	REF 731	LAST 1195	13,3237	3 0154 1	CA	MPAC	
0729	REF 58	LAST 1183	13,3240	50 120 1	INDEX	FIXLOC	
0730	REF 16	LAST 1216	13,3241	54 052 1	TS	QPRET	
0731	REF 4	LAST 1157	13,3242	0 3425 1	TC	INTWAKE	
R0732	RVCON SETS UP ORBIT INTEGRATION TO DO A CONIC SOLUTION FOR POSITION AND						
R0733	VELOCITY FOR THE INTERVAL (TET-TDEC)						
0734			13,3243	45345 1	RVCON DLOAD	DSU	
0735	REF 3	LAST 1216	13,3244	01116 0		TDEC	
0736	REF 16	LAST 1216	13,3245	01517 0		TET	
0737	REF 10	LAST 1177	13,3246	36074 1	STCALL	TAU.	
0738	REF 4	LAST 1216	13,3247	23441 1		RECTIFY	
0739			13,3250	77624 1	CALL		
0740	REF 1		13,3251	22376 0		KEPPREP	
0741			13,3252	43345 1	DLOAD	DAD	
0742	REF 6	LAST 1179	13,3253	01551 1		TC	
0743	REF 17	LAST 1217	13,3254	01517 0		TET	
0744	REF 18	LAST 1217	13,3255	35517 1	STCALL	TET	
0745	REF 2	LAST 1216	13,3256	27200 0		RECTOUT	

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P07455 - TESTLOOP

0746				13,3257	43014 0	TESTLOOP BOF	CLRG0	
07462	REF	4	LAST 1210	13,3260	04752 0		QUITFLAG	
07463				13,3261	27264 1		+3	
07464	REF	8	LAST 1217	13,3262	01632 1		STATEFLG	
07465	REF	1		13,3263	27225 1		INTEXIT	STOP INTEGRATION
07466				13,3264	73001 1	+3	SETPD	LXA,2
0747				13,3265	00013 0		100	
0748	REF	9	LAST 1215	13,3266	02030 0		PBCDY	
0749				13,3267	51575 1		VLOAD	ABVAL
0750	REF	18	LAST 1213	13,3270	01535 0		RCV	
0751				13,3271	43006 0		PUSH	CLEAR RC TO 100
0752	REF	1		13,3272	00262 1		MIDFLAG	
0753				13,3273	50023 0		DSU*	BNN MIDFLAG=0 IF R G.T. RMP
0754	REF	1		13,3274	53755 0		AME.2	
0755				13,3275	27300 1		+3	
0756				13,3276	77614 1		SET	
0757	REF	2	LAST 1218	13,3277	00062 0		MIDFLAG	
0758				13,3300	41345 0	NORFINAL	DLOAD	DMP
0759				13,3301	00013 0			100
0760				13,3302	00043 0			140
0761				13,3303	55762 1		SR1R	DDV*
0762	REF	3	LAST 1217	13,3304	51770 0			MUEARTH.2
0763				13,3305	41366 1		SQRT	DMP
0764	REF	1		13,3306	25752 0			.30
0765				13,3307	40442 1		SR3	S.4
0766				13,3310	54345 1		DLOAD	SL
0767	REF	732	LAST 1217	13,3311	00155 0		MPAC	
0768				13,3312	20220 0			150
0769				13,3313	40006 0		PUSH	RCV
0770	REF	1		13,3314	27341 1			MAXDT
0771				13,3315	50021 1		BDSU	BNN
0772	REF	1		13,3316	27413 1			DT/2MAX
0773	REF	2	LAST 1218	13,3317	27341 1			MAXDT
0774				13,3320	45345 1	DT/2COMP	DLOAD	DSU
0775	REF	4	LAST 1217	13,3321	01116 0			TDEC
0776	REF	19	LAST 1217	13,3322	01517 0			TET
0777				13,3323	54254 0		RTB	SL
0778	REF	6	LAST 946	13,3324	21612 1			SGHAGREL
0779				13,3325	20211 1			80
0780	REF	2	LAST 114	13,3326	02076 1		STORE	DT/2 B-19
0781				13,3327	51400 1		BDV	ABS
0782	REF	1		13,3330	27345 0			GFTMAXDT
0783				13,3331	50025 0		DSU	BNN
0784				13,3332	00015 0			120
0785	REF	1		13,3333	27351 0			POOHCHK
0786				13,3334	75345 1	USEMAXDT	DLOAD	SIGN
0787				13,3335	00015 0			120
0788	REF	3	LAST 1218	13,3336	02076 1			DT/2

IS TIME TO INTEG. TO GR THAN MAXTIME

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0789	REF	4	LAST 1218	13,3337	36076 0	STCALL	DT/2	
0790	REF	2	LAST 1218	13,3340	27351 0		POOHCHK	
0791				13,3341	65345 0	MAXDT	DLOAD	PDDL
0792	REF	2	LAST 1218	13,3342	27413 1			DT/2MAX
0793				13,3343	77650 1		GOTO	
0794	REF	1		13,3344	27320 0			DT/2COMP
0795				13,3345	77634 0	GETMAXDT	RTB	
0796	REF	13	LAST 362	13,3346	21712 0			SIGNMPAC
0797	REF	5	LAST 1219	13,3347	36076 0		STCALL	DT/2
0798	REF	1		13,3350	27334 0			USEMAXDT
0799				13,3351	51545 1	POOHCHK	DLOAD	ABS
0800	REF	6	LAST 1219	13,3352	02076 1			DT/2
0801				13,3353	50025 0		DSU	BMN
0802	REF	1		13,3354	27411 0			DT/2MIN
0803	REF	2	LAST 1213	13,3355	27157 1			A-PCHK
0804				13,3356	46135 1		SLOAD	BHIZ
0805	REF	19	LAST 888	13,3357	01012 0			MODREG
0806				13,3360	27363 1			+3
0807				13,3361	77650 1		GOTO	
0808	REF	1		13,3362	23252 0			TIMESTEP
08081				13,3363	77614 1	BON		WAS THIS CALL VIA CSM(LEM)PREC
08082	REF	6	LAST 1217	13,3364	01707 0			PRECIFLG
08083	REF	2	LAST 1219	13,3365	23252 0			TIMESTEP
0809				13,3366	45345 1		DLOAD	DSU
0810	REF	7	LAST 1219	13,3367	02076 1			DT/2
0811				13,3370	00015 0			120
0812				13,3371	43040 1	BMN		BOFCLR
0813	REF	3	LAST 1219	13,3372	27157 1			A-PCHK
0814	REF	3	LAST 1216	13,3373	04242 1			NEWIFLG
0815	REF	3	LAST 1219	13,3374	23252 0			TIMESTEP
0816				13,3375	45345 1		DLOAD	DSU
0817	REF	5	LAST 1218	13,3376	01116 0			TDEC
0818	REF	20	LAST 1218	13,3377	01517 0			TET
08181				13,3400	77640 0	BMN		NO BACKWARD INTEGRATION
08182	REF	2	LAST 1218	13,3401	27225 1			INTEXIT
0819				13,3402	40525 1		PDDL	SR4
0820	REF	8	LAST 1219	13,3403	02076 1			DT/2
0821				13,3404	44322 1		SR2R	BDSU
0822				13,3405	52040 1		BMN	GOTO
0823	REF	3	LAST 1219	13,3406	27225 1			INTEXIT
0824	REF	4	LAST 1219	13,3407	23252 0			TIMESTEP
0825				13,3410	00000 1	DT/2MIN	2DEC	5 B-20
0826				13,3411	01400 1			
0826				13,3412	14152 1	DT/2MAX	2DEC	4000 E2 B-20
0826				13,3413	00000 1			
0828				13,3414	77776 1	INTSTALL	EXIT	
0831	REF	1		13,3415	3 0106 0		CA	PASFLAG
0833	REF	1		13,3416	7 3466 1		MASK	INTBITAB
0834				13,3417	0 0006 1		EXTEND	
0835	REF	1		13,3420	1 3460 1		BZF	OKTOGRAB

EXCHANGE DT/2MAX WITH COMPUTED MAX.

WAS THIS CALL VIA CSM(LEM)PREC

YES

NO BACKWARD INTEGRATION

IS 4(DT) LS(TDEC - TET)

NO

IS THIS STALL AREA FREE

YES

L INTEGRATION INITIALIZATION

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0837	REF	1		13,3421	3 3465 0	CAF	WAKESTAL	
0838	REF	4	LAST 464	13,3422	0 5133 0	TC	JOBSLEEP	
0839				13,3423	77776 1	INTWAKE0	EXIT	
08395	REF	2	LAST 711	13,3424	1 3445 0	TCF	INTWAKE1	
0840	REF	2	LAST 1219	13,3425	4 0106 1	INTWAKE	CS	RASFLAG
0841	REF	1		13,3426	7 4745 1	MASK	REINTBIT	IS THIS INSTALLED ROUTINE TO BE
0842	REF	376	LAST 1131	13,3427	10 000 0	CCS	A	RESTARTED
0843	REF	3	LAST 1220	13,3430	0 3445 1	TC	INTWAKE1	NO
0844	REF	59	LAST 1217	13,3431	50 120 1	INDEX	FIXLOC	
0845	REF	17	LAST 1217	13,3432	3 0052 0	CA	QPRET	
0848	REF	5	LAST 898	13,3433	55 055 1	TS	TBASE2	YES, DONT RESTART WITH SOMEONE ELSE'S Q
0849	REF	109	LAST 1216	13,3434	0 5353 1	TC	PHASCHNG	
0850				13,3435	04022 0	DCT	04022	
0851	REF	6	LAST 1220	13,3436	3 1055 0	CA	TBASE2	
0852	REF	60	LAST 1220	13,3437	50 120 1	INDEX	FIXLOC	
0853	REF	18	LAST 1220	13,3440	54 052 1	TS	QPRET	
0854	REF	2	LAST 1220	13,3441	3 4745 0	CAF	REINTBIT	
0855	REF	3	LAST 1220	13,3442	7 0106 1	MASK	RASFLAG	
0856				13,3443	0 0006 1	EXTEND		
0857	REF	1		13,3444	1 3463 1	BZF	GOBAC	DONT INTWAKE IF WE CAME HERE VIA RESTART
0851	REF	2	LAST 1220	13,3445	3 3465 0	INTWAKE1	CAF	WAKESTAL
0862				13,3446	0 0004 0	INHINT		
0863	REF	5	LAST 465	13,3447	0 5137 1	TC	JOBWAKE	
0864	REF	22	LAST 1111	13,3450	10 064 1	CCS	LOCCTR	
0865	REF	4	LAST 1220	13,3451	1 3445 0	TCF	INTWAKE1	
0866				13,3452	00051 0	FORTYONE	DEC	41
0868	REF	2	LAST 1219	13,3453	4 3466 1	CS	INTBITAB	
0869	REF	4	LAST 1220	13,3454	7 0106 1	MASK	RASFLAG	
0870	REF	5	LAST 1220	13,3455	54 106 1	TS	RASFLAG	RELEASE STALL AREA
0871				13,3456	0 0003 1	RELINT		
0872	REF	2	LAST 1220	13,3457	1 3463 1	TCF	GOBAC	
0874	REF	2	LAST 215	13,3460	3 4736 1	OKTOGRAB	CAF	INTFLBIT
08745				13,3461	0 0004 0	INHINT		
0875	REF	6	LAST 1220	13,3462	26 106 1	ADS	RASFLAG	
0876	REF	231	LAST 1216	13,3463	0 6037 0	GOBAC	TC	INTPRET
0877				13,3464	77616 0	RVQ		
0888	REF	33	LAST 1214	13,3465	27415 1	WAKESTAL	CADR	INTSTALL +1
0892				13,3466	20100 1	INTBITAB	DCT	20100

L INTEGRATION INITIALIZATION

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P0895 AVETOMID

R0896 THIS ROUTINE PERFORMS THE TRANSITION FROM A THRUSTING PHASE TO THE COAST

R0897 PHASE BY INITIALIZING THIS VEHICLE'S PERMANENT STATE VECTOR WITH THE

R0898 VALUES LEFT BY THE AVERAGE ROUTINE IN RN, VN, PIPTIME.

R0899 BEFORE THIS IS DONE THE W-MATRIX, IF ITS VALID (ORWFLAG OR RENDWFLAG IS

R0900 SET) IS INTEGRATED FORWARD TO PIPTIME WITH THE PRE-THRUST STATE VECTOR.

R0901 IN ADDITION, THE OTHER VEHICLE IS INTEGRATED (PERMANENT) TO PIPTIME.

R0902 FINALLY TRKMKCNT IS ZEROED

0903	REF	4	LAST 1209	13,2000		SETLOC	INTINIT	
0904				13,3467		BANK		
0905	REF	4	LAST 1209 TO 1221:	435	471*	COUNT*	\$/INTIN	
0906				13,3467	43020-1	AVETOMID	STQ	BON
0907	REF	6	LAST 1157	13,3470	02772-1			EGRESS
0908	REF	11	LAST 843	13,3471	02716-0			RENDWFLAG
0909	REF	1		13,3472	27536-1			INT/W
0910				13,3473	77614-1	BON		W-MATRIX VALID ,GO INTEGRATE IT
0911	REF	1		13,3474	01711-1		ORBFLAG	
0912	REF	2	LAST 1221	13,3475	27536-1		INT/W	W-MATRIX VALID ,GO INTEGRATE IT
0913				13,3476	45145-0	OTHERS	DLOAD	CALL
0914	REF	24	LAST 973	13,3477	01235-1			PIPTIME
0915	REF	34	LAST 1220	13,3500	27414-0			INTSTALL
0916				13,3501	45014-0		SET	CALL
0917	REF	25	LAST 1216	13,3502	01474-1			VINTFLAG
0918	REF	8	LAST 1210	13,3503	26644-0			SETIFLGS
0923	REF	58	LAST 1216	13,3504	34041-0		STCALL	TDEC1
0924	REF	11	LAST 1213	13,3505	27134-1			INTEGRV
0925				13,3506	45174-1	AXT,2	CALL	NOW MOVE PROPERLY SCALE RN,UN AS WELL AS
0926				13,3507	00002-0		2	PIPTIME TO INTEGRATION ERASABLES.
0927	REF	35	LAST 1221	13,3510	27414-0			INTSTALL
0928				13,3511	77014-1	BON	AXT,2	
0929	REF	6	LAST 1156	13,3512	04304-1			MOONTHIS
0930				13,3513	27515-0			+2
0931				13,3514	00000-1			0
0932				13,3515	53775-1	VLOAD	VSR*	
0933	REF	16	LAST 973	13,3516	01221-1			RN
0934				13,3517	57176-0			0.2
0935	REF	12	LAST 1217	13,3520	01503-0	STORE	RRECT	
0936	REF	19	LAST 1218	13,3521	15535-0	STODL	RCV	
0937	REF	25	LAST 1221	13,3522	01235-1			PIPTIME
0938	REF	21	LAST 1219	13,3523	25517-0	STOVL	TET	
0939	REF	10	LAST 881	13,3524	01227-1			VN

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0940				13,3525	45057 1	VSR*	CALL	
0941				13,3526	57176 0		C,2	
0942	REF	3	LAST	710	13,3527		MINIRECT	FINISH SETTING UP STATE VECTOR
0943				13,3530	66234 1	RTB	SSP	
0944	REF	1		13,3531	26747 1		MOVATHIS	PUT TEMP STATE VECTOR INTO PERMANENT
0945	REF	11	LAST	838	13,3532		TRKMKCNT	
0946				13,3533	00000 1		0	
0947				13,3534	77650 1	GOTO		
0948	REF	2	LAST	1157	13,3535		FAZAB5	
0949				13,3536	45145 0	INT/W	DLOAD	CALL
0950	REF	26	LAST	1221	13,3537		PIPTIME	INTEGRATE W THRU BURN
0951	REF	36	LAST	1221	13,3540		INTSTALL	
0952				13,3541	43014 0		SET	SET
0953	REF	18	LAST	1215	13,3542		DIMOFIAG	DO W-MATRIX
0954	REF	3	LAST	1217	13,3543		AVENIDSW	SO WONT CLO2BER PN.VN.PIPTIME
0955				13,3544	43014 0		SET	CLEAR
0956	REF	9	LAST	1210	13,3545		D6OR9FLG	9X9 FOR LM
0957	REF	26	LAST	1221	13,3546		VINTFLAG	LM
0964	REF	59	LAST	1221	13,3547		STCALL	TDEC1
0965	REF	12	LAST	1221	13,3550			INTEGRV
0966				13,3551	77650 1	GOTO		
0967	REF	1		13,3552	27476 1		OTHERS	NOW GO DO THE OTHER VEHICLE

L INTEGRATION-INITIALIZATION

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P0968 MIDTOAV1

R0969 THIS ROUTINE INTEGRATES (PRECISION) TO THE TIME SPECIFIED IN TDEC1.
 R0970 IF, AT THE END OF AN INTEGRATION TIME STEP, CURRENT TIME PLUS A DELTA
 R0971 TIME (SEE TIMEDELT.....BASED ON THE COMPUTATION TIME FOR ONE TIME STEP)
 R0972 IS GREATER THAN THE DESIRED TIME, ALARM-1703 IS SET AND THE INTEGRATION
 R0973 IS DONE TO THE CURRENT TIME.
 R0974 RETURN IS IN BASIC TO THE RETURN ADDRESS PLUS ONE.

R0975 IF THE INTEGRATION IS FINISHED TO THE DESIRED TIME, RETURN IS IN BASIC
 R0976 TO THE RETURN ADDRESS

R0977 IN EITHER CASE, BEFORE RETURNING, THE EXTRAPOLATED STATE VECTOR IS TRAN-
 R0978 FFERRED FROM R,VATT TO R,VN1-PIPTIME1 IS SET TO THE FINISHING INTEGRA-
 R0979 TION TIME AND MPAC IS SET TO THE DELTA TIME---
 R0980 TAT MINUS CURRENT TIME.

R0981 MIDTOAV2

R0982 THIS ROUTINE INTEGRATES THIS VEHICLES STATE VECTOR TO THE CURRENT TIME.
 R0983 NO INPUTS ARE REQUIRED OF THE CALLER. RETURN IS IN BASIC TO THE RETURN
 R0984 ADDRESS WITH THE ABOVE TRANSFERS TO R,VN1-PIPTIME1 AND MPAC DONE

0985	REF	2	LAST	152	E7,1744		EBANK=	IRETURN1	
0986					13,3553	43020 1	MIDTOAV2	STQ	CLXGO
0987	REF	3	LAST	1223	13,3554	03744 0		IRETURN1	INTEGRATE TO PRESENT TIME PLUS TIMEDELT
0988	REF	1			13,3555	04634 1		MIDIFLAG	
0989	REF	1			13,3556	27572 1		ENTMID2	
0990					13,3557	43020 1	MIDTOAV1	STQ	SET
0991	REF	4	LAST	1223	13,3560	03744 0		IRETURN1	INTEGRATE TO TDEC1
0992	REF	2	LAST	1223	13,3561	04474 1		MIDIFLAG	
0993					13,3562	43234 0		RTB	DAD
0994	REF	32	LAST	1209	13,3563	21573 0			LOADTIME
0995	REF	1			13,3564	27674 1			TIMEDELT
0996					13,3565	51021 0		BDSU	BPL
0997	REF	60	LAST	1222	13,3566	00041 1			TDEC1
0998	REF	1			13,3567	27576 0		ENTMID1	YSS
0999					13,3570	77624 1		CALL	
1000	REF	1			13,3571	27662 0			NOTIME
									NO, SET ALARM, SWITCH TO MIDTOAV2
1001					13,3572	43234 0	ENTMID2	RTB	DAD
1002	REF	33	LAST	1223	13,3573	21573 0			LOADTIME
1003	REF	2	LAST	1223	13,3574	27674 1			TIMEDELT
1004	REF	61	LAST	1223	13,3575	00041 1		STORE	TDEC1
1005					13,3576	77624 1	ENTMID1	CALL	
1006	REF	37	LAST	1222	13,3577	27414 0			INTSTALL
1007					13,3600	45014 0		CLEAR	CALL

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1008	REF	19	LAST	1222	13,3601	01676 1		DIMCFLAG	NO W-MATRIX
1009	REF	1			13,3602	26066 0		THISVINT	
1010					13,3603	43014 0	CLEAR	SET	
1011	REF	19	LAST	1216	13,3604	01673 1		INTYPELG	
1012	REF	1			13,3605	04475 0		MIDAVFLG	LET INTEG. KNOW THE CALL IS FOR MIDTOAV.
1013					13,3606	77624 1	CALL		
1014	REF	13	LAST	1222	13,3607	27134 1		INTEGRV	GO INTEGRATE
1015					13,3610	77214 0	CLEAR	VLOAD	
1016	REF	2	LAST	1224	13,3611	04675 1		MIDAVFLG	
1017	REF	36	LAST	976	13,3612	00001 0		RATT	
1018	REF	7	LAST	881	13,3613	27545 0	STOVL	RNI	
1019	REF	25	LAST	954	13,3614	00007 0		VATT	
1020	REF	7	LAST	881	13,3615	17553 1	STODL	VNI	
1021	REF	16	LAST	786	13,3616	00015 0		TAT	
1022	REF	11	LAST	893	13,3617	03561 0	STORE	PIPTIME1	
10221					13,3620	66134 1	SXA,2	SXA,1	
10222	REF	18	LAST	880	13,3621	02777 1		RTX2	
10223	REF	14	LAST	766	13,3622	02776 0		RTX1	
1023					13,3623	77776 1	EXIT		
1024					13,3624	0 0004 0	INHINT		
1025					13,3625	0 0006 1	EXTEND		
1026	REF	30	LAST	991	13,3626	4 0025 1	DCS	TIME2	
1027	REF	733	LAST	1218	13,3627	20 155 1	DAS	MPAC	
1028	REF	14	LAST	1057	13,3630	0 7257 0	TC	TPAGREE	
1029	REF	5	LAST	1223	13,3631	3 1744 1	CA	IRETURN1	
1030	REF	16	LAST	896	13,3632	0 4640 1	TC	BANKJUMP	
1031					13,3633	47014 1	CKMID2	BOF	RTB
1032	REF	3	LAST	1223	13,3634	04754 0		MID1FLAG	
1033	REF	1			13,3635	27652 0		MID2	
1034	REF	34	LAST	1223	13,3636	21573 0		LOADTIME	
1035					13,3637	44215 1	DAD	DSU	
1036	REF	5	LAST	1223	13,3640	27674 1		TIMEDELT	
1037	REF	6	LAST	1219	13,3641	01116 0		TDEC	
1038					13,3642	45044 0	BPL	CALL	
1039	REF	2	LAST	1216	13,3643	27257 1		TESTLOOP	YES
1040	REF	2	LAST	1223	13,3644	27662 0		NOTIME	
1041					13,3645	43234 0	TIMEINC	RTB	DAD
1042	REF	35	LAST	1224	13,3646	21573 0		LOADTIME	
1043	REF	4	LAST	1224	13,3647	27674 1		TIMEDELT	
1044	REF	7	LAST	1224	13,3650	35116 1	STCALL	TDEC	
1045	REF	3	LAST	1224	13,3651	27257 1		TESTLOOP	
1046					13,3652	45345 1	MID2	DLOAD	DSU
1047	REF	8	LAST	1224	13,3653	01116 0		TDEC	
1048	REF	22	LAST	1221	13,3654	01517 0		TET	
1049					13,3655	45246 0	ABS	DSU	
1050	REF	1			13,3656	27672 1		3CSECS	

L INTEGRATION INITIALIZATION

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1051				13,3657	52040 1	BMN	GOTO	
1052	REF	4	LAST 1219	13,3660	27157 1		A-PCHK	
1053	REF	1		13,3661	27645 0		TIMEINC	
1054				13,3662	77414 0	NOTIME	CLEAR	EXIT TOO LATE
1055	REF	4	LAST 1224	13,3663	04674 0		MIDIFLAG	
1056	REF	6	LAST 1224	13,3664	251744 1	INCR	IRETURN1	SET ERROR EXIT (CALLOC +2)
1057	REF	41	LAST 983	13,3665	0 5567 0	TC	ALARM	INSUFFICIENT TIME FOR INTEGRATION --
1058				13,3666	01703 1	OCT	1703	TIG WILL BE SLIPPED...
1059	REF	232	LAST 1220	13,3667	0 6037 0	TC	INTPRET	
1060				13,3670	77616 0	RVQ		
1061				13,3671	00000 1	3CSECS	ZDEC	3
1061				13,3672	00003 1			
1062				13,3673	00000 1	TIMEDELT	ZDEC	2000
1062				13,3674	03720 1			
1063				27,3360		BANK	27	
1064	REF	1		04,2000		SETLOC	UPDATE2	
1065				04,3165		BANK		
1066	REF	1		1167		EBANK=	INTWAKUQ	
1067	REF	1				COUNT*	\$\$/INTIN	
1068	REF	1		1167		INTWAKUQ =	INTWAK10	TEMPORARY UNTIL NAME OF INTWAK10 IS CHNG
1069				04,3165	0 0003 1	INTWAKEU	RELINT	
1070				04,3166	0 0006 1		EXTEND	
1071	REF	2	LAST 1225	04,3167	231167 0	QXCH	INTWAKUQ	SAVE Q FOR RETURN
1072	REF	233	LAST 1225	04,3170	0 6037 0	TC	INTPRET	
1073				04,3171	53135 0	SLOAD	BZE	IS THIS A CSM/LEM STATE VECTOR UPDATE
1074	REF	3	LAST 212	04,3172	01502 1		UPSVFLAG	REQUEST. IF NOT GO TO INTWAKUP.
1075	REF	1		04,3173	11232 1		INTWAKUP	
1076				04,3174	77775 1	VLOAD		MOVE RRECT(6) AND VRECT(6) INTO
1077	REF	15	LAST 1221	04,3175	01503 0		RRECT	RCV(6) AND VCV(6) RESPECTIVELY.
1078	REF	20	LAST 1221	04,3176	25535 0	STOVL	RCV	
1079	REF	9	LAST 1217	04,3177	01511 0		VRECT	NOW GO TO 'RECTIFY +13D' TO
1080				04,3200	77624 1	CALL		STORE VRECT INTO VCV AND ZERO OUT
1081	REF	5	LAST 1217	04,3201	23456 1		RECTIFY +13D	TDELTA(6), TNUV(6), TC(2) AND XKEP(2)
1082				04,3202	51535 0	SLOAD	ABS	COMPARE ABSOLUTE VALUE OF 'UPSVFLAG'
1083	REF	4	LAST 1225	04,3203	01502 1		UPSVFLAG	TO 'UPDATE MOON STATE VECTOR CODE'
1084				04,3204	53025 0	DSU	BZE	TO DETERMINE WHETHER THE STATE VECTOR TO
1085	REF	1		04,3205	11243 1		UPMNSVCD	BE UPDATED IS IN THE EARTH OR LUNAR
1086	REF	1		04,3206	11213 1		INTWAKEM	SPHERE OF INFLUENCE.....
1087				04,3207	43174 1	AXT,2	CLRGU	EARTH SPHERE OF INFLUENCE.
1088				04,3210	00000 1	DEC	0	
1089	REF	21	LAST 1217	04,3211	00223 1		MOONFLAG	

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1090	REF	1	04,3212	11216 1	INTWAKEC	
1091			04,3213	43174 1	INTWAKEM AXT,2	SET LUNAR SPHERE OF INFLUENCE.
1092			04,3214	00002 0	DEC	2
1093	REF	22	LAST 1225	04,3215	00063 1	MOONFLAG
1094			04,3216	50135 0	INTWAKEC SLOAD	BAN COMMON CODING AFTER X2 INITIALIZED AND
A1095						MOONFLAG SET (OR CLEARED).
1096	REF	5	LAST 1225	04,3217	01502 1	UPSVFLAG
1097	REF	1		04,3220	11226 1	INTWAKLM
1098				04,3221	77624 1	CALL
1099	REF	4	LAST 1216	04,3222	26661 1	ATOPCSM
						UPDATE CSM STATE VECTOR
1100			04,3223	52014 0	CLEAR	GOTO
1101	REF	2	LAST 1221	04,3224	01671 0	ORBWFLAG
1102	REF	1		04,3225	11230 0	INTWAKEX
1103			04,3226	77624 1	INTWAKLM CALL	UPDATE LM STATE VECTOR
1104	REF	3	LAST 1216	04,3227	26734 0	ATOPLEM
1105			04,3230	77614 1	INTWAKEX CLEAR	
1106	REF	12	LAST 1221	04,3231	02676 1	RENDWFLG
1107			04,3232	45131 0	INTWAKUP SSP	CALL REMOVE :UPDATE STATE VECTOR INDICATOR:
1108	REF	6	LAST 1226	04,3233	01502 1	UPSVFLAG
1109			04,3234	00000 1		
1110	REF	2	LAST 495	04,3235	27425 1	INTWAKEC
1111			04,3236	77776 1	EXIT	RELEASE :GRAB: OF ORBIT INTEG
1112	REF	110	LAST 1220	04,3237	0 5353 1	TC PHASCHNG
1113			04,3240	04026 1	OCT	04026
1114	REF	3	LAST 1225	04,3241	0 1167 0	TC INTWAKUQ
1115			04,3242	00002 0	UPMNSVCD OCT	2
1116			04,3243	00000 1	OCT	0
1117			04,3244	77420 1	GRP2PC STQ	EXIT
1118	REF	2	LAST 126	04,3245	02711 1	GRP2SVQ
1119	REF	111	LAST 1226	04,3246	0 5353 1	TC PHASCHNG
1120			04,3247	04022 0	OCT	04022
1121	REF	234	LAST 1225	04,3250	0 6037 0	TC INTPRET
1122			04,3251	77650 1	GOTO	
1123	REF	3	LAST 1226	04,3252	02711 1	GRP2SVQ

L ORBITAL INTEGRATION

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R0001	DELETE								
0002			13,3675		BANK	13			
0003	REF	1	11,2000		SETLOC	ORBITAL			
0004			11,2376		BANK				
0005	REF	1			COUNT*	\$/ORBIT			
R0006	DELETE								
0007			11,2376	40354 1	KEPPREP	LXA,2	SETPD		
0008	REF	10	11,2377	02030 0			PBODY		
0009			11,2400	00001 0			0		
0010			11,2401	75543 1	DLOAD*	SQRT	SQRT(MU) (+18 OR +15)	0D	PL 2D
0011	REF	4	11,2402	51770 0			MUEARTH,2		
0012			11,2403	53515 0	PDVL	UNIT			PL 3D
0013	REF	21	11,2404	01535 0			RCV		
0014			11,2405	60325 0	PDDL	NORM	NORM R (+29 OR +27 - N1)	2D	PL 4D
0015			11,2406	00045 0			36D		
0016	REF	65	11,2407	00047 1			X1		
0017			11,2410	77715 1	PDVL				
0018			11,2411	65241 0	DUT	PDDL	F*SQRT(MU) (+7 OR +5)	4D	PL 6D
0019	REF	15	11,2412	01543 1			VCV		
0020	REF	11	11,2413	02074 0			TAU.	(+28)	
0021			11,2414	60225 1	DSU	NORM			
0022	REF	7	11,2415	01551 1			TC		
0023	REF	19	11,2416	00051 0			S1		
0024			11,2417	77742 0	SR1				
0025			11,2420	65271 0	DDV	PDDL			
0026			11,2421	00003 1			2D		
0027			11,2422	41405 0	DMP	PUSH	FS(+6 +N1-N2)	6D	PL 8D
0028			11,2423	00005 1			4D		
0029			11,2424	65316 0	DSQ	PDDL	(FS)SQ(+12 +2(N1-N2))	8D	PL 10D
0030			11,2425	00005 1			4D		
0031			11,2426	64716 0	DSQ	PDDL*	SSQ/MU(-20R +2(N1-N2))	10D	PL 12D
0032	REF	5	11,2427	51770 0			MUEARTH,2		
0033			11,2430	40442 1	SR3	SR4			
0034			11,2431	47515 0	PDVL	VSQ	PREALIGN MU (+43 OR +37)	12D	PL 14D
0035	REF	16	11,2432	01543 1			VCV		
0036			11,2433	44205 0	DMP	BDSU			PL 12D
0037			11,2434	00045 0			36D		
0038			11,2435	41271 0	DDV	DMP			PL 10D
0039			11,2436	00003 1			2D		
0040			11,2437	53605 1	DMP	SL*			
0041	REF	1	11,2440	25774 1			DP2/3		
0042			11,2441	20176 0			0-3,1		
0043			11,2442	43260 1	XSU,1	DAD	10L(1/R-ALPHA) (+13 +2(N1-N2))		
0044	REF	20	11,2443	00050 1			2(FS)SQ - ETCETRA		PL 8D
0045			11,2444	45257 0	SL*	DSU	X1 = N2-N1		
0046			11,2445	20211 1			-FS+2(FS)SQ-ETC (+6 +N1-N2)		PL 6D
0047			11,2446	41205 0	DMP	DMP			
0048			11,2447	00001 0			0D		
0049			11,2450	00005 1			4D		
0050			11,2451	53657 0	SL*	SL*			

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0051			11,2452	20211 1
0052			11,2453	20201 0
0053			11,2454	65215 1
0054	REF	2	LAST 125	11,2455 01553 0
0055			11,2456	53605 1
0056			11,2457	00001 0
0057			11,2460	20202 0
0058			11,2461	43204 0
0059	REF	3	LAST 1156	11,2462 57753 1
0060			11,2463	77626 0
0061	REF	3	LAST 1175	11,2464 75647 0
0062			11,2465	74020 0
0063	REF	3	LAST 1179	11,2466 02112 1
0064			11,2467	00012 1
0065			11,2470	74014 1
0066	REF	23	LAST 1226	11,2471 00303 1
0067	REF	1		11,2472 24023 0
0068			11,2473	00002 0
0069			11,2474	77650 1
0070	REF	2	LAST 1228	11,2475 24023 0

	80.1	
	0.1	S(-FS(1-2FS)-1/6...)(+17 OR +16)
DAD	PDDL	PL 60
	XKEP	
DMP	SL*	S(+17 OR +16)
	OD	
	1,1	
BOVB	DAD	
	TCDANZIG	
STADR		
STORE	XKEPNEW	
STQ	AXC.1	
	KEPRTN	
DEC	10	
BON	AXC.1	
	MOONFLAG	
	KEPLERN	
DEC	2	
GOTO		
	KEPLERN	

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0071			11,2476	66350 1	FBR3	LXA.1	SSP
0072	REF 18	LAST 1212	11,2477	01500 0			DIFEQCNT
0073	REF 21	LAST 1227	11,2500	00051 0			S1
0074			11,2501	77762 1		DEC	-13
0075			11,2502	54345 1		DLOAD	SR
0076	REF 9	LAST 1219	11,2503	02076 1			DT/2
0077			11,2504	20612 0			90
0078			11,2505	61500 0		TIX.1	ROUND
0079			11,2506	22507 0			+1
0080			11,2507	43206 1		PUSH	DAD
0081	REF 8	LAST 1227	11,2510	01551 1			TC
0082	REF 12	LAST 1227	11,2511	16074 0		STOOL	TAU.
0083			11,2512	77615 0		DAD	
0084	REF 23	LAST 1224	11,2513	01517 0			TET
0085	REF 24	LAST 1229	11,2514	35517 1		STCALL	TET
0086	REF 2	LAST 1217	11,2515	22376 0			KEPPREP

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P0087 AGC ROUTINE TO COMPUTE ACCELERATION COMPONENTS.

0088				11,2516	73150 1	ACCOMP	LXA,1	LXA,2
0089	REF	11	LAST 1227	11,2517	02030 0			PBODY
0090	REF	12	LAST 1230	11,2520	02030 0			PBODY
0091				11,2521	77775 1		VLOAD	
0092	REF	11	LAST 1215	11,2522	24007 0			ZEROVEC
0093	REF	2	LAST 114	11,2523	26062 1		STOVL	FV
0094	REF	20	LAST 1136	11,2524	02032 1			ALPHAV
0095				11,2525	53257 1		VSL*	VAD
0096				11,2526	57605 0			0 -7.2
0097	REF	22	LAST 1227	11,2527	01535 0			RCV
0098	REF	2	LAST 114	11,2530	02040 1		STORE	BETAV
0099				11,2531	65014 1		BOF	XCHX,2
0100	REF	20	LAST 1224	11,2532	01756 1			DIMCFLAG
0101				11,2533	22540 0			+5
0102	REF	19	LAST 1229	11,2534	01500 0			DIFECNT
0103	REF	3	LAST 115	11,2535	12132 1		STORE	VECTAB,2
0104				11,2536	77724 0		XCHX,2	
0105	REF	20	LAST 1230	11,2537	01500 0			DIFECNT
0106				11,2540	53575 0		VLOAD	UNIT
0107	REF	21	LAST 1230	11,2541	02032 1			ALPHAV
0108	REF	22	LAST 1230	11,2542	16032 1		STOVL	ALPHAV
0109				11,2543	00045 0			360
0110	REF	4	LAST 1134	11,2544	02070 1		STORE	ALPHAM
0111				11,2545	77624 1		CALL	
0112	REF	1		11,2546	22650 1			GAMCOMP
0113				11,2547	66175 1		VLOAD	SXA,1
0114	REF	3	LAST 1230	11,2550	02040 1			BETAV
0115	REF	33	LAST 1212	11,2551	00051 0			S2
0116	REF	23	LAST 1230	11,2552	16032 1		STOVL	ALPHAV
0117	REF	2	LAST 114	11,2553	02072 0			BETAM
0118	REF	5	LAST 1230	11,2554	02070 1		STORE	ALPHAM
0119				11,2555	71214 0		BOF	DLOAD
0120	REF	3	LAST 1218	11,2556	00342 1			MIDFLAG
0121	REF	1		11,2557	23022 0			GBLATE
0122	REF	25	LAST 1229	11,2560	01517 0			TET
0123				11,2561	77624 1		CALL	
0124	REF	3	LAST 985	11,2562	33664 0			LSPOS
0125				11,2563	72174 0		AXT,2	LXA,1
0126				11,2564	00002 0			2
0127	REF	34	LAST 1230	11,2565	00051 0			S2
0128				11,2566	77614 1		BOF	
0129	REF	24	LAST 1228	11,2567	00343 0			MOONFLAG
0130				11,2570	22573 0			+3
0131				11,2571	77076 0		VCOMP	AXT,2
0132				11,2572	00000 1			0
0133	REF	4	LAST 1230	11,2573	02040 1		STORE	BETAV
0134	REF	3	LAST 115	11,2574	26105 1		STOVL	RPQV

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0135				11,2575	00003-1		2D
0136	REF	2	LAST	114	11,2576	02122-1	STORE RPSV
0137					11,2577	45335-0	SLOAD DSU
0138	REF	20	LAST	1219	11,2600	01012-0	MODREG
0139	REF	1			11,2601	25776-0	OCT27
0140					11,2602	43030-0	BHIZ BOF
0141					11,2603	22606-1	+3
0142	REF	21	LAST	1230	11,2604	01756-1	DIMOFBAG
0143	REF	1			11,2605	22622-1	GETRPSV
0144					11,2606	74375-0	VLOAD VXSC
0145	REF	24	LAST	1230	11,2607	02032-1	ALPHAV
0146	REF	6	LAST	1230	11,2610	02070-1	ALPHAM
0147					11,2611	52257-0	VSR* VSU
0148					11,2612	57175-0	1,2
0149	REF	5	LAST	1230	11,2613	02040-1	BETAV
0150					11,2614	77724-0	XCHX,2
0151	REF	21	LAST	1230	11,2615	01500-0	DIFEQCNT
0152	REF	9	LAST	1230	11,2616	12140-1	STORE VECTAB +6,2
0154	REF	7	LAST	115	11,2617	02114-1	STORE RQVV
0155					11,2620	77724-0	XCHX,2
0156	REF	22	LAST	1231	11,2621	01500-0	DIFEQCNT
0157					11,2622	52175-0	GETRPSV VLOAD INCP,1
0158	REF	4	LAST	1230	11,2623	02105-1	RQVV
0159					11,2624	00004-0	4
0160					11,2625	43014-0	CLEAR BOF
0161	REF	3	LAST	1216	11,2626	04260-1	RPQFLAG
0162	REF	25	LAST	1230	11,2627	00343-0	MOONFLAG
0163					11,2630	22635-1	+5
0164					11,2631	53261-1	VSR VAD
0165					11,2632	20612-0	9D
0166	REF	3	LAST	1231	11,2633	02122-1	RPSV
0167	REF	4	LAST	1231	11,2634	02122-1	STORE RPSV
0168					11,2635	77624-1	CALL
0169	REF	2	LAST	1230	11,2636	22650-1	GAMCOMP
0170					11,2637	62174-1	AXT,2 INCR,1
0171					11,2640	00004-0	4
0172					11,2641	00004-0	4
0173					11,2642	77775-1	VLOAD
0174	REF	5	LAST	1231	11,2643	02122-1	RPSV
0175	REF	6	LAST	1231	11,2644	36040-0	STCALL BETAV
0176	REF	3	LAST	1231	11,2645	22650-1	GAMCOMP
0177					11,2646	77650-1	GOTO
0178	REF	2	LAST	1230	11,2647	23022-0	CEBATE
0179					11,2650	74575-0	GAMCOMP VLOAD VSRI
0180	REF	7	LAST	1231	11,2651	02040-1	BETAV
0181					11,2652	40236-1	VSQ SETPD
0182					11,2653	00001-0	0
0183					11,2654	61501-1	NORM ROUND
0184					11,2655	00040-0	31D
0185					11,2656	60525-0	PDDL NORM

NORMED B SQUARED TO PD LIST

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0186	REF 7	LAST 1231	11,2657	02070 1	ALPHAM	NORMALIZE (LESS ONE) LENGTH OF ALPHA
0187			11,2660	00041 1	320	SAVING NORM SCALE FACTOR IN X1
0188			11,2661	63342 1	SR1 PDVL	
0189	REF 8	LAST 1231	11,2662	02040 1	BETAV	C(PDL+2) = ALMOST NORMED ALPHA
0190			11,2663	77656 1	UNIT	
0191	REF 9	LAST 1232	11,2664	16040 1	STODL BETAV	
0192			11,2665	00045 0	360	
0193	REF 3	LAST 1230	11,2666	02072 0	STORE BETAM	
0194			11,2667	55301 0	NORM BDDV	FORM NORMALIZED QUOTIENT ALPHAM/BETAM
0195			11,2670	00042 1	330	
0196			11,2671	41562 0	SR1R PUSH	C(PDL+2) = ALMOST NORMALIZED RHO.
0197			11,2672	77743 1	DLOAD*	
0198	REF 1		11,2673	27710 1	ASCALE,1	
0199	REF 22	LAST 1229	11,2674	00051 0	STORE S1	
0200			11,2675	57124 1	XCHX,2 XAD,2	
0201	REF 23	LAST 1232	11,2676	00050 1	S1	
0202			11,2677	00040 0	320	
0203			11,2700	71264 1	XSU,2 DLOAD	
0204			11,2701	00041 1	330	
0205			11,2702	00003 1	20	
0206			11,2703	65057 0	SR* XCHX,2	
0207			11,2704	57177 1	0 -1,2	
0208	REF 24	LAST 1232	11,2705	00050 1	S1	
0209			11,2706	74406 0	PUSH SR1R	RHO/4 TO 40
0210			11,2707	50315 0	PDVL DOT	
0211	REF 25	LAST 1231	11,2710	02032 1	ALPHAV	
0212	REF 10	LAST 1232	11,2711	02040 1	BETAV	
0213			11,2712	44372 1	SL1R RDSU	(RHO/4) = 2(ALPHAV/2.BETAV/2)
0214			11,2713	57206 1	PUSH DMPR	TO PDL+6
0215			11,2714	00005 1	4	
02155			11,2715	77752 1	SL1	
0216			11,2716	43206 1	PUSH DAD	
0217	REF 1		11,2717	25756 1	DQUARTER	
0218			11,2720	75406 1	PUSH SQRT	
0219			11,2721	41475 1	DMPR PUSH	
0220			11,2722	00013 0	100	
0221			11,2723	43352 1	SL1 DAD	
0222	REF 2	LAST 1232	11,2724	25756 1	DQUARTER	
0223			11,2725	43325 1	PDDL DAD	(1/4)+2((Q+1)/4) TO PD+140
0224			11,2726	00013 0	100	
0225	REF 3	LAST 938	11,2727	24005 1	HALFDP	
0226			11,2730	72475 1	DMPR SL1	
0227			11,2731	00011 1	80	
0228			11,2732	56215 1	DAD DDV	
0229	REF 1		11,2733	25750 1	THREE/8	
0230			11,2734	00017 1	140	
0231			11,2735	74275 1	DMPR VXSC	
0232			11,2736	00007 0	6	
0233	REF 11	LAST 1232	11,2737	02040 1	BETAV	
0234			11,2740	64515 1	PDVL VSR	(G/2)(C(PD+4))8/2 TO PD+160

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0235	REF 26	LAST 1232	11,2741	02032-1	ALPHAV	
0236			11,2742	41455-0	VAD	PUSH A12 + C(PD+16D) TO PD+16D
0237			11,2743	41345-0	DLOAD	DMP
0238			11,2744	00001-0		0
0239			11,2745	00015-0		12D
0240			11,2746	61501-1	NORM	ROUND
0241			11,2747	00037-0		30D
0242			11,2750	40665-0	BDDV	DMP*
0243			11,2751	00003-1		2
0244	REF 6	LAST 1227	11,2752	51770-0		HUFARTH.2
0245			11,2753	74276-1	DCOMP	VXSC
0246			11,2754	57124-1	XCHX,2	XAD,2
0247	REF 25	LAST 1232	11,2755	00050-1		S1
0248	REF 35	LAST 1230	11,2756	00051-0		S2
0249			11,2757	55064-0	XSU,2	XSU,2
0250			11,2760	00036-1		30D
0251			11,2761	00037-0		31D
02513			11,2762	77600-1	BOV	CLEAR OVIND
02516			11,2763	22764-1		+1
0252			11,2764	65057-0	VSR*	XCHX,2
0253			11,2765	57177-1		0-1,2
0254	REF 26	LAST 1233	11,2766	00050-1		S1
0255			11,2767	77655-1	VAD	
0256	REF 3	LAST 1230	11,2770	02062-1		FV
0257	REF 4	LAST 1233	11,2771	02062-1	STORE	FV
025805			11,2772	43400-1	BOV	FV)
02581			11,2773	22774-0		+1
025815			11,2774	51575-1	GOBAQUE	VLOAD
025816	REF 8	LAST 1215	11,2775	01521-0		ABVAL
025817			11,2776	77654-0		TDELTA V
025818	REF 1		11,2777	23017-0	BZE	
025819			11,3000	54345-1		INT-ABRT
02582	REF 2	LAST 114	11,3001	02100-1	DLOAD	SR
025825			11,3002	20612-0		H
02583			11,3003	44206-0		9D
025835	REF 9	LAST 1229	11,3004	01551-1	PUSH	BDSU
02584	REF 13	LAST 1229	11,3005	16074-0		TC
025845	REF 26	LAST 1230	11,3006	01517-0	STODL	TAU.
02585			11,3007	45425-0		TET
025855	REF 27	LAST 1233	11,3010	42260-0	DSU	STADR
02586	REF 3	LAST 1229	11,3011	22376-0	STCALL	TET
025865			11,3012	77624-1		KEPPREP
02587	REF 6	LAST 1225	11,3013	23441-1	CALL	
025875			11,3014	77614-1		RECTIFY
02588	REF 4	LAST 1231	11,3015	04020-1	SETCG	
025885	REF 4	LAST 1224	11,3016	27257-1		RPQFLAG
						TESTLOOP
025886			11,3017	77776-1	INT-ABRT	EXIT
025887	REF 6	LAST 1201	11,3020	0-5652-0	TC	PODDDD
025888			11,3021	00430-0	UCT	00430

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P0259 THE OBLATE ROUTINE COMPUTES THE ACCELERATION DUE TO OBLATENESS. IT USES THE UNIT OF THE VEHICLE
 R0261 POSITION VECTOR FOUND IN ALPHAV AND THE DISTANCE TO THE CENTER IN ALPHAM. THIS IS ADDED TO THE SUM OF THE
 R0263 DISTURBING ACCELERATIONS IN FV AND THE PROPER DIFEQ STAGE IS CALLED VIA X1.

0265			11,3022	71354 0	OBLATE	LXA,2	DLOAD	
0266	REF	13	LAST 1230	11,3023	02030 0		PBODY	
0267	REF	8	LAST 1232	11,3024	02070 1		ALPHAM	
0268				11,3025	44601 0	SETPD	DSU*	
0269				11,3026	00001 0		0	
0270	REF	1		11,3027	50053 1		RDE,2	
0271				11,3030	43044 0	BPL	BDF	GET URPV
0272	REF	1		11,3031	23232 0		NBRANCH	
0273	REF	26	LAST 1231	11,3032	00343 0		MOONFLAG	
0274	REF	1		11,3033	23241 1		COSPHIE	
0275				11,3034	65375 0	VLOAD	PDDL	
0276	REF	27	LAST 1233	11,3035	02032 1		ALPHAV	
0277	REF	28	LAST 1233	11,3036	01517 0		TIT	
0278				11,3037	45125 0	PDDL	CALL	
0279	REF	1		11,3040	25746 0		3/5	
0280	REF	6	LAST 1133	11,3041	51670 1		R-TO-RP	
0284	REF	1		11,3042	00017 1	STORE	URPV	
0285				11,3043	47375 0	VLOAD	VXV	
0286	REF	3	LAST 1142	11,3044	02013 1		504LM	
0287	REF	3	LAST 1213	11,3045	24001 0		ZUNIT	
0288				11,3046	61255 1	VAD	VXM	
0289	REF	4	LAST 1234	11,3047	24001 0		ZUNIT	
0290	REF	8	LAST 1145	11,3050	00025 0		MMATRIX	
0291				11,3051	77656 1	UNIT		POSSIBLY UNNECESSARY
0292	REF	1		11,3052	00025 0	COMTERM	STORE	U7
0293				11,3053	57345 1	DLOAD	DMPR	
0294	REF	1		11,3054	00023 0		COSPHI/2	
0295	REF	1		11,3055	25760 1		3/32	
0296				11,3056	63525 0	PDDL	DSQ	P2/64 TO PD0
0297	REF	2	LAST 1234	11,3057	00023 0		COSPHI/2	
0298				11,3060	45275 0	DMPR	DSU	
0299	REF	1		11,3061	25762 0		15/16	
0300	REF	1		11,3062	25754 0		3/64	
0301				11,3063	57206 1	PUSH	DMPR	P3/32 TO PD2
0302	REF	3	LAST 1234	11,3064	00023 0		COSPHI/2	
0303				11,3065	76405 1	DMP	SL1R	
0304	REF	1		11,3066	25766 1		7/12	
0305				11,3067	57325 1	PDDL	DMPR	
0306				11,3070	00001 0		0	
0307	REF	1		11,3071	25774 1		2/5	
0308				11,3072	41421 0	BDSU	PUSH	P4/128 TO PD4
0309				11,3073	57275 0	DMPR	DMPR	
0310	REF	4	LAST 1234	11,3074	00023 0		COSPHI/2	BEGIN COMPUTING P5/1024
0311	REF	1		11,3075	25770 0		9/16	
0312				11,3076	57325 1	PDDL	DMPR	
0313				11,3077	00003 1		2	
0314	REF	1		11,3100	25772 1		5/128	

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0315		11,3101	77621 1	BDSU	
0316		11,3102	77603 1	DMP*	
0317	REF 1	11,3103	51764 0		J4REQ/J3,2
0318		11,3104	43271 1	DDV	DAD -3
0319	REF 9 LAST 1234	11,3105	02070 1		ALPHAM (((P5/256)B 2 /R+P4/32) /R+P3/3)ALPHAV
0320		11,3106	00005 1		4 4 3
0321		11,3107	56273 1	DMPR*	DDV
0322	REF 1	11,3110	51760 1		2J3RE/J2,2
0323	REF 10 LAST 1235	11,3111	02070 1		ALPHAM
0324		11,3112	74215 1	DAD	VXSC
0325		11,3113	00003 1		2
0326	REF 28 LAST 1234	11,3114	02032 1		ALPHAV
0327	REF 1	11,3115	14033 1	STODL	TVEC
0328		11,3116	70403 1	DMP*	SR1
0329	REF 2 LAST 1235	11,3117	51764 0		J4REQ/J3,2
0330		11,3120	43271 1	DDV	DAD
0331	REF 11 LAST 1235	11,3121	02070 1		ALPHAM -3
0332		11,3122	50473 1	DMPR*	SR3
0333	REF 2 LAST 1235	11,3123	51760 1		2J3RE/J2,2 3 4
0334		11,3124	43271 1	DDV	DAD
0335	REF 12 LAST 1235	11,3125	02070 1		ALPHAM
0336		11,3126	76561 1	VXSC	VSL1
0337	REF 2 LAST 1234	11,3127	00025 0		UZ
0338		11,3130	77645 0	BVSU	
0339	REF 2 LAST 1235	11,3131	00033 1		TVEC
0340	REF 3 LAST 1235	11,3132	14033 1	STODL	TVEC
0341	REF 13 LAST 1235	11,3133	02070 1		ALPHAM
0342		11,3134	63501 0	NORM	DSQ
0343	REF 66 LAST 1227	11,3135	00047 1		X1
0344		11,3136	60316 0	DSQ	NORM
0345	REF 27 LAST 1233	11,3137	00051 0		S1 4
0346		11,3140	54606 0	PUSH	BDDV* NORMED R TO OD
0347	REF 1	11,3141	51754 0		J2REQSQ,2
0348		11,3142	40161 0	VXSC	BOV
0349	REF 4 LAST 1235	11,3143	00033 1		TVEC
0350		11,3144	23145 0		+1 (RESET OVERFLOW INDICATOR)
0351		11,3145	56070 0	XAD,1	XAD,1
0352	REF 67 LAST 1235	11,3146	00046 0		X1
0353	REF 68 LAST 1235	11,3147	00046 0		X1
0354		11,3150	53670 0	XAD,1	VSL*
0355	REF 28 LAST 1235	11,3151	00050 1		S1
0356		11,3152	20153 1		0 -220,1
0357		11,3153	40055 0	VAD	BOV
0358	REF 5 LAST 1233	11,3154	02062 1		FV
0359	REF 1	11,3155	22774 0		GOBAQUE
0360	REF 6 LAST 1235	11,3156	36062 0	STCALL	FV
0361	REF 1	11,3157	27725 1		QUALITY1
0362		11,3160	77716 1	QUALITY3	DSQ
A0363					J22 TERM X R**4 IN 2D, SCALED B61 AS VECTOR.

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0364			11,3161	41206 0	PUSH	DMP	STORE COSPHI**2-SCALED-B2-IN-8D
0365	REF 3	LAST 1213	11,3162	27712 0		5/8	5-SCALED-B3
0366			11,3163	60525 0	PDDL	SR2	PUT 5 COSPHI**2, D5, IN 8D. GET
A0367							COSPHI**2 D2 FROM 8D
0368			11,3164	44215 1	DAD	BDSU	END-UP-WITH-(1-7-COSPHI**2), B5
0369			11,3165	00011 1		8D	ADDING COSPHI**2-B4-SAME-AS-COSPHI**2
A0370							X 2-D5
0371	REF 6	LAST 1198	11,3166	11043 0		D1/32	1-SCALED-B5
0372			11,3167	41205 0	DMP	DMP	
0373	REF 2	LAST 1234	11,3170	00017 1		URPV	X COMPONENT
0374	REF 4	LAST 1236	11,3171	27712 0		5/8	5-SCALED-B3
0375			11,3172	56561 0	VXSC	VSL5	AFTER SHIFT, SCALED B5
0376	REF 3	LAST 1236	11,3173	00017 1		URPV	VECTOR, B1.
0377			11,3174	77725 1	PDDL		VECTOR INTO 8D, 10D, 12D, SCALED B5.
A0378							GET 5 COSPHI**2 OUT OF 8D
0379			11,3175	43225 0	DSU	DAD	
0380	REF 7	LAST 1236	11,3176	11043 0		D1/32	1-B5
0381			11,3177	00011 1		8D	X COMPONENT (SAME AS MULTIPLYING
A0382							BY UNITX)
0383			11,3200	14011 1	STODL	8D	
0384	REF 4	LAST 1236	11,3201	00017 1		URPV	X COMPONENT
0385			11,3202	41205 0	DMP	DMP	
0386	REF 5	LAST 1236	11,3203	00023 0		URPV +4	Z COMPONENT
0387	REF 5	LAST 1236	11,3204	27712 0		5/8	5-B3-ANSWER-B5
0388			11,3205	43352 1	SL1	DAD	FROM 12D FOR Z COMPONENT (SL1 GIVES 10
A0389							INSTEAD OF 5 FOR COEFFICIENT)
0390			11,3206	60325 0	PDDL	NORM	BACK INTO 12D FOR Z COMPONENT.
0391	REF 14	LAST 1235	11,3207	02070 1		ALPHAM	SCALED-B27 FOR MOON
0392	REF 28	LAST 1182	11,3210	00050 1		X2	
0393			11,3211	67206 1	PUSH	SLOAD	STORE IN 14D, DESTROYING URPV
A0394							X COMPONENT
0395	REF 1		11,3212	01354 1		E32C31RM	
0396			11,3213	74271 0	DDV	VXSC	IF X2 = 0, DIVISION GIVES B53, VXSC
A0397							OUT OF 8D B5 GIVES B58
0398			11,3214	53257 1	VSL*	VAD	SHIFT-MAKES-B61, FOR ADDITION OF
A0399							VECTOR IN 2D
0400			11,3215	57601 1		0 -3,2	
0401			11,3216	70257 0	VSL*	V/SC	OPERAND FROM 0D, B108 FOR X1 = 0
0402			11,3217	20146 0		0 -27D.1	FOR X1 = 0, MAKES B88, GIVING B-20
A0403							FOR RESULT.
0404			11,3220	65325 0	PDDL	PDDL	
0405	REF 29	LAST 1234	11,3221	01517 0		TET	
0406	REF 6	LAST 1236	11,3222	27712 0		5/8	ANY NON-ZERO CONSTANT
0407			11,3223	45154 0	LXA,2	CALL	POSITION IN 0D, TIME IN 6D. X2 LEFT
A0408							ALONE.
0409	REF 14	LAST 1234	11,3224	02030 0		RP-TO-R	
0410	REF 9	LAST 1213	11,3225	55716 1		RP-TO-R	
0411			11,3226	40055 0	VAD	BOV	OVERFLOW INDICATOR RESET IN "RP-TO-R"
0412	REF 7	LAST 1235	11,3227	02062 1		FV	
0413	REF 2	LAST 1235	11,3230	22774 0		GOBAQUE	

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0414	REF	8	LAST 1236	11,3231	02062-1	STORE	FV	
0415				11,3232	72135-0	NBRANCH	SLOAD	LXA,1
0416	REF	23	LAST 1231	11,3233	01501-1			DIFEQCNT
0417	REF	734	LAST 1224	11,3234	00154-1			MPAC
0418				11,3235	73205-1	DMP	CGOTO	
0419	REF	1		11,3236	27714-0			-1/12
0420	REF	735	LAST 1237	11,3237	00155-0			MPAC
0421	REF	1		11,3240	23247-1			DIFEQTAB
0422				11,3241	77745-1	COSPHIE	DLOAD	
0423	REF	29	LAST 1235	11,3242	02036-0			ALPHAV +4
0424	REF	5	LAST 1234	11,3243	24023-0		STOVL	COSPHI/2
0425	REF	5	LAST 1234	11,3244	24001-0			ZUNIT
0426				11,3245	77650-1		GOTO	
0427	REF	1		11,3246	23052-1			COMTERM
0428	REF	1		11,3247	23466-1	DIFEQTAB	CADR	DIFEQ+0
0429	REF	1		11,3250	23472-1		CADR	DIFEQ+1
0430	REF	1		11,3251	23503-0		CADR	DIFEQ+2
0431				11,3252	77214-0	TIMESTEP	BOF	VLOAD
0432	REF	4	LAST 1230	11,3253	00342-1			MIDFLAG
0433	REF	1		11,3254	23303-0			RECTEST
0434	REF	23	LAST 1230	11,3255	01535-0			RCV
0435				11,3256	41241-0		DOT	DMP
0436	REF	17	LAST 1227	11,3257	01543-1			VCV
0437	REF	10	LAST 1229	11,3260	02076-1			DT/2
0438				11,3261	77640-0	BMN		(R.V) X (DELTA T)
0439	REF	2	LAST 1237	11,3262	23303-0			RECTEST
0440				11,3263	43014-0	BON		BOF
0441	REF	27	LAST 1234	11,3264	00303-1			MOONFLAG
0442	REF	1		11,3265	23360-0			LUNSPH
0443	REF	5	LAST 1233	11,3266	04340-1			RPQFLAG
0444	REF	1		11,3267	23355-0			EARS PH
0445				11,3270	45145-0	DLOAD	CALL	
0446	REF	30	LAST 1236	11,3271	01517-0			TET
0447	REF	4	LAST 1230	11,3272	33664-0			LSPOS
0448	REF	5	LAST 1231	11,3273	02105-1	STORE	RPQV	RPQV IN MPAC
0449				11,3274	77754-1	LXA,2		RPQV
0450	REF	15	LAST 1236	11,3275	02030-0			PBODY
0451				11,3276	51445-0	INLUNCHK	BVSU	ABVAL
0452	REF	24	LAST 1237	11,3277	01535-0			RCV
0453				11,3300	50025-0	DSU		BMN
0454	REF	1		11,3301	27720-1			RSPHERE
0455	REF	1		11,3302	23375-1			DOSWITCH
0456				11,3303	51575-1	RECTEST	VLOAD	ABVAL
0457	REF	9	LAST 1233	11,3304	01521-0			TDELTA V
0458				11,3305	77600-1	BOV		
0459	REF	1		11,3306	23331-1			CALLRECT
0460				11,3307	51025-1	DSU		BPL
0461	REF	2	LAST 958	11,3310	25764-0			3/4
0462	REF	2	LAST 1237	11,3311	23331-1			CALLRECT
0463				11,3312	53615-0	DAD	SL*	OR

1) EITHER TDELTA V OR TRUV EQUALS OR
EXCEEDS 3/4-IN MAGNITUDE

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0464	REF	3	LAST 1237	11,3313	25764 0		3/4	
0465				11,3314	57605 0		0 -7.2	2) ABVAL(TDELTAV) EQUALS OF EXCEEDS
0466				11,3315	45271 1	DDV	DSU	.01 (ABVAL(RCV))
0467				11,3316	00013 0		100	
0468	REF	1		11,3317	27716 1		RECRATIO	
0469				11,3320	77244 0	BPL	VLOAD	
0470	REF	3	LAST 1237	11,3321	23331 1		CALLRECT	
0471	REF	8	LAST 1215	11,3322	01527 0		TNUV	
0472				11,3323	45246 0	ABVAL	DSU	
0473	REF	4	LAST 1238	11,3324	25764 0		3/4	
0474				11,3325	77600 1	DDV		
0475	REF	4	LAST 1238	11,3326	23331 1		CALLRECT	
0476				11,3327	77640 0	BMN		
0477	REF	1		11,3330	23333 0		INTGRATE	
0478				11,3331	77624 1	CALLRECT	CALL	
0479	REF	7	LAST 1233	11,3332	23441 1		RECTIFY	
0480				11,3333	77775 1	INTGRATE	VLOAD	
0481	REF	9	LAST 1238	11,3334	01527 0		TNUV	
0482	REF	1		11,3335	25135 1	STOVL	ZV	
0483	REF	10	LAST 1237	11,3336	01521 0		TDELTAV	
0484	REF	2	LAST 104	11,3337	01127 1	STORE	YV	
0485				11,3340	77614 1	CLEAR		
0486	REF	1		11,3341	00261 1		JSWITCH	
0487				11,3342	66375 0	DIFEQO	VLOAD	
0488	REF	3	LAST 1238	11,3343	01127 1		YV	
0489	REF	24	LAST 1237	11,3344	01501 1		DIFTCNT	
0490				11,3345	00000 1		0	
0491	REF	30	LAST 1237	11,3346	16032 1	STOVL	ALPHAV	
0492	REF	3	LAST 1137	11,3347	24007 0		DPZER0	
0493	REF	3	LAST 1233	11,3350	02100 1	STORE	H	START H AT ZERO. GOES 0 (DELT/2) DELT.
0494				11,3351	52014 0	BON	GOTO	
0495	REF	2	LAST 1238	11,3352	00301 0		JSWITCH	
0496	REF	1		11,3353	23705 1		DDW..	
0497	REF	1		11,3354	22516 0		ACCOMP	
0498				11,3355	52175 0	EARSPPH	VLOAD	
0499	REF	6	LAST 1237	11,3356	02105 1		RPQV	
0500	REF	1		11,3357	23276 0		INLUNCHK	
0501				11,3360	60545 0	LUNSPH	DLOAD	
0502				11,3361	00013 0		100	
0503				11,3362	50025 0	DSU	BMN	
0504	REF	2	LAST 1237	11,3363	27720 1		RSPHERE	
0505	REF	3	LAST 1237	11,3364	23303 0		RECTEST	
0506				11,3365	71214 0	BOF	DLOAD	
0507	REF	6	LAST 1237	11,3366	04340 1		RPQFLAG	
0508	REF	2	LAST 1237	11,3367	23375 1		DESWITCH	
0509	REF	31	LAST 1237	11,3370	01517 0		TET	
0510				11,3371	77624 1	CALL		
0511	REF	2	LAST 487	11,3372	33664 0		LUNPOS	
0512				11,3373	77676 0	VCOMP		
0513	REF	7	LAST 1238	11,3374	02105 1	STORE	RPQV	

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0514			11,3375	77624-1	DOSWITCH CALL	
0515	REF	1	11,3376	23401 0		ORIGCHNG
0516			11,3377	77650-1	GOTO	
0517	REF	2 LAST 1238	11,3400	23333 0		INTGRATE
0518			11,3401	45020-1	ORIGCHNG STQ	CALL
0519	REF	3 LAST 114	11,3402	02112-1		ORIGEX
0520	REF	8 LAST 1238	11,3403	23441 1		RECTIFY
0521			11,3404	53775-1	VLOAD	VSL*
0522	REF	25 LAST 1237	11,3405	01535 0		RCV
0523			11,3406	57576-1		0,2
0524			11,3407	53651 0	VSU	VSL*
0525	REF	8 LAST 1238	11,3410	02105 1		PPQV
0526			11,3411	57574 0		2,2
0527	REF	14 LAST 1225	11,3412	01503 0	STORE	RRECT
0528	REF	26 LAST 1239	11,3413	15535 0	STODL	RCV
0529	REF	32 LAST 1238	11,3414	01517 0		TET
0530			11,3415	77624-1	CALL	
0531	REF	1	11,3416	33775-1		LUNVEL
0532			11,3417	57414-1	BOF	VCOMP
0533	REF	28 LAST 1237	11,3420	00343 0		MOONFLAG
0534			11,3421	23422-1		+1
0535			11,3422	53715 1	PDVL	VSL*
0536	REF	18 LAST 1237	11,3423	01543 1		VCV
0537			11,3424	57576 1		0,2
0538			11,3425	77651 0	VSU	
0539			11,3426	77657 0	VSL*	
0540			11,3427	57574 0		0 +2,2
0541	REF	10 LAST 1225	11,3430	01511 0	STORE	VRECT
0542	REF	19 LAST 1239	11,3431	01543-1	STORE	VCV
0543			11,3432	67154 0	LXA,2	SXA,2
0544	REF	4 LAST 1239	11,3433	02112-1		ORIGEX
0545	REF	19 LAST 1220	11,3434	00052 0		QPRET
0546			11,3435	52014 0	BON	GOTO
0547	REF	29 LAST 1239	11,3436	00303-1		MOONFLAG
0548	REF	2 LAST 1212	11,3437	26711-1		CLRMOON
0549	REF	3 LAST 1212	11,3440	26716 0		SETMOON

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P0550 THE RECTIFY SUBROUTINE IS CALLED BY THE INTEGRATION PROGRAM AND OCCASIONALLY BY THE MEASUREMENT INCORPORATION
R0552 ROUTINES TO ESTABLISH A NEW CONIC.

0553			11,3441	77354-0	RECTIFY	LXA,2	VLOAD
0554	REF 16	LAST 1237	11,3442	02030-0			PBODY
0555	REF 11	LAST 1238	11,3443	01521-0			TDELTA
0556			11,3444	53257-1		VSL*	VAD
0557			11,3445	57605-0			0-7.2
0558	REF 27	LAST 1239	11,3446	01535-0			RCV
0559	REF 15	LAST 1239	11,3447	01503-0	STORE	RRECT	
0560	REF 28	LAST 1240	11,3450	25535-0	STOVL	RCV	
0561	REF 10	LAST 1238	11,3451	01527-0			TNUV
0562			11,3452	53257-1	VSL*	VAD	
0563			11,3453	57602-1			0-4.2
0564	REF 20	LAST 1239	11,3454	01543-1			VCV
0565	REF 11	LAST 1239	11,3455	01511-0	MINIRECT	STORE	VRECT
0566	REF 21	LAST 1240	11,3456	25543-1	STOVL	VCV	
0567	REF 12	LAST 1230	11,3457	24007-0			ZEROVEC
0568	REF 12	LAST 1240	11,3460	01521-0	STORE	TDELTA	
0569	REF 11	LAST 1240	11,3461	15527-0	STODL	TNUV	
0570	REF 13	LAST 1240	11,3462	24007-0			ZEROVEC
0571	REF 10	LAST 1233	11,3463	01551-1	STORE	TC	
0572	REF 3	LAST 1228	11,3464	01553-0	STORE	XKEP	
0573			11,3465	77616-0	RVQ		

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PO574 THE THREE DIFEQ ROUTINES - DIFEQ+0, DIFEQ+12, AND DIFEQ+14 - ARE ENTERED TO PROCESS THE CONTRIBUTIONS AT THE
 R0576 BEGINNING, MIDDLE, AND END OF THE TIMESTEP, RESPECTIVELY. THE UPDATING IS DONE BY THE NYSTROM METHOD.

0578			11,3466	64575-1	DIFEQ+0	VLOAD	VSR3	
0579	REF	9	LAST 1237	11,3467	02062-1		FV	
0580	REF	2	LAST 114	11,3470	36046-0	STCALL	PHIV	
0581	REF	1		11,3471	23646-1		DIFEQCOM	
0582			11,3472	74575-0	DIFEQ+1	VLOAD	VSR1	
0583	REF	10	LAST 1241	11,3473	02062-1		FV	
0584			11,3474	53206-0		PUSH	VAD	
0585	REF	3	LAST 1241	11,3475	02046-1		PHIV	
0586	REF	2	LAST 114	11,3476	26054-1	STOVL	PSIV	
0587			11,3477	53362-0		VSR1	VAD	
0588	REF	4	LAST 1241	11,3500	02046-1		PHIV	
0589	REF	5	LAST 1241	11,3501	36046-0	STCALL	PHIV	
0590	REF	2	LAST 1241	11,3502	23646-1		DIFEQCOM	
0591			11,3503	57345-1	DIFEQ+2	DLOAD	DMPR	
0592	REF	4	LAST 1238	11,3504	02100-1		H	
0593	REF	2	LAST 1227	11,3505	25774-1		DP2/3	
0594			11,3506	74206-0		PUSH	VXSC	
0595	REF	6	LAST 1241	11,3507	02046-1		PHIV	
0596			11,3510	53372-1		VSL1	VAD	
0597	REF	2	LAST 1238	11,3511	01135-1		ZV	
0598			11,3512	53361-0		VXSC	VAD	
0599	REF	5	LAST 1241	11,3513	02100-1		H	
0600	REF	4	LAST 1238	11,3514	01127-1		YV	
0601	REF	5	LAST 1241	11,3515	25127-1	STOVL	YV	
0602	REF	11	LAST 1241	11,3516	02062-1		FV	
0603			11,3517	53322-1		VSR3	VAD	
0604	REF	3	LAST 1241	11,3520	02054-1		PSIV	
0605			11,3521	76561-1		VXSC	VSL1	
0606			11,3522	77655-1		VAD		
0607	REF	3	LAST 1241	11,3523	01135-1		ZV	
0608	REF	4	LAST 1241	11,3524	01135-1	STORE	ZV	
0609			11,3525	45014-0		BUFF	CALL	
0610	REF	3	LAST 1238	11,3526	00341-1		JSWITCH	
0611	REF	1		11,3527	23577-0		ENDSTATE	
0612	REF	23	LAST 1216	11,3530	11244-0		GRP2PC	
0613			11,3531	77354-0		LXA,2	VLOAD	
0614	REF	2	LAST 104	11,3532	01117-1		CCLREG	
0615	REF	5	LAST 1241	11,3533	01135-1		ZV	
0616			11,3534	77732-1		VSL3		ADJUST W-POSITION FOR STORAGE
0617	REF	31	LAST 1155	11,3535	12467-1	STORE	W +540,2	
0618			11,3536	77775-1		VLOAD		
0619	REF	6	LAST 1241	11,3537	01127-1		YV	
0620			11,3540	40132-0		VSL3	BOV	
0621	REF	1		11,3541	23671-0		WMATEND	
0622	REF	32	LAST 1241	11,3542	12401-1	STORE	W,2	
0623			11,3543	77624-1		CALL		
0624	REF	24	LAST 1241	11,3544	11244-0		GRP2PC	

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0625			11,3545	66354 0	LXA,2	SSP	
0626	REF	3	LAST 1241	11,3546	01117 1	COLREG	
0627	REF	36	LAST 1233	11,3547	00052 0	S2	
0628			11,3550	00000 1	0		
0629			11,3551	67114 1	INCR,2	SXA,2	
0630			11,3552	00006 1	6		
0631	REF	7	LAST 1241	11,3553	01126 0	YV	
0632			11,3554	45104 0	TIX,2	CALL	
0633	REF	1		11,3555	23642 0	RELOADSV	
0634	REF	25	LAST 1241	11,3556	11244 0	GRP2PC	
0635			11,3557	67154 0	LXA,2	SXA,2	
0636	REF	8	LAST 1242	11,3560	01126 0	YV	
0637	REF	4	LAST 1242	11,3561	01117 1	COLREG	
0638			11,3562	77624 1	NEXTCOL	CALL	
0639	REF	26	LAST 1242	11,3563	11244 0	GRP2PC	
0640			11,3564	76754 0	LXA,2	VLOAD*	
0641	REF	5	LAST 1242	11,3565	01117 1	COLREG	
0642	REF	33	LAST 1241	11,3566	75376 1	W,2	
0643			11,3567	77722 0	VSR3		ADJUST W-POSITION FOR INTEGRATION
0644	REF	9	LAST 1242	11,3570	01127 1	STORE	YV
0645			11,3571	76173 0	VLOAD*	AXT,1	
0646	REF	34	LAST 1242	11,3572	75310 1	W +54D,2	
0647			11,3573	00000 1	0		
0648			11,3574	77722 0	VSR3		ADJUST W-VELOCITY FOR INTEGRATION
0649	REF	6	LAST 1241	11,3575	35135 0	STCALL	ZV
0650	REF	1		11,3576	23342 0	DIFEQ0	
0651			11,3577	77200 0	ENDSTATE	BOV	VLOAD
0652	REF	3	LAST 1236	11,3600	22774 0	GOBAQUE	
0653	REF	7	LAST 1242	11,3601	01135 1	ZV	
0654	REF	12	LAST 1240	11,3602	25527 0	STOVL	THIV
0655	REF	10	LAST 1242	11,3603	01127 1	YV	
0656	REF	13	LAST 1240	11,3604	01521 0	STORE	TDDELTA
0657			11,3605	43014 0	RCN	DIFF	
0658	REF	3	LAST 1224	11,3606	04715 0	MIDAVFLG	
0659	REF	1		11,3607	27633 1	CKMID2	CHECK FOR MID2 BEFORE GOING TO TIMEINC
0660	REF	22	LAST 1231	11,3610	01756 1	DIMOFLLG	
0661	REF	5	LAST 1233	11,3611	27257 1	TESTLOOP	
0662			11,3612	77776 1	EXIT		
0663	REF	112	LAST 1226	11,3613	0 5353 1	TC	PHASCHNG
0664			11,3614	04022 0	OCT	04022	PHASE 1
0665	REF	68	LAST 1216	11,3615	0 5504 0	TC	UPFLAG
0666	REF	4	LAST 1216	11,3616	00236 0	ADRES	REINTFLG
0667	REF	235	LAST 1226	11,3617	0 6037 0	TC	INTPRET
0668			11,3620	77731 1	SSP		
0669	REF	20	LAST 1239	11,3621	00053 1	QPRET	
0670	REF	1		11,3622	23627 0	MOVED	
0671			11,3623	52014 0	BON	GOTO	
0672	REF	27	LAST 1222	11,3624	01714 1	VINTFLAG	

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0673	REF	5	LAST 1226	11,3625	26661 1		ATOPCSM	
0674	REF	4	LAST 1226	11,3626	26734 0		ATOPLEM	
0675				11,3627	66214 0	AMOVED	SET	SSP
0676	REF	4	LAST 1241	11,3630	00061 0		JSWITCH	
0677	REF	6	LAST 1242	11,3631	01120 0		COLREG	
0678				11,3632	77741 0		DEC	-30
0679				11,3633	66214 0		BOFF	SSP
0680	REF	10	LAST 1222	11,3634	01755 1			D6OR9FLG
0681	REF	1		11,3635	23562 1			NEXTCOL
0682	REF	7	LAST 1243	11,3636	01120 0			COLREG
0683				11,3637	77717 0		DEC	-48
0684				11,3640	77650 1		GOTO	
0685	REF	2	LAST 1243	11,3641	23562 1			NEXTCOL
0686				11,3642	77745 1	RELOADSV	DLOAD	RELOAD TEMPORARY STATE VECTOR
0687	REF	9	LAST 1224	11,3643	01116 0		TDEC	FROM PERMANENT IN CASE OF
0688	REF	62	LAST 1223	11,3644	34041 0		STCALL	TDEC1
0689	REF	1		11,3645	27141 0			INTEGRV2
0690				11,3646	43345 1	DIFEQCOM	DLOAD	BY STARTING AT INTEGRV2.
0691	REF	11	LAST 1237	11,3647	02076 1			INCREMENT H AND DIFEQCNT.
0692	REF	6	LAST 1241	11,3650	02100 1			
0693				11,3651	66110 1		INCR,1	SXA,1
0694				11,3652	77763 0		DEC	-12
0695	REF	25	LAST 1238	11,3653	01500 0			DIFEQCNT
0696	REF	7	LAST 1243	11,3654	02100 1		STORE	H
0697				11,3655	74561 0		VXSC	VSR1
0698	REF	12	LAST 1241	11,3656	02062 1			FV
0699				11,3657	74255 0		VAD	VXSC
0700	REF	8	LAST 1242	11,3660	01135 1			ZV
0701	REF	8	LAST 1243	11,3661	02100 1			H
0702				11,3662	77655 1		VAD	
0703	REF	11	LAST 1242	11,3663	01127 1			YV
0704	REF	31	LAST 1238	11,3664	02032 1		STORE	ALPHA V
0705				11,3665	52014 0		BON	GOTO
0706	REF	5	LAST 1243	11,3666	00301 0			JSWITCH
0707	REF	2	LAST 1238	11,3667	23705 1			DOW..
0708	REF	1		11,3670	22476 1			FBR3
0709				11,3671	43014 0	WMATEND	CLEAR	CLEAR
0710	REF	23	LAST 1242	11,3672	01676 1			DIMOF LAG
0711	REF	3	LAST 1226	11,3673	01671 0			UPB W LAG
0712				11,3674	77614 1		CLEAR	
0713	REF	13	LAST 1226	11,3675	02676 1			RENDWFLG
0714				11,3676	77414 0		SET	EXIT
0715	REF	9	LAST 1219	11,3677	01472 1			STATEFLG
0716	REF	42	LAST 1225	11,3700	0 5567 0		TC	ALARM
0717				11,3701	00421 0		OCT	421
0718	REF	236	LAST 1242	11,3702	0 6037 0		TC	INTPRET

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0719 11,5703 77650 1
0720 REF 6 LAST 1242 11,5704 27257 1

GOTO

TESTLOOP

FINISH INTEGRATING STATE VECTOR

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P0721 ORBITAL ROUTINE FOR EXTRAPOLATION OF THE W MATRIX. IT COMPUTES THE SECOND DERIVATIVE OF EACH COLUMN POSITION
 R0723 VECTOR OF THE MATRIX AND CALLS THE NYSTROM INTEGRATION ROUTINES TO SOLVE THE DIFFERENTIAL EQUATIONS. THE PROGRAM
 R0725 USES A TABLE OF VEHICLE POSITION VECTORS COMPUTED DURING THE INTEGRATION OF THE VEHICLES POSITION AND VELOCITY.

0727			11,3705	70754 0	DOW..	LXA,2	DLOAD*
0728	REF 17	LAST 1240	11,3706	02030 0			PBODY
0729	REF 7	LAST 1233	11,3707	51770 0			MUEARTH,2
0730	REF 4	LAST 1232	11,3710	36072 1		STCALL	BETAM
0731	REF 1		11,3711	23733 1			DOW..1
0732	REF 13	LAST 1243	11,3712	02062 1		STORE	FV
0733			11,3713	62014 0		BOF	INCR,1
0734	REF 5	LAST 1237	11,3714	00342 1			MIDFLAG
0735	REF 2	LAST 1234	11,3715	23232 0			NBRANCH
0736			11,3716	77771 0		DEC	-6
0737			11,3717	70744 1		LXC,2	DLOAD*
0738	REF 18	LAST 1245	11,3720	02030 0			PBODY
0739	REF 8	LAST 1245	11,3721	51772 1			MUEARTH -2,2
0740	REF 5	LAST 1245	11,3722	36072 1		STCALL	BETAM
0741	REF 2	LAST 1245	11,3723	23733 1			DOW..1
0742			11,3724	50414 0		BON	VSR6
0743	REF 30	LAST 1239	11,3725	00303 1			MOONFLAG
0744			11,3726	23727 1			+
0745			11,3727	77655 1		VAD	
0746	REF 14	LAST 1245	11,3730	02062 1			FV
0747	REF 15	LAST 1245	11,3731	26062 0		STCALL	FV
0748	REF 3	LAST 1245	11,3732	23232 0			NBRANCH
0749			11,3733	60575 0	DOW..1	VLOAD	VSR4
0750	REF 32	LAST 1243	11,3734	02032 1			ALPHAV
0751			11,3735	53513 0		PDVL*	UNIT
0752	REF 10	LAST 1231	11,3736	02132 0			VECTAB,1
0753			11,3737	46315 1		PDVL	VPROJ
0754	REF 33	LAST 1245	11,3740	02032 1			ALPHAV
0755			11,3741	52361 1		VXSC	VSU
0756	REF 5	LAST 1238	11,3742	25764 0			3/4
0757			11,3743	60325 0		PDDL	NORM
0758			11,3744	00045 0			360
0759	REF 37	LAST 1242	11,3745	00052 0			S2
0760			11,3746	63406 0		PUSH	DSQ
0761			11,3747	77605 1		DMP	
0762			11,3750	65301 0		NORM	PDDL
0763			11,3751	00043 0			340
0764	REF 6	LAST 1245	11,3752	02072 0			BETAM
0765			11,3753	56342 1		SR1	DDV
0766			11,3754	77761 1		VXSC	
0767			11,3755	57154 0		LXA,2	XAD,2
0768	REF 38	LAST 1245	11,3756	00051 0			S2
0769	REF 39	LAST 1245	11,3757	00051 0			S2
0770			11,3760	57074 0		XAD,2	XAD,2
0771	REF 40	LAST 1245	11,3761	00051 0			S2
0772			11,3762	00042 1			340
0773			11,3763	43457 0		VSL*	RVQ

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0774- 11,3764 57606 0 0-8D.2
R07741 *****
R07743 *****

07745 * 11,3765 43131 0 SETITCTR-SSP BOFF SET-ITERCTR-FOR-LAMBERT-CALLS. - THIS
07746 *REF 4 LAST 1183 11,3766 00027 1 ITERCTR CODING BELONGS IN INITVEL AND IS HERE
07747 * 11,3767 00024 1 200 FOR PURPOSES OF A ONE-MODULE
07748 *REF 3 LAST 713 11,3770 03752 1 AVEGFLAG REMANUFACTURE ONLY. CODING SHOULD
07749 *REF 1 11,3771 25212 1 LAMBERT BE MOVED BACK TO INITVEL FOR LUMINARY-1B
077491* 11,3772 52131 0 SSP GOTO
077492*REF 5 LAST 1246 11,3773 00027 1 ITERCTR
077493* 11,3774 00005 1 5
077494*REF 2 LAST 1246 11,3775 25212 1 LAMBERT

R077495*****
R077497*****

0775 REF 1 12,2000 SETLOC ORBITAL1
0776 12,3745 BANK
0777 12,3745 04631 1 3/5 2DEC .6 B-2
0777 12,3746 23146 0
0778 12,3747 14000 1 THREE/8 2DEC .375
0778 12,3750 00000 1
0779 12,3751 02314 0 .3D 2DEC .3 B-2
0779 12,3752 31463 1
0780 12,3753 01400 1 3/64 2DEC 3 B-6
0780 12,3754 00000 1
0781 12,3755 10000 0 DP1/4 2DEC .25
0781 12,3756 00000 1
0782 REF 2 LAST 1199 12,3755 DQUARTER EQUALS DP1/4
0783 REF 3 LAST 1246 12,3755 POS1/4 EQUALS DP1/4
0784 12,3757 03000 1 3/32 2DEC 5 B-5
0784 12,3760 00000 1
0785 12,3761 36000 1 15/16 2DEC 15. B -4
0785 12,3762 00000 1
0786 12,3763 30000 1 3/4 2DEC 3.0 B -2
0786 12,3764 00000 1
0787 12,3765 22525 0 7/12 2DEC .5833333333
0787 12,3766 12525 0
0788 12,3767 22000 1 9/16 2DEC 9 B -4
0788 12,3770 00000 1
0789 12,3771 01200 1 5/128 2DEC 5 B-7
0789 12,3772 00000 1
0790 REF 14 LAST 1240 12,2006 DPZERO EQUALS ZEROVEC
0791 12,3773 25252 0 DP2/3 2DEC .6666666667
0791 12,3774 25253 1
0792 REF 3 LAST 1241 12,3773 2/3 EQUALS DP2/3
0793 12,3775 00027 1 OCT27 OCT 27

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0794		13,3675		BANK	13	
0795	REF 2 LAST 46	13,2000		SETLOC	ORBITAL2	
0796		13,3675		BANK		
0797	IT IS VITAL THAT THE FOLLOWING CONSTANTS NOT BE SHUFFLED					
0798		13,3675	77764-1	DEC	-11	
0799		13,3676	77775-1	DEC	-2	
0800		13,3677	77766-0	DEC	-9	
0801		13,3700	77771-0	DEC	-6	
0802		13,3701	77775-1	DEC	-2	
0803		13,3702	77775-1	DEC	-2	
0804		13,3703	00000-1	DEC	0	
0805		13,3704	77763-0	DEC	-12	
0806		13,3705	77766-0	DEC	-9	
0807		13,3706	77773-1	DEC	-4	
0808		13,3707	77770-1	ASCALE	DEC	-7
0809		13,3710	77771-0	DEC	-6	
0810		13,3711	24000-1	5/8	2DEC	5-8-3
0810		13,3712	00000-1			
0811		13,3713	74631-0	-1/12	2DEC	-.1
0811		13,3714	63145-1			
0812		13,3715	00243-1	RECRATIO	2DEC	.01
0812		13,3716	32703-1			
0813		13,3717	03654-0	RSPHERE	2DEC	64373.76 E3 B-29
0813		13,3720	21000-1			
0814		13,3721	03654-0	RDM	2DEC	16093.44 E3 B-27
0814		13,3722	21000-1			
0815		13,3723	04627-0	RDE	2DEC	80467.20 E3 B-29
0815		13,3724	25200-1			
0816		0000		RATT	EQUALS	00
0817		0006		VATT	EQUALS	60
0818		0014		TAT	EQUALS	120
0819		0016		RATT1	EQUALS	140
0820		0024		VATT1	EQUALS	200
0821		0032		MU(P)	EQUALS	260
0822		0040		TDEC1	EQUALS	320
0823		0016		URPV	EQUALS	140
0824	REF 6 LAST 1236	0022		COSPHI/2	EQUALS	URPV +4
0825		0024		UZ	EQUALS	200
0826		0032		TVEC	EQUALS	260
0827		13,3725	71214-0	QUALITY1	BOF	DLOAD
0828	REF 31 LAST 1245	13,3726	00343-0			MOONFLAG
0829	REF 4 LAST 1245	13,3727	23232-0			NBRANCH
0830	REF 7 LAST 1247	13,3730	00017-1			URPV
0831		13,3731	77716-1			
0832		13,3732	63525-0	QUALITY2	PODL	DSQ
0833	REF 8 LAST 1247	13,3733	00021-1			URPV +2
0834		13,3734	77625-0	DSU		
0835		13,3735	74205-0	DMP	VXSC	5(Y**2-X**2)UP
0836	REF 7 LAST 1236	13,3736	27712-0		5/8	CONSTANT, 583
0837	REF 9 LAST 1247	13,3737	00017-1		URPV	VECTOR. RESULT MAXIMUM IS 5, SCALING

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A0838						HERE B6
0839			13,3740	65332 0	VSL3 PDDL	STORE SCALED B3 IN 2D, 4D, 6D FOR XYZ
0840	REF 10	LAST 1247	13,3741	00017 1	URPV	X COMPONENT, B1
0841			13,3742	43342 0	SA1 DAD	2 X X COMPONENT FOR B3 SCALING
0842			13,3743	00003 1	2D	ADD TO VECTOR X COMPONENT OF ANSWER,
A0843						SAME AS MULTIPLYING BY UNITY. MAX IS 7.
0844			13,3744	14003 1	STODL 2D	
0845	REF 11	LAST 1248	13,3745	00021 1	URPV +2	Y COMPONENT, B1
0846			13,3746	44342 1	SA1 BDSU	2 X Y COMPONENT FOR B3 SCALING
0847			13,3747	00005 1	4D	SUBTRACT FROM VECTOR Y COMPONENT OF
A0848						ANSWER, SAME AS MULTIPLYING BY UNITY.
A0849						MAX IS 7.
0850			13,3750	00005 1	STORE 4D	2D HAS VECTOR, B3.
0851			13,3751	74335 1	SLOAD VXSC	MULTIPLY COEFFICIENT TIMES VECTOR IN 2D
0852	REF 1		13,3752	01353 0	E3J22R2M	
0853			13,3753	43525 1	PDDL RVQ	J22 TERM X R**4 IN 2D, SCALED B61
0854	REF 6	LAST 1237	13,3754	00023 0	COSPHI/2	SAME AS URPV +4 Z COMPONENT

L INFLIGHT ALIGNMENT ROUTINES

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0001 22,3773 BANK 22
 0002 REF 2 LAST 324 23,2000 SETLOC INFLIGHT
 0003 23,3247 BANK

0004 REF 23 LAST 974 23,1642 EBANK= XSM

R0005 CALCGTG COMPUTES THE GYRO TORQUE ANGLES REQUIRED TO BRING THE STABLE MEMBER INTO THE DESIRED ORIENTATION.

R0007 THE INPUT IS THE DESIRED STABLE MEMBER COORDINATES REFERRED TO PRESENT STABLE MEMBER COORDINATES. THE THREE
 R0009 HALF-UNIT VECTORS ARE STORED AT XDC, YDC, AND ZDC.

P0010 THE OUTPUTS ARE THE THREE GYRO TORQUING ANGLES TO BE APPLIED TO THE Y, Z, AND X GYROS AND ARE STORED UP AT IGC,
 R0012 MGC, AND UGC RESPECTIVELY.

0013	REF	1				COUNT*	\$/INFLT		
0014				23,3247	71220 1	CALCGTA	ITA	LOAD	PUSHDOWN 00-03, 160-270, 340-370
0015	REF	41	LAST 1245	23,3250	00051 0			S2	XDC = (XD1 XD2 XD3)
0016	REF	6	LAST 974	23,3251	02665 0			XDC	YDC = (YD1 YD2 YD3)
0017				23,3252	65325 0		PDDL	PDDL	ZDC = (ZD1 ZD2 ZD3)
0018	REF	15	LAST 1146	23,3253	06522 1			HI6ZEROS	
0019	REF	7	LAST 1249	23,3254	02671 0			XDC +4	
0020				23,3255	55476 1		DCOMP	VDEF	
0021				23,3256	77656 1		UNIT		
0022	REF	1		23,3257	14027 1		STOOL	ZPRIME	ZP = UNIT(-XD3 0 XD1) = (ZP1 ZP2 ZP3)
0023	REF	2	LAST 1249	23,3260	00027 1			ZPRIME	
0024				23,3261	77742 0		SR1		
0025	REF	12	LAST 1137	23,3262	14023 0		STOOL	SIN H	SIN(IGC) = ZP1
0026	REF	3	LAST 1249	23,3263	00033 1			ZPRIME +4	
0027				23,3264	77742 0		SR1		
0028	REF	11	LAST 1137	23,3265	34021 0		STCALL	COS H	COS(IGC) = ZP3
0029	REF	4	LAST 322	23,3266	47320 0			ARC TRIG	
0030	REF	2	LAST 123	23,3267	16742 1		STOOL	IGC	Y GYRO TORQUING ANGLE FRACTION OF REV.
0031	REF	8	LAST 1249	23,3270	02667 1			XDC +2	
0032				23,3271	77742 0		SR1		
0033	REF	13	LAST 1249	23,3272	14023 0		STOOL	SIN H	SIN(MGC) = XD2
0034	REF	4	LAST 1249	23,3273	00027 1			ZPRIME	
0035				23,3274	65205 0		DMP	PDDL	
0036	REF	9	LAST 1249	23,3275	02671 0			XDC +4	P000 = (ZP1)(XD3)
0037	REF	5	LAST 1249	23,3276	00033 1			ZPRIME +4	
0038				23,3277	45205 1		DMP	DSU	
0039	REF	10	LAST 1249	23,3300	02665 0			XDC	MPAC = (ZP3)(XD1)
0040				23,3301	77626 0		STADR		
0041	REF	12	LAST 1249	23,3302	43756 1		STCALL	COS H	COS(MGC) = MPAC - P000
0042	REF	5	LAST 1249	23,3303	47320 0			ARC TRIG	

L INFLIGHT-ALIGNMENT-ROUTINES

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0043	REF	2	LAST	123	23,3304	26744 1	STOVL	MGC	Z GYRO TORQUING ANGLE	FRACTION OF REV.
0044	REF	6	LAST	1249	23,3305	00027 1		ZPRIME		
0045					23,3306	77641 1	DOT			
0046	REF	4	LAST	931	23,3307	02701 0		ZDC		
0047	REF	13	LAST	1249	23,3310	24021 1	STOVL	COSTH	$\cos(\theta_{GC}) = ZP \cdot ZDC$	
0048	REF	7	LAST	1250	23,3311	00027 1		ZPRIME		
0049					23,3312	77641 1	DOT			
0050	REF	4	LAST	931	23,3313	02673 1		YDC		
0051	REF	14	LAST	1249	23,3314	34025 1	STCALL	SINTH	$\sin(\theta_{GC}) = ZP \cdot YDC$	
0052	REF	6	LAST	1249	23,3315	47320 0		ARCTAN		
0053	REF	14	LAST	971	23,3316	36740 1	STCALL	GGC	X GYRO TORQUING ANGLE	FRACTION OF REV.
0054	REF	42	LAST	1249	23,3317	00051 0		S2		

L INFLIGHT ALIGNMENT ROUTINES

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R0055 ARCTRIG COMPUTES AN ANGLE GIVEN THE SINE AND COSINE OF THIS ANGLE.

R0056 THE INPUTS ARE SIN/4 AND COS/4 STORED DP AT SINTH AND COSTH.

R0057 THE OUTPUT IS THE CALCULATED ANGLE BETWEEN +.5 AND -.5 REVOLUTIONS AND STORED AT THETA. THE OUTPUT IS ALSO
R0059 AVAILABLE AT MPAC.

0060			23,3320	51545 1	ARCTRIG	DLOAD	ABS	PUSHDOWN 16D-21D
0061	REF 15	LAST 1250	23,3321	00023 0			SINTH	
0062			23,3322	50025 0		DSU	BMN	
0063	REF 1		23,3323	07534 1			QTSN45	ABS(SIN/4) - SIN(45)/4
0064	REF 1		23,3324	47333 1			TRIG1	IF (-45,45) OR (135,-135)
0065			23,3325	72545 0		DLOAD	SL1	(45,135) OR (-135,-45)
0066	REF 14	LAST 1250	23,3326	00021 1			COSTH	
0067			23,3327	75326 1		ACOS	SIGN	
0068	REF 16	LAST 1251	23,3330	00023 0			SINTH	
0069	REF 7	LAST 1137	23,3331	00025 0		STORE	THETA	X = ARCCOS(COS) WITH SIGN(SIN)
0070			23,3332	77616 0		RVQ		
0071			23,3333	72545 0	TRIG1	DLOAD	SL1	(-45,45) OR (135,-135)
0072	REF 17	LAST 1251	23,3334	00023 0			SINTH	
0073			23,3335	77736 0		ASIN		
0074	REF 8	LAST 1251	23,3336	14025 0		STODL	THETA	X = ARCSIN(SIN) WITH SIGN(SIN)
0075	REF 15	LAST 1251	23,3337	00021 1			COSTH	
0076			23,3340	77640 0		BMN		
0077	REF 1		23,3341	47344 1			TRIG2	IF (135,-135)
0078			23,3342	43545 1		DLOAD	RVQ	
0079	REF 9	LAST 1251	23,3343	00025 0			THETA	X = ARCSIN(SIN) (-45,45)
0080			23,3344	75345 1	TRIG2	DLOAD	SIGN	(135,-135)
0081	REF 6	LAST 1146	23,3345	06520 0			HIDPHALF	
0082	REF 18	LAST 1251	23,3346	00023 0			SINTH	
0083			23,3347	77625 0		DSU		
0084	REF 10	LAST 1251	23,3350	00025 0			THETA	
0085	REF 11	LAST 1251	23,3351	00025 0		STORE	THETA	X = .5 WITH SIGN(SIN) - ARCSIN(SIN)
0086			23,3352	77616 0		RVQ		(+) - (+) OR (-) - (-)

L INFLIGHT ALIGNMENT ROUTINES

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RO087 SMN8, NBSM, AND AXISROT, WHICH USED TO APPEAR HERE, HAVE BEEN
 RO088 COMBINED IN A ROUTINE CALLED AX*SR*T, WHICH APPEARS AMONG THE POWERED
 RO089 FLIGHT SUBROUTINES.

L INFLIGHT ALIGNMENT ROUTINES

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R0090 CALCGA COMPUTES THE CDU DRIVING ANGLES REQUIRED TO BRING THE STABLE MEMBER INTO THE DESIRED ORIENTATION.

R0092 THE INPUTS ARE 1) THE NAVIGATION BASE COORDINATES REFERRED TO ANY COORDINATE SYSTEM. THE THREE HALF-UNIT
 R0094 VECTORS ARE STORED AT XNB, YNB, AND ZNB. 2) THE DESIRED STABLE MEMBER COORDINATES REFERRED TO THE SAME
 R0096 COORDINATE SYSTEM ARE STORED AT XSM, YSM, AND ZSM.

R0097 THE OUTPUTS ARE THE THREE CDU DRIVING ANGLES AND ARE STORED SP AT THETAD, THETAD +1, AND THETAD +2.

0099				23,3353	77601 0	CALCGA	SETPD		PUSHDOWN 00-05, 160-210, 340-370
0100				23,3354	00001 0			0	
0101				23,3355	47375 0		VLOAD	VXV	
0102	REF	8	LAST	968	23,3356	02665 0		XNB	XNB = OGA (OUTER GIMBAL AXIS)
0103	REF	2	LAST	122	23,3357	02651 1		YSM	YSM = IGA (INNER GIMBAL AXIS)
0104				23,3360	41456 0		UNIT	PUSH	PDO = UNIT(OGA X IGA) = MGA
0105				23,3361	44041 1		DOT	ITA	
0106	REF	6	LAST	981	23,3362	02701 0		ZNB	
0107	REF	43	LAST	1250	23,3363	00051 0		S2	
0108	REF	16	LAST	1251	23,3364	24021 1	STOVL	COSTH	$\cos(OG) = MGA \cdot ZNB$
0109				23,3365	00001 0			0	
0110				23,3366	77641 1		DOT		
0111	REF	6	LAST	981	23,3367	02673 1		YNB	
0112	REF	19	LAST	1251	23,3370	34023 1	STCALL	SINTH	$\sin(OG) = MGA \cdot YNB$
0113	REF	7	LAST	1250	23,3371	47320 0		ARCTRIG	
0114	REF	15	LAST	1250	23,3372	26740 0	STOVL	OGC	
0115				23,3373	00001 0			0	
0116				23,3374	50235 0		VXV	DOT	PROVISION FOR MG ANGLE OF 90 DEGREES
0117	REF	9	LAST	1253	23,3375	02665 0		XNB	
0118	REF	3	LAST	1253	23,3376	02651 1		YSM	
0119				23,3377	77752 1		SL1		
0120	REF	17	LAST	1253	23,3400	24021 1	STOVL	COSTH	$\cos(MG) = IGA \cdot (MGA \cdot X \cdot OGA)$
0121	REF	4	LAST	1253	23,3401	02651 1		YSM	
0122				23,3402	77641 1		DOT		
0123	REF	10	LAST	1253	23,3403	02665 0		XNB	
0124	REF	20	LAST	1253	23,3404	34023 1	STCALL	SINTH	$\sin(MG) = IGA \cdot OGA$
0125	REF	8	LAST	1253	23,3405	47320 0		ARCTRIG	
0126	REF	3	LAST	1250	23,3406	02744 1	STORE	MGC	
0127				23,3407	45246 0		ABS	DSU	
0128	REF	1		23,3410	07536 0			.166...	
0129				23,3411	77644 1		BPL		
0130	REF	1		23,3412	47431 1			GIMLOCK1	IF ANGLE GREATER THAN 60 DEGREES
0131				23,3413	50375 0	CALCGA1	VLOAD	DOT	
0132	REF	2	LAST	122	23,3414	02657 1		ZSM	
0133				23,3415	00001 0			0	
0134	REF	18	LAST	1253	23,3416	24021 1	STOVL	COSTH	$\cos(IG) = ZSM \cdot MGA$
0135	REF	24	LAST	1249	23,3417	02643 1		XSM	

L INFLIGHT ALIGNMENT ROUTINES

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0136 23,4420 45441 1
0137 REF 21 LAST 1253 23,3421 43754 0
0138 REF 9 LAST 1253 23,3422 47320 0

DOT STADR
STCALL SINTH
ARCTRIG

SIN(IG) = XSM . MGA

0139 REF 3 LAST 1249 23,3423 26742 1
0140 REF 16 LAST 1253 23,3424 02740 0
0141 23,3425 77634 0
01415 REF 4 LAST 483 23,3426 21620 0
0143 REF 20 LAST 968 23,3427 34322 0
0144 REF 44 LAST 1253 23,3430 00051 0

STOVL IGC
LGC
RTB
VISTO2S
STCALL THETAD
S2

0145 23,3431 77776 1
0146 REF 43 LAST 1243 23,3432 0 5567 0
0147 23,3433 00401 1
0148 REF 69 LAST 1242 23,3434 0 5504 0
0149 REF 2 LAST 374 23,3435 00056 1

GIMLOCK1 EXIT

TC ALARM
DCT 00401
TC UPFLAG
ADRES GLOCKFAIL

GIMBAL LOCK HAS OCCURED

0150 REF 237 LAST 1243 23,3436 0 6037 0
0151 23,3437 77650 1
0152 REF 1 23,3440 47413 1

TC INTPRET
GUTU
CALCGA?

L INFLIGHT ALIGNMENT ROUTINES

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R0153 AXISGEN COMPUTES THE COORDINATES OF ONE COORDINATE SYSTEM REFERRED TO ANOTHER COORDINATE SYSTEM.

R0155 THE INPUTS ARE 1) THE STAR1 VECTOR REFERRED TO COORDINATE SYSTEM A STORED AT STARAD. 2) THE STAR2 VECTOR
 R0157 REFERRED TO COORDINATE SYSTEM A STORED AT STARAD +6. 3) THE STAR1 VECTOR REFERRED TO COORDINATE SYSTEM B STORED
 R0159 AT LOCATION 6 OF THE VAC AREA. 4) THE STAR2 VECTOR REFERRED TO COORDINATE SYSTEM B STORED AT LOCATION 12D OF
 R0161 THE VAC AREA.

R0162 THE OUTPUT DEFINES COORDINATE SYSTEM A REFERRED TO COORDINATE SYSTEM B. THE THREE HALF-UNIT VECTORS ARE STORED
 R0164 AT LOCATIONS XDC, XDC +6, XDC +12D, AND STARAD, STARAD +6, STARAD +12D.

0155				23,3441	66370 0	AXISGEN	AXT,1	SSP		PUSHDOWN	00-30D,34D-37D
0166	REF	32	LAST	971	23,3442	02714 1		STARAD +6			
0167	REF	29	LAST	1235	23,3443	00051 0		S1			
0168	REF	33	LAST	1255	23,3444	02700 1		STARAD -6			
0169					23,3445	77601 0		SETPD			
0170					23,3446	00001 0		0			
0171					23,3447	46773 0	AXISGEN1	VLOAD*	VXV*	06D	UA = S1
0172	REF	34	LAST	1255	23,3450	02723 0		STARAD +12D,1			STARAD +00D UB = S1
0173	REF	35	LAST	1255	23,3451	02731 0		STARAD +18D,1			
0174					23,3452	77656 1		UNIT		12D	VA = UNIT(S1 X S2)
0175	REF	36	LAST	1255	23,3453	06731 1		STORE	STARAD +18D,1		STARAD +06D VB = UNIT(S1 X S2)
0176					23,3454	77773 1		VLOAD*			
0177	REF	37	LAST	1255	23,3455	02723 0		STARAD +12D,1			
0178					23,3456	76433 1		VXV*	VSL1		
0179	REF	38	LAST	1255	23,3457	02731 0		STARAD +18D,1	18D	WA = UA X VA	
0180	REF	39	LAST	1255	23,3460	06757 1		STORE	STARAD +24D,1		STARAD +12D WB = UB X VB
0181					23,3461	77700 0		TIX,1			
0182	REF	1			23,3462	47447 0		AXISGEN1			
0183					23,3463	66160 0		AXC,1	SXA,1		
0184					23,3464	00006 1		6			
0185					23,3465	00036 1		30D			
0186					23,3466	66370 0		AXT,1	SSP		
0187					23,3467	00022 1		18D			
0188	REF	30	LAST	1255	23,3470	00051 0		S1			
0189					23,3471	00006 1		6			
0190					23,3472	66374 1		AXT,2	SSP		
0191					23,3473	00006 1		6			
0192	REF	45	LAST	1254	23,3474	00052 0		S2			
0193					23,3475	00002 0		2			
0194					23,3476	76720 0	AXISGEN2	XCHX,1	VLOAD*		
0195					23,3477	00036 1		30D		X1=-6 X2=+6	X1=-6 X2=+4 X1=-6 X2=+2
0196					23,3500	00001 0		0,1			

L INFLIGHT ALIGNMENT ROUTINES

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0197			23,3501	62757 0	VXSC*	PDVL*	J=(UA)(UB1)	J=(UA)(UB2)	J=(UA)(UB3)
0198	REF	40	LAST 1255	23,3502	75062 1	STARAD +6.2			
0199				23,3503	00007 0	6.1			
0200				23,3504	77757 1	VXSC*			
0201	REF	41	LAST 1256	23,3505	75054 1	STARAD +120.2			
0202				23,3506	30031 0	STOVL* 240	K=(VA)(VB1)	J=(VA)(VB2)	J=(VA)(VB3)
0203				23,3507	00015 0	120.1			
0204				23,3510	53357 0	VXSC*	VAD		
0205	REF	42	LAST 1256	23,3511	75046 1	STARAD +180.2	L=(WA)(WB1)	J=(WA)(WB2)	J=(WA)(WB3)
0206				23,3512	76455 1	VAD	VSL1		
0207				23,3513	00031 0	240			
0208				23,3514	53520 0	XCHX,1	UNIT		
0209				23,3515	00036 1	300			
0210	REF	11	LAST 1249	23,3516	06707 1	STORE	XDC +180.1	XDC = L+J+K	YDC = L+J+K
							ZDC = L+J+K		
0211				23,3517	77700 0	TIX,1			
0212	REF	1		23,3520	47521 1	AXISGEN3			
0213				23,3521	77704 1	AXISGEN3	TIX,2		
0214	REF	1		23,3522	47476 1	AXISGEN2			
0215				23,3523	77775 1	VLOAD			
0216	REF	12	LAST 1256	23,3524	02665 0	XDC			
0217	REF	43	LAST 1256	23,3525	26707 0	STOVL	STARAD		
0218	REF	5	LAST 1250	23,3526	02673 1	YDC			
0219	REF	44	LAST 1256	23,3527	26715 0	STOVL	STARAD +6		
0220	REF	5	LAST 1250	23,3530	02701 0	ZDC			
0221	REF	45	LAST 1256	23,3531	02723 0	STORE	STARAD +120		
0222				23,3532	77616 0	RVQ			

L INFLIGHT ALIGNMENT ROUTINES

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0281	23,3533	05520 0	QTSN45	2DEC	.1768
0281	23,3534	26075 1			
0282	23,3535	05252 1	.166...	2DEC	.166666667
0282	23,3536	25253 1			

3770420

GAP: ASSEMBLE REVISION 001 OF AGC PROGRAM LMY99 BY NASA 2021112-061

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L INFLIGHT ALIGNMENT ROUTINES

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L POWERED FLIGHT SUBROUTINES

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0001 14,3774 BANK 14 SAME FBANK AS THE FINDCDUD SUB-PROGRAM
 0002 REF 1 23,2000 SETLOC POWFLITE
 0003 23,3537 BANK

0004 REF 1 0142 EBANK=DEXDEX
 0005 REF 1 COUNT*\$\$/POWFL

R0006 CDUTRIG, CDUTRIG1, CDUTRIG2, AND CD*TR*GS ALL COMPUTE THE SINES AND
 R0007 COSINES OF THREE 2'S COMPLEMENT ANGLES AND PLACE THE RESULT, DOUBLE
 R0008 PRECISION, IN THE SAME ORDER AS THE INPUTS, AT SINCDU AND COSCDU. AN
 R0009 ADDITIONAL OUTPUT IS THE 1'S COMPLEMENT ANGLES AT CDUSPOT. THESE
 R0010 ROUTINES GO OUT OF THEIR WAY TO LEAVE THE MPAC AREA AS THEY FIND IT,
 R0011 EXCEPT FOR THE GENERALLY UNIMPORTANT MPAC +2. THEY DIFFER ONLY IN
 R0012 WHERE THEY GET THE ANGLES, AND IN METHOD OF CALLING.

R0013 CDUTRIG (AND CDUTRIG1, WHICH CAN BE CALLED IN BASIC) COMPUTE THE
 R0014 SINES AND COSINES FROM THE CURRENT CONTENTS OF THE CDU REGISTERS.
 R0015 THE CONTENTS OF CDUTEMP, ETC., ARE NOT TOUCHED SO THAT THEY MAY
 R0016 CONTINUE TO FORM A CONSISTENT SET WITH THE LATEST PIPA READINGS.

R0017 CDUTRIG1 IS LIKE CDUTRIG EXCEPT THAT IT CAN BE CALLED IN BASIC.

R0018 CD*TR*GS FINDS CDU VALUES IN CDUSPOT RATHER THAN IN CDUTEMP. THIS
 R0019 ALLOWS USERS TO MAKE TRANSFORMATIONS USING ARBITRARY ANGLES, OR REAL
 R0020 ANGLES IN AN ORDER OTHER THAN X-Y-Z. A CALL TO THIS ROUTINE IS
 R0021 NECESSARY IN PREPARATION FOR A CALL TO AX*SR*T IN EITHER OF ITS TWO
 R0022 MODES (SYNB OR NBSM). SINCE AX*SR*T EXPECTS TO FIND THE SINES AND
 R0023 COSINES IN THE ORDER Y Z X THE ANGLES MUST HAVE BEEN PLACED IN CDUSPOT
 R0024 IN THIS ORDER. CD*TR*GS NEED NOT BE REPEATED WHEN AX*SR*T IS CALLED
 R0025 MORE THAN ONCE, PROVIDED THE ANGLES HAVE NOT CHANGED. NOTE THAT SINCE
 R0026 IT CLOBBERS BUF2 (IN THE SINE AND COSINE ROUTINES) CD*TR*GS CANNOT BE
 R0027 CALLED USING BANKCALL. SORRY.

R0028 CD*TR*G IS LIKE CD*TR*GS EXCEPT THAT IT CAN BE CALLED IN
 R0029 INTERPRETIVE.

0030 23,3537 77776-1 CDUTRIG EXIT
 0031 REF 1 23,3540 0-3547-1 TC CDUTRIGS
 0032 REF 238 LAST 1254 23,3541 0-6037-0 TC INTPRET
 0033 23,3542 77616-0 RVQ

0034 23,3543 77776-1 CD*TR*G EXIT
 0035 REF 1 23,3544 0-3555-1 TC CD*TR*GS
 0036 REF 239 LAST 1259 23,3545 0-6037-0 TC INTPRET
 0037 23,3546 77616-0 RVQ

0038 REF 17 LAST 948 23,3547 3-0032-0 CDUTRIGS CA CDJX
 0039 REF 26 LAST 968 23,3550 54-772-1 TS CDUSPOT +4
 0040 REF 8 LAST 948 23,3551 3-0033-1 CA CDUY
 0041 REF 27 LAST 1259 23,3552 54-766-1 TS CDUSPOT

L POWERED FLIGHT-SUBROUTINES

USER'S PAGE NO. 2 EO-S3

0042	REF 11	LAST 948	23,3553	3 0034 0	CA	CDUZ	
0043	REF 28	LAST 1259	23,3554	54 770 0	TS	CDUSPOT +2	
0044			23,3555	0 0006 1	CD*TR*GS	EXTEND	
0045	REF 26	LAST 922	23,3556	22 142 0	QXCH	TEM2	
0046	REF 23	LAST 1077	23,3557	3 4751 0	CAF	FOUR	
0047	REF 21	LAST 1047	23,3560	7 6242 1	TR*GL**P	MASK SIX	MAKE IT EVEN AND SMALLER
0048	REF 13	LAST 922	23,3561	54 143 0	TS	TEM3	
0049	REF 14	LAST 1260	23,3562	50 143 1	INDEX	TEM3	
0050	REF 29	LAST 1260	23,3563	3 0766 0	CA	CDUSPOT	
0051	REF 736	LAST 1257	23,3564	52 155 1	DXCH	MPAC	STORING 2'S COMP ANGLE. LOADING MPAC
0052	REF 65	LAST 1073	23,3565	52 127 1	DXCH	VBUF +4	STORING MPAC FOR LATER RESTORATION
0053	REF 5	LAST 824	23,3566	0 4713 0	TC	USPRCADR	
0054	REF 15	LAST 570	23,3567	21576 0	CADR	CDULOGIC	
0055			23,3570	0 0006 1	EXTEND		
0056	REF 737	LAST 1260	23,3571	3 0155 0	DCA	MPAC	
0057	REF 15	LAST 1260	23,3572	50 143 1	INDEX	TEM3	
0058	REF 30	LAST 1260	23,3573	52 767 0	DXCH	CDUSPOT	STORING 1'S COMPLEMENT ANGLE
0059	REF 6	LAST 1260	23,3574	0 4713 0	TC	USPRCADR	
0060	REF 2	LAST 1013	23,3575	01517 0	CADR	COSINE	
0061	REF 738	LAST 1260	23,3576	52 155 1	DXCH	MPAC	
0062	REF 16	LAST 1260	23,3577	50 143 1	INDEX	TEM3	
0063	REF 4	LAST 100	23,3600	52 745 0	DXCH	CDSCDU	STORING COSINE
0064			23,3601	0 0006 1	EXTEND		
0065	REF 17	LAST 1260	23,3602	5 0143 1	INDEX	TEM3	
0066	REF 31	LAST 1260	23,3603	3 0767 1	DCA	CDUSPOT	LOADING 1'S COMPLEMENT ANGLE
0067	REF 7	LAST 1260	23,3604	0 4713 0	TC	USPRCADR	
0068	REF 2	LAST 1013	23,3605	01531 1	CADR	SINE +1	SINE +1 EXPECTS ARGUMENT IN A AND L
0069	REF 66	LAST 1260	23,3606	52 127 1	DXCH	VBUF +4	BRINGING UP PRIOR MPAC TO BE RESTORED
0070	REF 739	LAST 1260	23,3607	52 155 1	DXCH	MPAC	
0071	REF 18	LAST 1260	23,3610	50 143 1	INDEX	TEM3	
0072	REF 4	LAST 100	23,3611	52 737 0	DXCH	SINCDU	
0073	REF 19	LAST 1260	23,3612	10 143 0	CCS	TEM3	
0074	REF 1		23,3613	1 3560 0	TCF	TR*GL**P	
0075	REF 27	LAST 1260	23,3614	0 0142 0	TC	TEM2	

L POWERED FLIGHT SUBROUTINES

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P0076 *****

R0078 QUICTRIG. INTENDED FOR GUIDANCE CYCLE USE WHERE TIME IS CRITICAL, IS A MUCH FASTER VERSION OF CD*TR*GS.
 R0080 QUICTRIG COMPUTES AND STORES THE SINES AND COSINES OF THE 2'S COMPLEMENT ANGLES AT CDUSPOT, CDUSPOT +2,
 R0082 AND CDUSPOT +4. UNLIKE CD*TR*GS, QUICTRIG DOES NOT LEAVE THE 1'S COMPLEMENT VERSIONS OF THE ANGLES IN
 R0084 CDUSPOT. QUICTRIG'S EXECUTION TIME IS 4.1 MS; THIS IS 10 TIMES AS FAST AS CD*TR*GS. QUICTRIG MAY BE
 R0086 CALLED FROM INTERPRETIVE AS AN RTB OP-CODE, OR FROM BASIC VIA BANKCALL OR IBANKCALL.

0090		23,3615	0 0004 0	QUICTRIG INHINT		INHINT SINCE DAP USES THE SAME TEMPS
00901		23,3616	0 0006 1	EXTEND		
00902	REF 38	LAST 903	23,3617	22 061 0	QXCH	ITEMP1
0091	REF 24	LAST 1260	23,3620	3 4751 0	CAF	FOUR
0092	REF 22	LAST 1260	23,3621	7 6242 1	MASK	SIX
0093	REF 14	LAST 903	23,3622	54 062 1	TS	ITEMP2
0094	REF 15	LAST 1261	23,3623	50 062 0	INDEX	ITEMP2
0095	REF 32	LAST 1260	23,3624	3 6766 0	CA	CDUSPOT
0096	REF 5	LAST 602	23,3625	0 5033 1	TC	SPSIN
0097			23,3626	0 0006 1	EXTEND	
0098	REF 68	LAST 1132	23,3627	7 4736 0	MP	BIT14
0099	REF 16	LAST 1261	23,3630	50 062 0	INDEX	ITEMP2
0100	REF 5	LAST 1260	23,3631	52 737 0	DXCH	SINCDU
0101	REF 17	LAST 1261	23,3632	50 062 0	INDEX	ITEMP2
0102	REF 33	LAST 1261	23,3633	3 0766 0	CA	CDUSPOT
0103	REF 5	LAST 602	23,3634	0 5032 0	TC	SPCOS
0104			23,3635	0 0006 1	EXTEND	
0105	REF 69	LAST 1261	23,3636	7 4736 0	MP	BIT14
0106	REF 18	LAST 1261	23,3637	50 062 0	INDEX	ITEMP2
0107	REF 5	LAST 1260	23,3640	52 745 0	DXCH	COSCDU
0108	REF 19	LAST 1261	23,3641	10 062 1	CCS	ITEMP2
0109	REF 5	LAST 912	23,3642	1 3621 0	TCF	QUICTRIG +4
01091	REF 39	LAST 1261	23,3643	3 0061 0	CA	ITEMP1
0110			23,3644	0 0003 1	RELINT	
01101	REF 377	LAST 1220	23,3645	0 0000 1	TC	A

SCALE DOWN TO MATCH INTERPRETER OUTPUTS

L POWERED FLIGHT-SUBROUTINES

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R0111 *****

R0113 THESE INTERFACE ROUTINES MAKE IT POSSIBLE TO CALL AX*SR*T, ETC., IN
 R0114 INTERPRETIVE. LATER, WHERE POSSIBLE, THEY WILL BE ELIMINATED.

R0127 ~~THESE INTERFACE ROUTINES ARE PERMANENT. ALL RESTORE USER'S EBANK~~
 R0128 ~~SETTING. ALL ARE STRICT INTERPRETIVE SUBROUTINES, CALLED USING "CALL".~~
 R0129 ~~RETURNING VIA QPRET. ALL EXPECT AND RETURN THE VECTOR TO BE TRANSFOR-~~
 R0130 ~~MED INTERPRETER-STYLE IN MPAC; COMPONENTS AT MPAC, MPAC +3, AND MPAC +5.~~

R0131 TRG*SMNB AND TRG*NBSM BOTH EXPECT TO SEE THE 2'S COMPLEMENT ANGLES
 R0132 ~~AT CDUSPOT (ORDER Y-Z-X, AT CDUSPOT, CDUSPOT +2, AND CDUSPOT +4; ODD~~
 R0133 ~~LOCATIONS NEED NOT BE ZEROED). TRG*NBSM DOES THE NB TO SM TRANSFOR-~~
 R0134 ~~MATION; TRG*SMNB, VICE-VERSA.~~

R0135 CDU*NBSM DOES ITS TRANSFORMATION USING THE PRESENT CONTENTS OF
 R0136 THE CDU COUNTERS. OTHERWISE IT IS LIKE TRG*NBSM.

R01361 CDU*SMNB IS THE COMPLEMENT OF CDU*NBSM.

01362				23,3646	77776 1	CDU*SMNB EXIT		
01363	REF	2	LAST 1259	23,3647	0 3547 1	TC	CDUTRIGS	
01364	REF	1		23,3650	1 3653 0	TCF	C*MM*N1	

0137				23,3651	77776 1	TRG*SMNB EXIT		
0138	REF	2	LAST 1259	23,3652	0 3555 1	TC	CD*TR*GS	
0139	REF	4	LAST 1070	23,3653	0 7532 1	C*MM*N1	TC	MPACVBUF
0140	REF	32	LAST 1099	23,3654	4 6245 0	CS	THREE	AX*SR*T EXPECTS VECTOR IN VBUF
0141	REF	2	LAST 601	23,3655	0 3675 0	C*MM*N2	TC	AX*SR*T
0142	REF	240	LAST 1259	23,3656	0 6037 0	TC	INTPRET	SIGNAL FOR SM TO NB TRANSFORMATION
0143				23,3657	43575 1	VLOAD	RVQ	
0144	REF	67	LAST 1260	23,3660	00123 1		VBUF	

0145				23,3661	77776 1	CDU*NBSM EXIT		
0146	REF	3	LAST 1262	23,3662	0 3547 1	TC	CDUTRIGS	
0147	REF	1		23,3663	1 3666 0	TCF	C*MM*N3	

0148				23,3664	77776 1	TRG*NBSM EXIT		
0149	REF	3	LAST 1262	23,3665	0 3555 1	TC	CD*TR*GS	
0150	REF	5	LAST 1262	23,3666	0 7532 1	C*MM*N3	TC	MPACVBUF
0151	REF	33	LAST 1262	23,3667	3 6245 1	CA	THREE	FOR AX*SR*T
0152	REF	1		23,3670	1 3655 0	TCF	C*MM*N2	SIGNAL FOR NB TO SM TRANSFORMATION

R0153 *NBSM* AND *SMNB* EXPECT TO SEE THE SINES AND COSINES (AT SINCDU
 R0154 AND COSCDU) RATHER THAN THE ANGLES THEMSELVES. OTHERWISE THEY ARE
 R0155 LIKE TRG*NBSM AND TRG*SMNB.

R0156 NOTE THAT JUST AS CD*TR*GS NEED BE CALLED ONLY ONCE FOR EACH SERIES
 R0157 OF TRANSFORMATIONS USING THE SAME ANGLES, SO TOO ONLY ONE OF TRG*NBSM

L POWERED FLIGHT SUBROUTINES

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R0158 AND TRG*SMNB NEED BE CALLED FOR EACH SERIES. FOR SUBSEQUENT TRANSFOR-
 R0159 MATIONS USE *NBSM* AND *SMNB*.

0160 23,3671 77776 1 *SMNB* EXIT
 0161 REF 2 LAST 1262 23,3672 1 3653 0 TCF C*MM*N1

0162 23,3673 77776 1 *NBSM* EXIT
 0163 REF 2 LAST 1262 23,3674 1 3666 0 TCF C*MM*N3

R0164 AX*SR*T COMBINES THE OLD SMNB AND NBSM. FOR THE NB TO SM
 R0165 TRANSFORMATION, ENTER WITH +3 IN A. FOR SM TO NB, ENTER WITH -3.
 R0166 THE VECTOR TO BE TRANSFORMED ARRIVES, AND IS RETURNED, IN VBUF.
 R0167 AX*SR*T EXPECTS TO FIND THE SINES AND COSINES OF THE ANGLES OF ROTATION
 R0168 AT SINCDU AND COSCDU. IN THE ORDER Y Z X. A CALL TO CD*TR*GS, WITH
 R0169 THE 2'S COMPLEMENT ANGLES (ORDER Y Z X) AT CDUSPOT, WILL TAKE CARE OF
 R0170 THIS. HERE IS A SAMPLE CALLING SEQUENCE:-

R0171 TC CDUTRIGS
 R0172 CS THREE ("CA THREE" FOR NBSM)
 R0173 TC AX*SR*T

R0174 THE CALL TO CD*TR*GS NEED NOT BE REPEATED, WHEN AX*SR*T IS CALLED MORE
 R0175 THAN ONCE, UNLESS THE ANGLES HAVE CHANGED.

R0176 AX*SR*T IS GUARANTEED SAFE ONLY FOR VECTORS OF MAGNITUDE LESS THAN
 R0177 UNITY. A LOOK AT THE CASE IN WHICH A VECTOR OF GREATER MAGNITUDE
 R0178 HAPPENS TO LIE ALONG AN AXIS OF THE SYSTEM TO WHICH IT IS TO BE TRANS-
 R0179 FORMED CONVINCES ONE THAT THIS IS A RESTRICTION WHICH MUST BE ACCEPTED.

0180 REF 2 LAST 1259 23,3675 54 142 1 AX*SR*T TS DEXDEX WHERE IT BECOMES THE INDEX OF INDEXES
 0181 23,3676 0 0006 1 EXTEND
 0182 REF 1 23,3677 22 145 1 DXCH RTNSAVER

0183 REF 3 LAST 1263 23,3700 10 142 1 R*TL**P CCS DEXDEX +3 --> 0 -3 --> 2
 0184 REF 4 LAST 1263 23,3701 4 0142 1 CS DEXDEX THUS: +2 --> 1 -2 --> 1
 0185 REF 34 LAST 1262 23,3702 6 6245 1 AD THREE +1 --> 2 -1 --> 0
 0186 23,3703 0 0006 1 EXTEND
 0187 REF 378 LAST 1261 23,3704 5 0000 1 INDEX A
 0188 REF 1 23,3705 3 3764 1 DCA INDEXI
 0189 REF 1 23,3706 52 144 1 DXCH DEXI

0190 REF 127 LAST 1183 23,3707 3 4753 1 CA ONE
 0191 REF 160 LAST 1115 23,3710 54 130 1 TS BUF
 0192 23,3711 0 0006 1 EXTEND
 0193 REF 2 LAST 98 23,3712 5 0143 1 INDEX DEXI
 0194 REF 63 LAST 1262 23,3713 4 0123 0 DCS VBUF
 0195 REF 1 23,3714 1 3716 0 TCF LOOP1

REALLY BE A SUBTRACT, AND VICE VERSA

0196 REF 161 LAST 1263 23,3715 52 131 0 LOOP2 DXCH BUF LOADING VECTOR COMPONENT, STORING INDEX

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0197	REF 740	LAST 1260	23,3716	52 155 1	LOUP1	DXCH	MPAC	
0198	REF 1		23,3717	3 3762 1		CA	SINESLOC	
0199	REF 3	LAST 1263	23,3720	6 0143 1		AD	DEX1	
0200	REF 81	LAST 1076	23,3721	54 116 0		TS	ADDRWD	
0201	REF 21	LAST 1085	23,3722	0 7107 0		TC	DMPSUB	MULTIPLY BY SIN(CDUANGLE)
0202	REF 5	LAST 1263	23,3723	10 142 1		CCS	DEXDEX	
0203	REF 741	LAST 1264	23,3724	52 155 1		DXCH	MPAC	NBSM CASE
0204			23,3725	1 3730 1		TCF	+3	
0205			23,3726	0 0006 1		EXTEND		SMNB CASE
0206	REF 742	LAST 1264	23,3727	4 0155 1		DGS	MPAC	
0207	REF 1		23,3730	52 160 1		DXCH	TERMITMP	
0208	REF 23	LAST 1261	23,3731	3 6242 0		CA	SIX	SINCDU AND COSCDU (EACH 6 WORDS) MUST
0209	REF 82	LAST 1264	23,3732	26 116 0		ADS	ADDRWD	BE CONSECUTIVE AND IN THAT ORDER
0210			23,3733	0 0006 1		EXTEND		
0211	REF 162	LAST 1263	23,3734	5 0130 0		INDEX	BUF	
0212	REF 4	LAST 1264	23,3735	5 0143 1		INDEX	DEX1	
0213	REF 69	LAST 1263	23,3736	3 0123 1		DCA	VBUF	
0214	REF 743	LAST 1264	23,3737	52 155 1		DXCH	MPAC	
0215	REF 22	LAST 1264	23,3740	0 7107 0		TC	DMPSUB	MULTIPLY BY COS(CDUANGLE)
0216	REF 744	LAST 1264	23,3741	52 155 1		DXCH	MPAC	
0217	REF 2	LAST 1264	23,3742	20 160 1		DAS	TERMITMP	
0218	REF 3	LAST 1264	23,3743	52 160 1		DXCH	TERMITMP	
0219			23,3744	20 001 1		DDOUBL		
0220	REF 163	LAST 1264	23,3745	50 130 0		INDEX	BUF	
0221	REF 5	LAST 1264	23,3746	50 143 1		INDEX	DEX1	
0222	REF 70	LAST 1264	23,3747	52 123 0		DXCH	VBUF	
0223	REF 164	LAST 1264	23,3750	52 131 0		DXCH	BUF	LOADING INDEX, STORING VECTOR COMPONENT
0224	REF 379	LAST 1263	23,3751	10 000 0		CCS	A	'CAUSE THAT'S WHERE THE INDEX NOW IS
0225	REF 1		23,3752	1 3715 0		TCF	LOOP2	
0226			23,3753	0 0006 1		EXTEND		
0227	REF 6	LAST 1264	23,3754	26 142 1		DIM	DEXDEX	DECREMENT MAGNITUDE PRESERVING SIGN
0228	REF 7	LAST 1264	23,3755	10 142 1	TSTPOINT	CCS	DEXDEX	ONLY THE BRANCHING FUNCTION IS USED
0229	REF 1		23,3756	1 3700 1		TCF	R*TL**P	
0230	REF 2	LAST 1263	23,3757	0 0145 1		TC	RTNSAVER	
0231	REF 2	LAST 1264	23,3760	1 3700 1		TCF	R*TL**P	
0232	REF 3	LAST 1264	23,3761	0 0145 1		TC	RTNSAVER	
0233	REF 6	LAST 1261	23,3762	00736 0	SINESLOC	ADRES	SINCDU	FOR USE IN SETTING ADDRWD
0234			23,3763	00004 0	INDEXI	DEC	4	***** DON'T *****
0235			23,3764	00002 0		DEC	2	***** TOUCH *****
0236			23,3765	00000 1		DEC	0	***** THESE *****

L POWERED FLIGHT SUBROUTINES

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0237 23,3766 00004-0 DEC 4 ***** CONSTANTS *****

R0238 *****

0240 10,2030 BANK 10
 0241 REF 1 10,2000 SETLOC FLESHLOC
 0242 10,2030 BANK
 0243 REF 1 COUNT* \$\$/POWFL

R0244 ROUTINE FLESHPOT COMPUTES THE BODY-STABLE MEMBER TRANSFORMATION MATRIX (COMMONLY CALLED XNB) AND STORES
 R0246 IT IN THE LOCATIONS SPECIFIED BY THE ECADR ENTERING IN A.

0247 10,2030 77776-1 CALCSMSC EXIT
 0248 REF 310 LAST 977 10,2031 0 4616-1 TC BANKCALL
 02481 REF 2 LAST 861 10,2032 20036-0 CADR FLESHPOT -1
 02482 REF 241 LAST 1262 10,2033 0 6037-0 TC INTPRET
 02483 10,2034 77616-0 RVQ

0249 REF 11 LAST 1253 10,2035 02664-1 XNBECADR ECADR XNB

0250 REF 1 10,2036 3-2035-0 -1 CAF XNBECADR

0251 REF 28 LAST 1260 10,2037 54 142-1 FLESHPOT TS TEM2
 0252 REF 62 LAST 1089 10,2040 56 003-1 XCH EBANK
 0253 REF 29 LAST 1265 10,2041 56 142-0 XCH TEM2
 0254 REF 15 LAST 1089 10,2042 7 4357-0 MASK LOW8
 0255 REF 8 LAST 1099 10,2043 6 5007-0 AD COT1400
 0256 REF 22 LAST 1070 10,2044 54 141-1 TS TEM1

0257 10,2045 0 0006-1 EXTEND
 0258 REF 3 LAST 478 10,2046 3 0745-1 DCA COSCDUY
 0259 REF 745 LAST 1264 10,2047 52 155-1 DXCH MPAC
 0260 REF 17 LAST 796 10,2050 0 7103-1 TC DMP
 0261 REF 7 LAST 917 10,2051 00746-1 ADRES COSCDUZ
 0262 REF 746 LAST 1265 10,2052 52 155-1 DXCH MPAC
 0263 10,2053 20 001-1 DDOUBL
 0264 REF 23 LAST 1265 10,2054 50 141-0 INDEX TEM1
 0265 10,2055 52 001-1 DXCH 0 = COSY COSZ

0266 10,2056 0 0006-1 EXTEND
 0267 REF 6 LAST 917 10,2057 3 0741-0 DCA SINCDUZ
 0268 REF 24 LAST 1265 10,2060 50 141-0 INDEX TEM1
 0269 10,2061 52 003-0 DXCH 2 = SINZ

0270 10,2062 0 0006-1 EXTEND
 0271 REF 3 LAST 478 10,2063 4 0737-0 DCS SINCDUY
 0272 REF 747 LAST 1265 10,2064 52 155-1 DXCH MPAC
 0273 REF 23 LAST 1264 10,2065 0 7107-0 TC DMP SUB ADDRND SET TO COSCDUZ

L POWERED FLIGHT SUBROUTINES

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0274 REF 748 LAST 1265 10,2066 52 155 1
0275 10,2067 20 001 1
0276 REF 25 LAST 1265 10,2070 50 141 0
0277 10,2071 52 005 0

DXCH MPAC

DDOUBL

INDEX TEM1

DXCH 4

= - SINY COSZ

0278 10,2072 0 0006 1
0279 REF 5 LAST 917 10,2073 4 0743 0
0280 REF 749 LAST 1266 10,2074 52 155 1
0281 REF 24 LAST 1265 10,2075 0 7107 0
0282 REF 750 LAST 1266 10,2076 52 155 1
0283 10,2077 20 001 1
0284 REF 751 LAST 1266 10,2100 52 160 1

EXTEND

DCS SINCDEX

DXCH MPAC

TC DNPSUB

ADDRWD SET TO COSCDUX STILL

DXCH MPAC

DDOUBL

DXCH MPAC +3

0285 10,2101 0 0006 1
0286 REF 6 LAST 1266 10,2102 4 0743 0
0287 REF 752 LAST 1266 10,2103 52 155 1
0288 REF 18 LAST 1265 10,2104 0 7103 1
0289 REF 7 LAST 1265 10,2105 00740 1
0290 10,2106 0 0006 1
0291 REF 753 LAST 1266 10,2107 4 0155 1
0292 REF 754 LAST 1266 10,2110 52 162 0
0293 REF 19 LAST 1266 10,2111 0 7103 1
0294 REF 4 LAST 1265 10,2112 00736 0
0295 REF 755 LAST 1266 10,2113 52 155 1
0296 10,2114 20 001 1
0297 10,2115 20 001 1
0298 REF 756 LAST 1266 10,2116 52 162 0

EXTEND

DCS SINCDEX

DXCH MPAC

TC DMP

ADRES SINCDEX

EXTEND

DCS MPAC

DXCH MPAC +5

TC DMP

ADRES SINCDEX

DXCH MPAC

DDOUBL

DDOUBL

DXCH MPAC +5

0299 REF 757 LAST 1266 10,2117 52 155 1
0300 REF 20 LAST 1266 10,2120 0 7103 1
0301 REF 4 LAST 1265 10,2121 00744 0
0302 REF 758 LAST 1266 10,2122 52 155 1
0303 10,2123 20 001 1
0304 10,2124 20 001 1
0305 REF 165 LAST 1264 10,2125 52 131 0

DXCH MPAC

TC DMP

ADRES COSCDUX

DXCH MPAC

DDOUBL

DDOUBL

DXCH BUF

0306 10,2126 0 0006 1
0307 REF 5 LAST 1266 10,2127 3 0745 1
0308 REF 759 LAST 1266 10,2130 52 155 1
0309 REF 21 LAST 1266 10,2131 0 7103 1
0310 REF 6 LAST 917 10,2132 00750 0
0311 REF 760 LAST 1266 10,2133 52 155 1
0312 10,2134 20 001 1
0313 REF 761 LAST 1266 10,2135 20 162 0

EXTEND

DCA COSCDUX

DXCH MPAC

TC DMP

ADRES COSCDUX

DXCH MPAC

DDOUBL

DAS MPAC +5

0314 10,2136 0 0006 1
0315 REF 5 LAST 1266 10,2137 3 0737 1
0316 REF 762 LAST 1266 10,2140 52 155 1
0317 REF 25 LAST 1266 10,2141 0 7107 0
0318 REF 763 LAST 1266 10,2142 52 155 1

EXTEND

DCA SINCDEX

DXCH MPAC

TC DNPSUB

ADDRWD SET TO COSCDUX

DXCH MPAC

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0319			10,2143	20 001 1	DDOUBL	
0320	REF 166	LAST 1266	10,2144	20 131 0	DAS	BUF
0321	REF 167	LAST 1267	10,2145	52 131 0	DXCH	BUF
0322	REF 764	LAST 1266	10,2146	52 155 1	DXCH	MPAC
0323			10,2147	0 0006 1	EXTEND	
0324	REF 765	LAST 1267	10,2150	3 0155 0	DCA	MPAC
0325	REF 26	LAST 1266	10,2151	50 141 0	INDEX	TEM1
0326			10,2152	52 015 1	DXCH	14 = SINY COSX + SINX SINZ COSY
0327			10,2153	0 0006 1	EXTEND	
0328	REF 766	LAST 1267	10,2154	3 0160 0	DCA	MPAC +3
0329	REF 27	LAST 1267	10,2155	50 141 0	INDEX	TEM1
0330			10,2156	52 017 0	DXCH	16 = - SINX COSZ
0331			10,2157	0 0006 1	EXTEND	
0332	REF 767	LAST 1267	10,2160	3 0162 1	DCA	MPAC +5
0333	REF 28	LAST 1267	10,2161	50 141 0	INDEX	TEM1
0334			10,2162	52 021 0	DXCH	20 = COSX COSY - SINX SINY SINZ
0335	REF 29	LAST 1267	10,2163	3 0141 0	CA	TEM1
0336	REF 83	LAST 1264	10,2164	54 116 0	TS	ADD 40
0337			10,2165	0 0006 1	EXTEND	
0338	REF 22	LAST 863	10,2166	3 0006 1	DCA	Z
0339	REF 25	LAST 1261	10,2167	6 4751 0	AD	FOR
0340	REF 43	LAST 1116	10,2170	52 165 1	DXCH	LOC
0341	REF 36	LAST 1122	10,2171	3 4744 1	CAF	BIT8
0342	REF 11	LAST 1003	10,2172	54 023 1	TS	EDJP
0343	REF 2	LAST 1011	10,2173	1 7460 0	TCF	VXV
0344	REF 768	LAST 1267	10,2174	52 155 1	DXCH	MPAC
0345			10,2175	20 001 1	DDOUBL	
0346	REF 30	LAST 1267	10,2176	50 141 0	INDEX	TEM1
0347			10,2177	52 007 1	DXCH	6
0348	REF 769	LAST 1267	10,2200	52 160 1	DXCH	MPAC +3
0349			10,2201	20 001 1	DDOUBL	
0350	REF 31	LAST 1267	10,2202	50 141 0	INDEX	TEM1
0351			10,2203	52 011 0	DXCH	10
0352	REF 770	LAST 1267	10,2204	52 162 0	DXCH	MPAC +5
0353			10,2205	20 001 1	DDOUBL	
0354	REF 32	LAST 1267	10,2206	50 141 0	INDEX	TEM1
0355			10,2207	52 013 1	DXCH	12
0356	REF 30	LAST 1265	10,2210	3 0142 0	CA	TEM2
0357	REF 63	LAST 1265	10,2211	54 003 0	TS	EBANK
0358	REF 6	LAST 983	10,2212	1 4631 0	TCF	SWRTURN

L TIME OF FREE FALL

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R0001 THE TFF SUBROUTINES MAY BE USED IN EITHER EARTH OR MOON CENTERED COORDINATES. THE TFF ROUTINES NEVER
 R0003 KNOW WHICH ORIGIN APPLIES. IT IS THE USER WHO KNOWS, AND WHO SUPPLIES RONE, VONE AND 1/SQRT(MU) AT THE
 R0005 APPROPRIATE SCALE LEVEL FOR THE PROPER PRIMARY BODY.

R0006 EARTH ORIGIN POSITION -29 METERS
 R0007 VELOCITY -7 METERS/CENTISECOND
 R0009 1/SQRT(MU) +17 SQRT(CS SQ/METERS CUBED)

R0011 MOON ORIGIN POSITION -27 METERS
 R0012 VELOCITY -5 METERS/CENTISECONDS
 R0014 1/SQRT(MU) +14 SQRT(CS SQ/METERS CUBED)

R0016 ALL DATA PROVIDED TO AND RECEIVED FROM ANY TFF SUBROUTINE WILL BE AT ONE OF THE LEVELS ABOVE. IN ALL CASES,
 R0018 THE FREE FALL TIME IS RETURNED IN CENTISECONDS AT (-28). PROGRAM TFF/CONIC WILL GENERATE VONE/RTMU AND
 R0020 LEAVE IT IN VONE AT (+10) IF EARTH ORIGIN AND (+9) IF MOON ORIGIN.

R0021 THE USER MUST STORE THE STATE VECTOR IN RONE, VONE AND MU IN THE FORM 1/SQRT(MU) IN TFF/RTMU
 R0023 AT THE PROPER SCALE BEFORE CALLING TFF/CONIC. SINCE RONE, VONE ARE IN THE EXTENDED VERB STORAGE AREA,
 R0025 THE USER MUST ALSO LOCK-OUT THE EXTENDED VERBS, AND RELEASE THEM WHEN FINISHED.

R0027 PROGRAMS CALC/TFF AND CALC/TPER ASSUME THAT THE TERMINAL RADIUS IS LESS THAN THE PRESENT
 R0029 RADIUS. THIS RESTRICTION CAN BE REMOVED BY A 15 W CODING CHANGE, BUT AT PRESENT IT IS NOT DEEMED NECESSARY.

R0031 THE FOLLOWING ERASABLE QUANTITIES ARE USED BY THE TFF ROUTINES. AND ARE LOCATED IN THE PUSH LIST.
 R0032
 R0034

A0035		BELOW	E: IS USED FOR EARTH ORIGIN SCALE
A0036			M: IS USED FOR MOON ORIGIN SCALE
A0037		TFFSW = 119D BIT1	0 = CALCTFF 1 = CALCTPER
0038	0012	TFFDELQ = 10D	Q2-Q1 E: (-16) M: (-15)
0039	0014	RMAG1 = 12D	ABVAL(RN) M E: (-29) M: (-27)
A0040		RPER = 14D	PERIGEE RADIUS M E: (-29) M: (-27)
0041	0016	TFFQ1 = 14D	R.V / SQRT(MUE) E: (-16) M: (-15)
A0042		SDEL2 = 14D	SIN(THETA) /2
0043	0016	CDEL2 = 14D	COS(THETA) /2
A0044		RAPO = 16D	APOGEE RADIUS M E: (-29) M: (-27)
0045	0020	NRTERM = 16D	TERMINAL RADIUS M E: (-29+NR) M: (-27+NR)
A0046			
0047	0022	RTERM = 18D	TERMINAL RADIUS M E: (-29) M: (-27)
0048	0024	TFFVSQ = 20D	-(V SQUARED/MU) 1/M E: (20) M: (18)
0049	0026	TFF1/ALF = 22D	SEMI MAJ AXIS M E: (-22-2 NA) M: (-20-2 NA)
A0050			
0051	0030	TFFRTALF = 24D	SQRT(ALFA) E: (10+NA) M: (9+NA)
0052	0032	TFFALFA = 26D	ALFA 1/M E: (26-NR) M: (24-NR)
0053	0034	TFFNP = 28D	SEMI LATUS RECTUM M E: (-38+2 NR) M: (-36+2 NR)
A0054			
0055	0036	TFF/RTMU = 30D	1/SQRT(MU) E: (17) M: (14)
0056	0040	NRMAG = 32D	PRESENT RADIUS M E: (-29+NR) M: (-27+NR)
A0057			
0058	0042	TFFX = 34D	
0059	0044	TFFTEM = 36D	TEMPORARY

L TIME OF FREE FALL

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A0060
A0061
A0062
A0063
A0064
A0065

REGISTERS S1, S2 ARE UNTOUCHED BY ANY TFF SUBROUTINE
INDEX REGISTERS X1, X2 ARE USED BY ALL TFF SUBROUTINES. THEY ARE ESTAB-
LISHED IN TFF/CONIC AND MUST BE PRESERVED BETWEEN CALLS TO SUBSEQUENT
SUBROUTINES.

-NR
-NA

C(X1) = NORM COUNT OF RMAG
C(X2) = NORM COUNT OF SQRT(ABS(ALFA))

L TIME OF FREE FALL

USER'S PAGE NO. 3 EO S3

P0066

R0067 SUBROUTINE NAME: TFFCONIC

DATE: 01.29.67

R0069 MOD NO: 0

LOG SECTION: TIME OF FREE FALL

R0071 MOD BY: RR-BAIRNSFATHER

R0072 MOD NO: 1 MOD BY: RR-BAIRNSFATHER DATE: 11-APR-67

R0073 MOD NO: 2 MOD BY: RR-BAIRNSFATHER DATE: 21 NOV 67 ADD MOON MU.

R0075 MOD NO: 3 MOD BY: RR-BAIRNSFATHER DATE: 21 MAR 68 ACCEPT DIFFERENT EARTH/MOON SCALES

R0077 FUNCTIONAL DESCRIPTION: THIS SUBROUTINE IS CALLED TO COMPUTE THOSE CONIC PARAMETERS REQUIRED BY THE TFF

R0079 SUBROUTINES AND TO ESTABLISH THEM IN THE PUSH LIST AREA. THE PARAMETERS ARE LISTED UNDER OUTPUT.

R0081 THE EQUATIONS ARE

R0082

R0083 $H = RN * VN$

ANGULAR MOMENTUM

R0085 $LCP = H * H / MU$

SEMI LATUS RECTUM

R0086

R0088 $ALFA = 2/RN - VN * VN / MU$

RECIPROCAL SEMI-MAJ-AXIS, SIGNED

R0089

R0091 AND ALFA IS POS FOR ELLIPTIC ORBITS

R0092 0 FOR PARABOLIC ORBITS

R0093 NEG FOR HYPERBOLIC ORBITS.

P0094 SUBROUTINE ALSO COMPUTES AND SAVES RMAG.

R0095 CALLING SEQUENCE:

R0096 TFFCONIC EXPECTS CALLER TO ENTER WITH CORRECT GRAVITATIONAL CONSTANT IN MPAC. IN THE FORM

R0098 $1/\sqrt{MU}$. PROGRAM WILL SAVE IN TFF/RTMU. THE SCALE IS DETERMINED BY WHETHER EARTH OR MOON

R0100 ORIGIN IS USED. THE CALLER MUST LOCK OUT THE EXTENDED VERBS BEFORE PROVIDING STATE VECTOR IN RONE,

R0102 VONE AT PROPER SCALE. THE EXTENDED VERBS MUST BE RESTORED WHEN THE CALLER IS FINISHED USING THE

R0104 TFF ROUTINES.

R0105 ENTRY POINT TFFCONMU EXPECTS THAT TFF/RTMU IS ALREADY LOADED.

R0107 TO SPECIFY MU: DLOAD CALL IF MU ALREADY STORED: CALL

R0109 YDURMU 1/RTMU E: (17) M: (14) TFFCONMU

R0111 TFFCONIC

R0112 PUSHLOC = PDL+0, ARBITRARY IF LEQ 180

R0113 SUBROUTINES CALLED: NONE

R0114 NORMAL EXIT MODES: RVQ

R0115 ALARMS: NONE

R0116 OUTPUT: THE FOLLOWING ARE STORED IN THE PUSH LIST AREA.

R0117 RMAG1 E: (-29) M: (-27) M: RN, PRESENT RADIUS LENGTH.

R0118 NR MAG E: (-29+NR) M: RMAG, NORMALIZED

R0119 M: (-27+NR)

R0120 X1 -NR, NORM COUNT

R0121 TFFNP E: (-38+2NR) M: LCP, SEMI-LATUS RECTUM, WEIGHTED BY NR. FOR VGAMCALC

R0123 M: (-36+2NR)

R0124 TFF/RTMU E: (17) M: (14) $1/\sqrt{MU}$ R0125 TFFVSQ E: (20) M: (18) $1/M - (V^2/MU)$: PRESENT VELOCITY, NORMLIZED. FOR VGAMCALCR0127 TFFALFA E: (26-NR) $1/M$ ALFA, WEIGHTED BY NR

R0128 M: (24-NR)

R0129 TFFRTALF E: (10+NA) \sqrt{ALFA} , NORMALIZED

R0130 M: (9+NA)

L TIME OF FREE FALL

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R0131		X2		-NA, NORM COUNT		
R0132		TFF1/ALF	E: (-22-2NA)	SIGNED SEMI MAJ AXIS, WEIGHTED BY NA		
R0133			M: (-20-2NA)			
R0134		PUSHLOC AT PDL+0				
R0135		THE FOLLOWING IS STORED IN GENERAL ERASABLE				
R0136		VONE' E: (10) M: (9) V/RT(MU), NORMALIZED VELOCITY				
R0137		ERASABLE INITIALIZATION REQUIRED:				
R0138		RONE E: (-29) M: (-27) M	STATE VECTOR		LEFT BY CALLER	
R0140		VONE E: (-7) M: (-5) M/CS	STATE VECTOR		LEFT BY CALLER	
R0142		TFF/RTMU E: (17) M: (14)	1/RT(CS SQ/M CUBE)		IF ENTER VIA TFFCONMU.	
R0144		DEBRIS: QPRET, PDL+0 ... PDL+3				
R0145						

0146			33,3777		BANK 33	
0147	REF	1	27,2000		SETLOC TBF-FF	
0148			27,3360		BANK	
0149	REF	2 LAST 46 TO 46:	2	2*	COUNT* \$\$/TFF	
0150	REF	4 LAST 717	27,3360	00037-0	TFFCONIC STORE TFF/RTMU	1/SQRT(MU) E: (-17) M: (14)
0151			27,3361	53575-0	TFFCONMU VLOAD UNIT	COME HERE WITH TFFRTMU LOADED.
0152	REF	15 LAST 720	27,3362	02207-0	RONE	SAVED RN. M E: (-29) M: (-27)
0153			27,3363	77725-1	PDDL	UR/2 TO PDL+0, +5
0154			27,3364	00045-0	360	MAGNITUDE
0155	REF	1	27,3365	00015-0	STORE RMAG1	M E: (-29) M: (-27)
0156			27,3366	77701-1	NORM	
0157	REF	69 LAST 1235	27,3367	00047-1	X1	-NR
0158	REF	1	27,3370	24041-1	STOVL NR MAG	RMAG M E: (-29+NR) M: (-27+NR)
0159	REF	9 LAST 720	27,3371	02215-0	VONE	SAVED VN. M/CS E: (-7) M: (-5)
0160			27,3372	77761-1	VXSC	
0161	REF	5 LAST 1271	27,3373	00037-0	TFF/RTMU	E: (-17) M: (14)
0162	REF	1	27,3374	02170-0	STORE VONE'	VN/SQRT(MU) E: (10) M: (9)
0163			27,3375	47361-0	VXSC VXV	
0164	REF	2 LAST 1271	27,3376	00041-1	NR MAG	E: (-29+NR) M: (-27+NR)
A0165						UR/2 FROM PDL
0166			27,3377	47572-1	VSL1 VSQ	BEFORE: E: (-19+NR) M: (-18+NR)
0167	REF	1	27,3400	14035-1	STOVL TFFNP	LC P M E: (-38+2NR) M: (-36+2NR)
A0168						SAVE ALSO FOR VGAMCALC
0169	REF	1	27,3401	06512-1	TFF1/4	
0170			27,3402	63271-0	DDV PDVL	(2/RMAG) 1/M E: (26-NR) M: (24-NR)
0171	REF	3 LAST 1271	27,3403	00041-1	NR MAG	RMAG M E: (-29+NR) M: (-27+NR)
0172	REF	2 LAST 1271	27,3404	02170-0	VONE'	SAVED VN. E: (10) M: (9)
0173			27,3405	57436-1	VSQ DCOMP	KEEP MPAC+2 HONEST FOR SQRT.
0174	REF	1	27,3406	00025-0	STORE TFFVSQ	-(V-SQ/MU) E: (20) M: (18)
A0175						SAVE FOR VGAMCALC
0176			27,3407	43257-0	SR* DAD	

L TIME OF FREE FALL

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0177		27,3410	20573 1		0 -6,1	GET -VSQ/MU	E:(26-NR)	M:(24-NR)
0178		27,3411	77626 0	STADR				
A0179						2/RMAG	FROM PDL+2	
0180	REF	1	27,3412	77744 0	STORE	TFFALFA	ALFA -1/M	E:(26-NR) M:(24-NR)
0181		27,3413	41457 1	SL*	PUSH	TEMP SAVE ALFA	E:(20)	M:(18)
0182		27,3414	20173 0		0 -6,1			
0183		27,3415	75446 0	ABS	SQRT	E:(10)	M:(9)	
0184		27,3416	77701 1	NDRM				
0185	REF	29	27,3417	00050 1		X2	X2 = -NA	
0186	REF	1	27,3420	00031 0	STORE	TFFALFA	SQRT(ABS(ALFA))	E:(10+NA) M:(9+NA)
0187		27,3421	75316 1	DSQ	SIGN	NOT SO ACCURATE, BUT OK		
A0188						ALFA FROM PDL+2	E:(20)	M:(18)
0189		27,3422	55254 1	BZE	RDDV	SET 1/ALFA = 0, TO SHOW SMALL ALFA		
0190		27,3423	57425 0		+2			
0191	REF	2	27,3424	06512 1		TFF1/4		
0192	REF	1	27,3425	00027 1	STORE	TFF1/ALF	1/ALFA	E:(-22-2 NA) M:(-20-2 NA)
0193		27,3426	77616 0	DUMPCNIC	RVQ			

A0194

39 W

L TIME OF FREE FALL

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P0195 SUBROUTINE NAME: TFFRP/RA

DATE: 01.17.67

R0197 MOD NO: 0

LOG SECTION: TIME OF FREE FALL

R0199 MOD BY: RR BAIRNSFATHER

R0200 MOD NO: 1

MOD BY: RR BAIRNSFATHER

DATE: 11 APR 67

R0201 MOD NO: 2

MOD BY: RR BAIRNSFATHER

DATE: 21 MAR 68

ACCEPT DIFFERENT EARTH/MOON SCALES

R0203

ALSO IMPROVE ACCURACY OF RAPO.

R0205 FUNCTIONAL DESCRIPTION: USED BY CALCTPER AND TFF DISPLAYS TO CALCULATE PERIGEE RADIUS AND ALSO

R0207 APOGEE RADIUS FOR A GENERAL CONIC.

R0209 PROGRAM GIVES PERIGEE RADIUS AS

APOGEE RADIUS IS GIVEN BY

R0210 $RP = P / (1+E)$ $RA = (1+E) / ALFA$

R0212 WHERE 2

R0213 $E = 1 - P \cdot ALFA$

R0214 IF RA IS NEGATIVE OR SHOWS DIVIDE OVERFLOW, THEN RA = POSMAX BECAUSE

R0216 1. APOGEE RADIUS IS NOT MEANINGFUL FOR HYPERBOLA

R0217 2. APOGEE RADIUS IS NOT DEFINED FOR PARABOLA

R0218 3. APOGEE RADIUS EXCEEDS THE SCALING FOR ELLIPSE.

R0219 THIS SUBROUTINE REQUIRES THE SIGNED RECIPROCAL SEMI MAJ AXIS, ALFA, AND SEMI LATUS RECTUM AS DATA.

R0221 CALLING SEQUENCE: CALL

R0222 TFFRP/RA

R0223 PUSHLOC = PDL+0, ARBITRARY IF LEQ 100

R0224 C(MPAC) UNSPECIFIED

R0225 SUBROUTINES CALLED: NONE

R0226 NORMAL EXIT MODE: RVQ

R0227 IF ELLIPSE, WITHIN NORMAL SCALING, RAPO IS CORRECT.

R0228 OTHERWISE, RAPO = POSMAX.

R0229 ALARMS: NONE

R0230 OUTPUT: STORED IN PUSH LIST AREA. SCALE OF OUTPUT AGREES WITH DATA SUPPLIED TO TFF/CONIC.

R0232 RPER E: (-29) M: (-27) M PERIGEE RADIUS

DESTROYED BY CALCTFF/CALCTPER, TFFTRIG.

R0234 RAPD E: (-29) M: (-27) M APOGEE RADIUS

WILL BE DESTROYED BY CALCTFF/CALCTPER

R0236 PUSHLOC AT PDL+0

R0237 ERASABLE INITIALIZATION REQUIRED:

R0238 TFFALFA E: (26-NR) M 1/SEMI MAJ AXIS

LEFT BY TFFCONIC

R0240 M: (24-NR)

R0241 TFFNP L: (-38+2NR) M LC P, SEMI LATUS RECTUM

LEFT BY TFFCONIC

R0243 M: (-36+2NR)

R0244 X1 -NR, NORM COUNT OF RMAG

LEFT BY TFFCONIC

R0246 X2 -NA, NORM COUNT OF ALFA

LEFT BY TFFCONIC

R0248 DEBRIS: QPRET, PDL+0 ... PDL+1

L TIME OF FREE FALL

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P0249
0250          0020          RAPD = 16D          APOGEE RADIUS M E:(-29) M:(-27)
0251          0016          RPER = 14D          PERIGEE RADIUS M E:(-29) M:(-27)
A0252
0252          27,3427 41345 0 TFFRP/RA DLOAD DMP
0254 REF 2 LAST 1272 27,3430 00033 1 TFFALFA ALFA 1/M E:(26-NR) M:(24-NR)
0255 REF 2 LAST 1271 27,3431 00035 1 TFFRP LC P M E:(-38+2NR) M:(-36+2NR)
0256          27,3432 57457 0 SR* DCOMP ALFA P (-12+NR)
0257          27,3433 20571 0 0 -8D,1 ALFA P (-4)
0258          27,3434 51415 0 DAD ABS {DCOMP GIVES VALID TP RESULT FOR SQRT}
                                {ABS PROTECTS SQRT IF E IS VERY NEAR 0}
A0259
0260 REF 1          27,3435 17765 0 DMP DP2(-4)
0261          27,3436 43366 0 SQRT DAD E SQ = (1 - P ALFA) (-4)
0262 REF 3 LAST 1272 27,3437 06512 1 TFF1/4
0263          27,3440 55206 0 PUSH BDDV (1+E) (-2) TO PDL+0
0264 REF 3 LAST 1274 27,3441 00035 1 TFFRP LCP M E:(-38+2NR) M:(-36+2NR)
0265          27,3442 53657 0 SR* SR* (DOES SR THEN SL TO AVOID OVFL)
0266          27,3443 20601 1 0,1 X1=-NR
0267          27,3444 20572 0 0 -7,1 (EFFECTIVE SL)
0268 REF 3 LAST 721 27,3445 14017 1 STODL RPER PERIGEE RADIUS M E:(-29) M:(-27)
                                (1+E) (-2) FROM PDL+0
A0269
0270          27,3446 41005 1 DMP BDDV
0271 REF 2 LAST 1272 27,3447 00027 1 TFF1/ALF E:(-22-2NA) M:(-20-2NA)
0272 REF 4 LAST 1228 27,3450 57753 1 TODANZIG CLEAR OVFLND, IF ON.
0273          27,3451 53654 0 BZE SL*
0274 REF 1          27,3452 57461 0 MAXRA SET POSMAX, IF ALFA=C
0275          27,3453 57603 0 0 -5,2 -5+NA
0276          27,3454 40057 1 SL* BDDV
0277          27,3455 57576 1 0,2
0278 REF 2 LAST 1274 27,3456 57461 0 MAXRA SET POSMAX IF OVFL.
0279          27,3457 77644 1 BPL CONTINUE WITH VALID RAPO.
0280          27,3460 57463 1 +3
0281          27,3461 77745 1 MAXRA DLOAD RAPO CALC IS NOT VALID. SET RAPO =
0282 REF 3 LAST 856 27,3462 17771 0 NEARONE POSMAX AS A TAG.
0283 REF 1          27,3463 00021 1 +3 STORE RAPO APOGEE RADIUS M E:(-29) M:(-27)
0284          27,3464 77616 0 DUMPRPRA RVQ

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A0285

30 W

L TIME OF FREE FALL

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P0286 SUBROUTINE NAME: CALCTPER / CALCTFF

DATE: 01.29.67

R0288 MOD NO: 0

LOG SECTION: TIME OF FREE FALL

R0290 MOD BY: RR-BAIRNSFATHER

R0291 MOD NO: 1 MOD BY: RR-BAIRNSFATHER

DATE: 21 MAR 67

R0292 MOD NO: 2 MOD BY: RR-BAIRNSFATHER

DATE: 14 APR 67

R0293 MOD NO: 3 MOD BY: RR-BAIRNSFATHER

DATE: 8 JUL 67

NEAR EARTH MUE AND NEG TFF (GONEPAST)

R0295 MOD NO: 4 MOD BY: RR-BAIRNSFATHER

DATE: 21 NOV 67

ADD VARIABLE MU.

R0297 MOD NO: 5 MOD BY: RR-BAIRNSFATHER

DATE: 21 MAR 68

ACCEPT DIFFERENT EARTH/MOON SCALES

R0299 FUNCTIONAL DESCRIPTION: PROGRAM CALCULATES THE FREE-FALL TIME OF FLIGHT FROM PRESENT POSITION RN AND

R0301 VELOCITY VN TO A RADIUS LENGTH SPECIFIED BY RTERM, SUPPLIED BY THE USER. THE POSITION VECTOR

R0303 RN MAY BE ON EITHER SIDE OF THE CONIC, BUT RTERM IS CONSIDERED ON THE INBOUND SIDE.

R0305 THE EQUATIONS ARE

R0306 $Q2 = -\sqrt{RTERM(2-RTERM ALFA) - LCP}$ (INBOUND SIDE) LEQ +- LCE/SQRT(ALFA)

R0308

R0309 $Q1 = RN.VN / \sqrt{MU}$ LEQ +- LCE/SQRT(ALFA)R0311 $Z = NUM / DEN$ LEQ +- 1/SQRT(ALFA)

R0313 WHERE, IF INBOUND

R0314 $NUM = RTERM - RN$ LEQ +- 2 LCE/ALFAR0316 $DEN = Q2 + Q1$ LEQ +- 2 LCE/SQRT(ALFA)

R0318 AND, IF OUTBOUND

R0319 $NUM = Q2 - Q1$ LEQ +- 2 LCE/SQRT(ALFA)R0321 $DEN = 2 - ALFA(RTERM + RN)$ LEQ +- 2 LCER0323 IF $ALFA ZZ < 1.0$ (FOR ALL CONICS EXCEPT ELLIPSES HAVING ABS(DEL ECC ANOM) ≥ 90 DEG)R0325 THEN $X = ALFA Z^2$ R0326 AND $TFF = (RTERM + RN - 2 ZZ T(X) - 1) Z / \sqrt{MU}$

R0327 EXCEPT IF ALFA PNZ, AND IF TFF NEG,

R0328 THEN $TFF = 2 PI / (ALFA \sqrt{ALFA}) + TFF$ R0329 OR IF $ALFA ZZ \geq 1.0$ (FOR ELLIPSES HAVING ABS(DEL ECC ANOM) ≥ 90 DEG)R0331 THEN $X = 1/ALFA Z^2$ R0332 AND $TFF = (PI/\sqrt{ALFA} - Q2 + Q1 + 2(X T(X) - 1) / ALFA Z) / ALFA \sqrt{MU}$ R0334 WHERE $T(X)$ IS A POLYNOMIAL APPROXIMATION TO THE SERIESR0335 $\frac{1}{3} - \frac{X}{5} + \frac{X^2}{7} - \frac{X^3}{9} \dots$ R0336 $(X < 1.0)$

R0337 CALLING SEQUENCE: TIME TO RTERM

TIME TO PERIGEE

R0339 CALL

CALL

R0340 CALCTFF

CALCTPER

R0342 C(MPAC) = TERMNL RAD M

C(MPAC) = PERIGEE RAD M

R0344 FOR EITHER, E: (-29) M: (-27)

R0345 FOR EITHER, PUSHLOC = PDL+0, ARBITRARY IF LEQ 80.

L TIME OF FREE FALL

USER'S PAGE NO. 9 EO S3

R0346 SUBROUTINES CALLED: T(X). VIA RTB

R0347 NORMAL EXIT MODE: RVQ

R0348 HOWEVER, PROGRAM EXITS WITH ONE OF THE FOLLOWING VALUES FOR TFF (-28) CS IN MPAC. USER MUST STORE.

R0350 A. TFF= FLIGHT TIME. NORMAL CASE FOR POSITIVE FLIGHT TIME LESS THAN ONE ORBITAL PERIOD.

R0352 B. (THIS OPTION IS NO LONGER USED.)

R0353 C. TFF = POSMAX. THIS INDICATES THAT THE CONIC FROM THE PRESENT POSITION WILL NOT RETURN TO

R0355 THE SPECIFIED ALTITUDE. ALSO INDICATES OUTBOUND PARABOLA OR HYPERBOLA.

R0357 OUTPUT: C(MPAC) (-28) CS TIME OF FLIGHT, OR TIME TO PERIGEE

R0358 TFFX (0) X, LEFT FOR ENTRY DISPLAY TFF ROUTINES

R0360 NRTERM E: (-29+NR) M: RTERM, WEIGHTED BY NR LEFT FOR ENTRY DISPLAY TFF ROUTINES

R0362 M: (-27+NR)

R0363 TFFTEM E: (-59+2NR) LCP Z Z SGN(SSELF) LEFT FOR ENTRY DISPLAY TFF ROUTINES

R0365 M: (-55+2NR) LCP /ALFA SGN(SSELF) LEFT FOR ENTRY DISPLAY TFF ROUTINES

R0367 NOTE: TFFTEM = PDL 36D AND WILL BE DESTROYED BY .:UNIT:.

R0368 RMAG1 E: (-29) M: (-27) PDL 12 NOT TOUCHED.

R0369 TFFQ1 E: (-16) M: (-15) PDL 14D

R0370 TFFDELQ E: (-16) M: (-15) PDL 10D

R0371 PUSHLOC AT PDL+0

R0372 ERASABLE INITIALIZATION REQUIRED:

R0373 RONE E: (-29) M: (-27) M STATE VECTOR

LEFT BY USER

R0375 VONE E: (+10) M: (+9) VN/SQRT(MU)

LEFT BY TFF/CONIC

R0377 RMAG1 E: (-29) M: (-27) PRESENT RADIUS, M

LEFT BY TFFCONIC

R0379 C(MPAC) E: (-29) M: (-27) RTERM, TERMINAL RADIUS LENGTH, M

LEFT BY USER

R0381 THE FOLLOWING ARE STORED IN THE PUSH LIST AREA.

R0382 TFF/RTMU E: (-17) M: (14) 1/SQRT(MU)

LEFT BY TFFCONIC.

R0384 NRMAG E: (-29+NR) M: RMAG, NORMALIZED

LEFT BY TFFCONIC

R0386 M: (-27+NR)

R0387 X1 -NR, NORM COUNT

LEFT BY TFFCONIC

R0389 TFFNP E: (-38+2NR) M: LCP, SEMI LATUS RECTUM, WEIGHT NR

LEFT BY TFFCONIC

R0391 M: (-36+2NR)

R0392 TFFALFA E: (-26-NR) 1/M ALFA, WEIGHT NR

LEFT BY TFFCONIC

R0394 M: (-24-NR)

R0395 TFFRTALF E: (10+NA) SQRT(ALFA), NORMALIZED

LEFT BY TFFCONIC

R0397 M: (9+NA)

R0398 X2 -NA, NORM COUNT

LEFT BY TFFCONIC

R0400 TFF1/ALF E: (-22-2NA) SIGNED SEMIMAJ AXIS, WEIGHTED BY NA

LEFT BY TFFCONIC

R0402 M: (-20-2NA)

R0403 DEBRIS: QPRET, PDL+0 ... PDL+3

R0404 RTERM E: (-29) M: (-27) RTERM, TERMINAL RADIUS LENGTH

R0405 RAPD E: (-29) M: (-27) PDL 16D (=NRTERM)

R0406 RPER E: (-29) M: (-27) PDL 14D (=TFFQ1)

L TIME OF FREE FALL

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P0407											
0408			27,3465	77614 1	CALCTPER	SETGO			ENTER WITH RPER	IN MPAC	
0409	REF	1	27,3466	03436 0			TFFSW				
0410			27,3467	57472 1			+3				
0411			27,3470	77614 1	CALCTFF	CLEAR			ENTER WITH RTERM	IN MPAC	
0412	REF	2	27,3471	03676 0			TFFSW				
0413	REF	1	27,3472	00023 0		+3	STORE	RTERM	E: (-29)	M: (-27)	
0414			27,3473	77657 0			SL*				
0415			27,3474	20201 0			0,1		X1=-NR		
0416	REF	1	27,3475	00021 1	STORE	NRTERM			RTERM	E: (-29+NR)	M: (-27+NR)
0417			27,3476	44205 0	DMP	BDSU					
0418	REF	3	27,3477	00033 1			TFFALFA		ALFA	E: (26-NR)	M: (24-NR)
0419	REF	4	27,3500	06512 1			TFF1/4				
0420			27,3501	41206 0	PUSH	DMP			(2-ALFA RTERM)	(-3)	TO PDL+0
0421	REF	2	27,3502	00021 1			NRTERM		E: (-29+NR)	M: (-27+NR)	
0422			27,3503	53725 1	PDDL	SR*			RTERM(2-ALFA RTERM)	TO PDL+2	
A0423									E: (-32+NR)	M: (-30+NR)	
0424	REF	4	27,3504	00035 1			TFFNP		LC P	E: (-38+2NR)	M: (-36+2NR)
0425			27,3505	20573 1			0 -6,1		X1 = -NR		
0426			27,3506	43276 0	DCOMP	DAD			DUE TO SHIFTS, KEEP PRECISION FOR SQRT		
A0427									RTERM(2-ALFA RTERM)	FROM PDL+2	
A0428									E: (-32+NR)	M: (-30+NR)	
0429			27,3507	77657 0	SR*				LEAVE	E: (-32)	M: (-30)
0430			27,3510	20601 1			0,1		X1 = -NR		
0431			27,3511	71214 0	BOFF	DLOAD			CHECK TFF / TPER SWITCH		
0432	REF	3	27,3512	03756 0			TFFSW				
0433			27,3513	57515 1			+2		IF TFF, CONTINUE		
0434	REF	1	27,3514	06522 1			TFFZERUS		IF TPER, SET Q2 = 0		
0435			27,3515	75440 0	+2	BMN	SQRT		E: (-16)	M: (-15)	
0436	REF	1	27,3516	57650 0			MAXTFF1		NO FREE FALL CONIC TO RTERM FROM HERE		
A0437									RESET PDL, SET TFF=POS MAX, AND EXIT.		
0438			27,3517	41075 0	DCOMP	BOVB			RT IS ON INBOUND SIDE. ASSURE OVFINO=0		
0439	REF	5	27,3520	57753 1			TCDANZIG		ANY PORT IN A STORM.		
0440	REF	1	27,3521	24045 0	STOVL	TFFTEM			Q2	E: (-16)	M: (-15)
0441	REF	3	27,3522	02170 0			VONE		VN/SQRT(MU)	E: (10)	M: (9)
0442			27,3523	52441 1	DOT	SL3					
0443	REF	16	27,3524	02207 0			RONE		SAVED RN.	E: (-29)	M: (-27)
0444	REF	1	27,3525	00017 1	STORE	TFFQ1			Q1, SAVE FOR GONEPAST TEST.		
A0445									E: (-16)	M: (-15)	
0446			27,3526	44240 1	BMN	BDSU					
0447	REF	1	27,3527	57550 0			INBOUND		USE ALTERNATE Z		
0448	REF	2	27,3530	00045 0			TFFTEM		Q2	E: (-16)	M: (-15)
A0449									OUTBOUND Z CALC CONTINUES HERE		
0450	PLF	1	27,3531	14043 0	STOVL	TFFX			NUM=Q2-Q1	E: (-16)	M: (-15)
0451	REF	4	27,3532	00035 1			TFFALFA		ALFA	E: (26-NR)	M: (24-NR)
0452			27,3533	44205 0	DMP	BDSU					

L TIME OF FREE FALL

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0455	REF	4	LAST 1271	27,3534	00041 1		NRMAG	KMAG E: (-29+NR) M: (-27+NR)
A0454								(2-RTERM ALFA) (-3) FROM PDL+0
0455				27,3535	51406 1	SAVEDEN	PUSH ABS	DEN TO PDL+0 E: (-3) OR (-16)
A0456								M: (-3) OR (-15)
0457				27,3536	40015 1	DAD	BOV	INDETERMINANCY TEST
0458	REF	1		27,3537	17757 1		LIM(-22)	=1.0-B(-22)
0459	REF	1		27,3540	57561 1		TFFXTEST	GO IF DEN > /= B(-22)
0460				27,3541	65345 0	DLOAD	PDDL	SET DEN=0 OTHERWISE
0461	REF	2	LAST 1277	27,3542	06522 1		TFFZEROS	
A0462								XCH ZERO WITH PDL+0
0463				27,3543	57545 1	DLOAD	DCOMP	
0464	REF	5	LAST 1277	27,3544	00033 1		TFFALFA	ALFA E: (26-NR) M: (24-NR)
0465				27,3545	71240 1	BMN	DLOAD	FOR TPER: Z INDET AT DELE/2=0 AND 90.
0466	REF	1		27,3546	57655 0		TFFELL	ASSUME 90. AND LEAVE 0 IN PDL: 1/Z=D/N
A0467								Z INDET. AT PERIGEE FOR PARAB OR HYPERB.
0468				27,3547	77616 0	DUMPTFF1	RVQ	RETURN TFF =0
A0469						INBOUND	Z	CALC CONTINUES HERE
0470				27,3550	77745 1	INBOUND	DLOAD	RESET PDL+0
0471				27,3551	45345 1	DLOAD	DSU	ALTERNATE Z-CALC
0472	REF	2	LAST 1277	27,3552	00023 0		RTERM	E: (-29) M: (-27)
0473	REF	2	LAST 1271	27,3553	00015 0		RMAG1	E: (-29) M: (-27)
0474	REF	2	LAST 1277	27,3554	14043 0	STOOL	TFFX	NUM=RTERM-RN E: (-29) M: (-27)
0475	REF	3	LAST 1277	27,3555	00045 0		TFFTEM	Q2 E: (-16) M: (-15)
0476				27,3556	52015 1	DAD	GOTO	
0477	REF	2	LAST 1277	27,3557	00017 1		TFF V1	Q1 E: (-16) M: (-15)
0478	REF	1		27,3560	57535 0		SAVEDEN	DEN = Q2+Q1 E: (-16) M: (-15)
0479				27,3561	65215 1	TFFXTEST	DAD	(ABS(DEN) TO PDL+2) E: (-3) OR (-16)
A0480								M: (-3) OR (-15)
0481	REF	1		27,3562	17761 1		DP(-22)	RESTORE ABS(DEN) TO MPAC
0482	REF	3	LAST 1278	27,3563	00043 0		TFFX	NUM E: (-16) OR (-29) M: (-15) OR (-27)
0483				27,3564	53605 1	DMP	SR*	
0484	REF	2	LAST 1272	27,3565	00031 0		TFFRTALF	SQRT(ALFA) E: (10+NA) M: (9+NA)
0485				27,3566	57201 0		0 -3.2	X2=-NA
0486				27,3567	77671 1	DDV		C(MPAC) = NUM SQRT(ALFA) E: (-3) OR (-16)
A0487								M: (-3) OR (-15)
A0488								ABS(DEN) FROM PDL+2 E: (-3) OR (-16)
A0489								M: (-3) OR (-15)
0490				27,3570	40145 0	DLOAD	BOV	(THE DLOAD IS SHARED WITH TFFELL)
0491	REF	4	LAST 1278	27,3571	00043 0		TFFX	NUM E: (-16) OR (-29) M: (-15) OR (-27)
0492	REF	1		27,3572	57655 0		TFFELL	USE EQN FOR DELE GEQ 90. LEQ -90
A0493								OTHERWISE, CONTINUE FOR GENERAL CONIC FOR TFF EQN
0494				27,3573	45471 1	DDV	STADR	
A0495								DEN FROM PDL+0 E: (-3) OR (-16)
A0496								M: (-3) OR (-15)
0497	REF	4	LAST 1278	27,3574	77732 1	STORE	TFFTEM	Z SAVE FOR SIGN OF SDELTA

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A0498								E: (-13) M: (-12)
0499			27,3575	63406 0	PUSH	DSQ		Z TO PDL+0
0500			27,3576	41206 0	PUSH	DMP		Z SQ TO PDL+2 E: (-26) M: (-24)
0501	REF	5	LAST 1277	27,3577	00035 1		TFFNP	LC P E: (-38+2NR) M: (-36+2NR)
0502			27,3600	75261 0	SL	SIGN		
0503			27,3601	20206 1		5		
0504	REF	5	LAST 1278	27,3602	00045 0		TFFTEM	AFFIX SIGN FOR SDELF (ENTRY DISPLAY)
0505	REF	6	LAST 1279	27,3603	14045 0	STOOL	TFFTEM	P ZSQ E: (-59+2NR) M: (-55+2NR)
A0506								(ARG IS USED IN TFF/TRIG)
A0507								ZSQ FROM PDL+2 E: (-26) M: (-24)
0508			27,3604	41206 0	PUSH	DMP		RESTORE PUSH LOC
0509	REF	6	LAST 1278	27,3605	00033 1		TFFALFA	ALFA E: (26-NR) M: (24-NR)
0510			27,3606	77657 0	SL*			
0511			27,3607	20201 0		0,1		X1=-NR
0512	REF	5	LAST 1278	27,3610	00043 0	STORE	TFFX	X
0513			27,3611	41234 1	RTB	DMP		
0514	REF	1		27,3612	57735 1		T(X)	POLY
A0515								ZSQ FROM PDL+2 E: (-26) M: (-24)
0516			27,3613	44302 0	SR2	BDSU		2 ZSQ T(X) E: (-29) M: (-27)
0517	REF	3	LAST 1278	27,3614	00023 0		RTERM	RTERM E: (-29) M: (-27)
0518			27,3615	41215 1	DAD	DMP		
0519	REF	3	LAST 1278	27,3616	00015 0		PHAG1	E: (-29) M: (-27)
A0520								Z FROM PDL+0 E: (-13) M: (-12)
0521			27,3617	51042 0	SR3	BPL		TFF SQRT(MU) E: (-45) M: (-42)
0522	REF	1		27,3620	57641 0		ENDTFF	(NO PUSH UP)
0523			27,3621	75206 1	PUSH	SIGN		TFF SQRT(MU) TO PDL+0
0524	REF	3	LAST 1278	27,3622	00017 1		TFFQ1	Q1 FOR GONEPAST TEST
0525			27,3623	71244 0	BPL	DEUAD		GONE PAST ?
0526	REF	1		27,3624	57645 1		NEGTF	YES. TFF < 0.
0527	REF	3	LAST 1274	27,3625	00027 1		TFF1/ALF	1/ALFA E: (-22-2NA) M: (-20-2NA)
0528			27,3626	51076 1	DCOMP	BPL		ALFA > 0 ?
0529	REF	2	LAST 1279	27,3627	57645 1		NEGTF	NO. TFF IS NEGATIVE.

A0530

CORRECT FOR ORBITAL PERIOD.

0531			27,3630	77676 0	DCOMP			YES. CORRECT FOR ORB PERIOD.
0532			27,3631	56205 0	DMP	DDV		
0533	REF	1		27,3632	17755 0		PI/16	2 PI (-5)
0534	REF	3	LAST 1278	27,3633	00031 0		TFFRTALF	SQRT(ALFA) E: (10+NA) M: (9+NA)
0535			27,3634	53657 0	SL*	SL*		
0536			27,3635	57602 1		0 -4,2		X2=-NA
0537			27,3636	57602 1		0 -4,2		
0538			27,3637	43257 0	SL*	DAD		
0539			27,3640	57576 1		0,2		
A0540								TFF SQRT(MU) FROM PDL+0 E: (-45) M: (-42)
0541			27,3641	40005 0	ENDTFF	DMP	BOV	TFF SQRT(MU) IN MPAC E: (-45) M: (-42)
0542	REF	6	LAST 1271	27,3642	00037 0		TFF/RTMU	E: (17) M: (14)
0543	REF	1		27,3643	57651 1		MAXTFF	SET POSMAX IF OVFL.
0544			27,3644	77616 0	DUMPTFF2	RVQ		RETURN TFF (-28) CS IN MPAC.

L TIME OF FREE FALL

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0545 27,3645 77745 1 NEGTFE DLOAD TFF SQRT(MU) FROM PDL+0, NEGATIVE.
 A0546
 0547 27,3646 77650 1 GOTO
 0548 REF 2 LAST 1279 27,3647 57641 0 ENDTFF
 0549 27,3650 77745 1 MAXTFF1 DLOAD RESET PDL
 0550 27,3651 43545 1 MAXTFF DLOAD RVQ
 0551 REF 4 LAST 1274 27,3652 17771 0 NEARONE

R0552 TIME OF FLIGHT ELLIPSE WHEN DEL (ECCENTRIC ANOM) GEQ 90 AND LEQ -90.

A0553 NUM FROM TFFX. E: (-16) OR (-29)
 A0554 M: (-15) OR (-27)
 0555 27,3653 77712 0 TFFELL SL2 NUM E: (-14) OR (-27) M: (-13) OR (-25)
 0556 27,3654 41465 0 BDDV PUSH TEMP SAVE D/N IN PDL+0
 A0557 DEN FROM PDL+0 E: (-3)/(-16) M: (-3)/(-15)
 A0558 N/D TO PDL+0 E: (11) M: (10)
 0559 27,3655 45345 1 TFFEL1 DLOAD DSU (ENTER WITH D/N=0 IN PDL+0)
 0560 REF 7 LAST 1279 27,3656 00045 0 TFFTEM Q2 E: (-16) M: (-15)
 0561 REF 4 LAST 1279 27,3657 00017 1 TFFQ1 Q1 E: (-16) M: (-15)
 0562 REF 1 27,3660 14013 0 STODL TFFDELQ Q2-Q1 E: (-16) M: (-15)
 A0563 D/N FROM PDL+0
 0564 27,3661 77626 0 STADR
 0565 REF 8 LAST 1280 27,3662 77732 1 STORE TFFTEM D/N E: (11) M: (10)
 0566 27,3663 53605 1 DMP SL*
 0567 REF 4 LAST 1279 27,3664 00027 1 TFFI/ALF 1/ALFA E: (-22-2NA) M: (-20-2NA)
 0568 27,3665 57576 1 0.2 1/ALFA Z E: (-11-NA) M: (-10-NA)
 0569 27,3666 41206 0 PUSH DMP TO PDL+0
 0570 REF 9 LAST 1280 27,3667 00045 0 TFFTEM 1/Z E: (11) M: (10)
 0571 27,3670 41057 0 SL* BOVB
 0572 27,3671 57576 1 0.2 X2= -NA
 0573 REF 14 LAST 1219 27,3672 21712 0 SIGNIPAC IN CASE X= 1.0, CONTINUE
 0574 REF 6 LAST 1279 27,3673 00043 0 STORE TFFX X=1/ALFA ZSQ
 0575 27,3674 41234 1 FT3 DMP
 0576 REF 2 LAST 1279 27,3675 57735 1 T(X) POLY
 0577 REF 7 LAST 1280 27,3676 00043 0 TFFX
 0578 27,3677 45242 1 SR3 DSU
 0579 REF 1 27,3700 17763 0 DP2(-3)
 0580 27,3701 41405 0 DMP PUSH 2(X-T(X)-1)/Z ALFA E: (-15-NA)
 A0581 M: (-14-NA)
 A0582 1/ALFA Z FROM PDL+0 E: (-11-NA)
 A0583 M: (-10-NA)
 0584 27,3702 41345 0 DLOAD DMP GET SIGN FOR SDELF
 0585 REF 10 LAST 1280 27,3703 00045 0 TFFTEM 1/Z E: (11) M: (10)
 0586 REF 4 LAST 1279 27,3704 00015 0 RNAG1 E: (-29) M: (-27)
 0587 27,3705 43312 0 SL2 DAD
 0588 REF 5 LAST 1280 27,3706 00017 1 TFFQ1 Q1 E: (-16) M: (-15)
 0589 REF 11 LAST 1280 27,3707 14045 0 STODL TFFTEM (Q1+R 1/Z) =SGN OF SDELF E: (-16) M: (-15)
 0590 REF 6 LAST 1279 27,3710 00035 1 TFFNP LC-P E: (-38+2NR) M: (-36+2NR)
 0591 27,3711 53605 1 DMP SL* CALC FOR ARG FOR TFF/TRIG.

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0592	REF	5	LAST 1280	27,3712	00027 1		TFF1/ALF	1/ALFA E: (-22-2NA) M: (-20-2NA)
0593				27,3713	57575 1		1,2	X2=-NA
0594				27,3714	53765 0	SIGN	SL*	
0595	REF	12	LAST 1280	27,3715	00045 0		TFFTEM	AFFIX SIGN FOR SDELF
0596				27,3716	57576 1		0,2	
0597	REF	13	LAST 1281	27,3717	14045 0	STOOL	TFFTEM	P/ALFA E: (-59+2NR) M: (-55+2NR)
A0598								(ARG FOR USE IN TFF/TRIG)
0599	REF	6	LAST 1281	27,3720	00027 1		TFF1/ALF	1/ALFA E: (-22-2NA) M: (-20-2NA)
0600				27,3721	41366 1	SQRT	DMP	
0601	REF	2	LAST 1279	27,3722	17755 0		PI/16	PI (-4)
0602				27,3723	77615 0	DAD		
A0603								2(XT(X)-1)/Z ALFA FROM PDL E: (-15-NA)
A0604								M: (-14-NA)
0605				27,3724	45257 0	SL*	DSU	
0606				27,3725	57577 0		0-1,2	
0607	REF	2	LAST 1280	27,3726	00013 0		TFFDELQ	Q2-Q1 E: (-16) M: (-15)
0608				27,3727	53605 1	DMP	SL*	
0609	REF	7	LAST 1281	27,3730	00027 1		TFF1/ALF	1/ALFA E: (-22-2NA) M: (-20-2NA)
0610				27,3731	57601 1		0-3,2	
0611				27,3732	52057 1	SL*	GOTO	
0612				27,3733	57602 1		0-4,2	
0613	REF	3	LAST 1280	27,3734	57641 0		ENDTFF	TFF SQRT(MU) IN MPAC E: (-45) M: (-42)

L TIME OF FREE FALL

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P0614 PROGRAM NAME: T(X)

DATE: 01.17.67

R0616 MOD NO: 0

LOG SECTION: TIME OF FREE FALL

R0618 MOD BY: RR-BAIRNSFATHER

R0619 FUNCTIONAL DESCRIPTION: THE POLYNOMIAL T(X) IS USED BY TIME OF FLIGHT SUBROUTINES CALCTFF AND

R0621 CALCTPER TO APPROXIMATE THE SERIES

R0622 $\frac{2}{3} - \frac{1}{5} + \frac{1}{7} - \frac{1}{9} \dots$ R0623 $\frac{1}{3} - \frac{1}{5} + \frac{1}{7} - \frac{1}{9} \dots$ R0624 WHERE $X = \text{ALFA } Z \cdot Z$ IF $\text{ALFA } Z \cdot Z \leq 1$ R0625 $X = 1/(\text{ALFA } Z \cdot Z)$ IF $\text{ALFA } Z \cdot Z > 1$

R0626 ALSO X IS NEG FOR HYPERBOLIC ORBITS

R0627 $X = 0$ FOR PARABOLIC ORBITS

R0628 X IS POSITIVE FOR ELLIPTIC ORBITS

R0629 FOR FLIGHT 278, THE POLYNOMIAL T(X) IS FITTED OVER THE RANGE (0,+1) AND HAS A MAXIMUM

R0631 DEVIATION FROM THE SERIES OF 2×10^{-5} (T(X) IS A CHEBYCHEV TYPE FIT AND WAS OBTAINED USING

R0633 MAC PROGRAM AUTCURFIT294RKB AND IS VALID TO THE SAME TOLERANCE OVER THE RANGE (-.08,+1).)

R0635 CALLING SEQUENCE: RTB

R0636 T(X)

R0637 C(MPAC) = X

R0638 SUBROUTINES CALLED: NONE

R0639 NORMAL EXIT MODE: TC DANZIG

R0640 ALARMS: NONE

R0641 OUTPUT: C(MPAC) = T(X)

R0642 ERASABLE INITIALIZATION REQUIRED:

R0643 C(MPAC) = X

R0644 DEBRIS: NONE

0645	REF 7 LAST 1189	27,3735	0 7222 1	T(X)	TC	POLY	
0646		27,3736	00004 0		DEC	4	N-1
0647		27,3737	12525 0		2DEC	3.333333333	E-1
0647		27,3740	12525 0				
0648		27,3741	7146 0		2DEC*	-1.999819135	E-1 *
0648		27,3742	57703 1				
0649		27,3743	04423 0		2DEC*	1.418148467	E-1 *
0649		27,3744	17645 0				
0650		27,3745	74604 0		2DEC*	-1.01310997	E-1 *
0650		27,3746	43667 1				
0651		27,3747	01626 1		2DEC*	5.609004986	E-2 *
0651		27,3750	37256 1				
0652		27,3751	77404 1		2DEC*	-1.536156925	E-2 *
0652		27,3752	52071 0				
0653	REF 60 LAST 1212	27,3753	0 6061 0	ENDT(X)	TC	DANZIG	
0654	REF 1	27,3755		TCDANZIG =		ENDT(X)	

L TIME OF FREE FALL

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P0655 TFF CONSTANTS

-0656-

32,3773

BANK 32

0657 REF 2 LAST 46 27,2000
 0658 27,3754

SETLOC TDF-FF1
 BANK

A0659

NOTE _ NOTE _ ADJUSTED MUE FOR NEAR-EARTH-TRAJ.

A0660

MUE = 3.990 815 471 E10 -H CUBE/CS SQ

A0661

RTMUE = 1.997702549 E5 B-18* MODIFIED EARTH MU

A0663

NOTE _ NOTE _ ADJUSTED MUE FOR NEAR-EARTH-TRAJ.

A0664

MUM = 4.902 778 E8 -H CUBE /CS SQ

A0665

RTMUM 2DEC* 2.21422176 E4 B-18*

0666

27,3754 06220 1 PI/16 2DEC 3.141592653 B-4

0667

27,3755 37553 0

0668

27,3756 37777 1 LIM(-22) 20CT 37777 37700 1.0 -B(-22)

0669

27,3757 37700 1

0670

27,3760 00000 1 DP(-22) 20CT 00000 00100 B(-22)

0671

27,3761 00100 0

0672

27,3762 04000 0 DP2(-3) 2DEC 1 B-3

0673

27,3763 00000 1

0674

27,3764 02000 0 DP2(-4) 2DEC 1 B-4 1/16

0675

27,3765 00000 1

R0671 RPAD1 2DEC 6373338 B-29 M (-29) =20 909 901.57 FT

0672

REF 4 LAST 717 23,2314

RPAD1 = RPAD

0673

27,3766 00305 1 R300K 2DEC 6464778 B-29 (-29) M

0674

27,3767 11205 0

0675

27,3770 37777 1 NEARONE 2DEC .999999999

0676

27,3771 37777 1

0677

REF 16 LAST 1249 23,2521

TFFZEROS EQUALS HI6ZEROS

0678

REF 1 23,2511

TFF1/4 EQUALS HI0P1/4

L AGC BLOCK TWO SELF-CHECK

USER'S PAGE NO. 1 EO SS

R0001 PROGRAM DESCRIPTION
R0003 PROGRAM NAME - SELF-CHECK
R0005 MOD NO - 1
R0007 MOD BY - GAUNTT

DATE 20 DECEMBER 1967
LOG SECTION AGC BLOCK TWO SELF-CHECK
ASSEMBLY-SUBROUTINE-UTILITY4-REV. 25

R0008 FUNCTIONAL DESCRIPTION

R0009 PROGRAM HAS TWO MAIN PARTS. THE FIRST IS SELF-CHECK WHICH RUNS AS A ZERO PRIORITY JOB WITH NO CORE SET, AS
R0011 PART OF THE BACK-UP IDLE LOOP. THE SECOND IS SHOW-BANKSUM WHICH RUNS AS A REGULAR EXECUTIVE JOB WITH ITS OWN
R0013 STARTING VERB.
R0014 THE PURPOSE OF SELF-CHECK IS TO CHECK OUT VARIOUS PARTS OF THE COMPUTER AS OUTLINED BELOW IN THE OPTIONS.
R0016 THE PURPOSE OF SHOW-BANKSUM IS TO DISPLAY THE SUM OF EACH BANK, ONE AT A TIME.
R0020 IN ALL THERE ARE 7 POSSIBLE OPTIONS IN THIS BLOCK II VERSION OF SELF-CHECK. MORE DETAIL DESCRIPTION MAY BE
R0022 FOUND IN E-2065 BLOCK II AGC SELF-CHECK AND SHOW BANKSUM BY EDWIN D. SMALLY DECEMBER 1966, AND ADDENDA 2 AND 3.
R0024 THE DIFFERENT OPTIONS ARE CONTROLLED BY PUTTING DIFFERENT NUMBERS IN THE SMODE REGISTER (NO. 27). BELOW IS
R0026 A DESCRIPTION OF WHAT PARTS OF THE COMPUTER THAT ARE CHECKED BY THE OPTIONS, AND THE CORRESPONDING NUMBER. IN
R0028 OCTAL, TO LOAD INTO SMODE.
R0032 +-4 ERASABLE MEMORY
R0033 +-5 FIXED MEMORY
R0034 +-1,2,3,6,7,10 EVERYTHING IN OPTIONS 4 AND 5.
R0036 -0 SAME AS +-10 UNTIL AN ERROR IS DETECTED.
R0037 +0 NO CHECK, PUTS COMPUTER INTO THE BACKUP IDLE LOOP.

R0038 WARNINGS

R0039 USE OF E MEMORY RESERVED FOR SELF-CHECK (EVEN IN IDLE LOOP) AS TEMP STORAGE BY OTHER PROGRAMS IS DANGEROUS.
R0041 SMODE SET GREATER THAN OCT 10 PUTS COMPUTER INTO BACKUP IDLE LOOP.

R0042 CALLING SEQUENCE

R0043 TO CALL SELF-CHECK KEY IN
R0044 V-21-N-27-E OPTION-NUMBER-E
R0047 TO CALL SHOW-BANKSUM KEY IN
R0048 V-91-E DISPLAYS FIRST BANK
R0049 V-33-E PROCEED, DISPLAYS NEXT BANK

R0050 EXIT MODES, NORMAL AND ALARM

R0051 SELF-CHECK NORMALLY CONTINUES INDEFINITELY UNLESS THERE IS AN ERROR DETECTED. IF SO + OPTION NUMBERS PUT
R0053 COMPUTER INTO BACKUP IDLE LOOP, - OPTION NUMBERS RESTART THE OPTION.
R0054 THE -0 OPTION PROCEEDS FROM THE LINE FOLLOWING THE LINE WHERE THE ERROR WAS DETECTED.
R0057 SHOW-BANKSUM PROCEEDS UNTIL A TERMINATE IS KEYED IN (V 34 E). THE COMPUTER IS PUT INTO THE BACKUP IDLE LOOP
R0059

R0060 OUTPUT

L AGC BLOCK TWO SELF-CHECK

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R0061 SELF-CHECK UPON DETECTING AN ERROR LOADS THE SELF-CHECK ALARM CONSTANT (01102) INTO THE FAILREG SET AND
 R0062 TURNS ON THE ALARM LIGHT. THE OPERATOR MAY THEN DISPLAY THE THREE FAILREGS BY KEYING IN V 05 N 09 E. FOR FURTHER
 R0065 INFORMATION HE MAY KEY IN V 05 N 08 E, THE DSKY DISPLAY IN R1 WILL BE ADDRESS+1 OF WHERE THE ERROR WAS DETECTED,
 R0067 IN R2 THE BBCON OF SELF-CHECK, AND IN R3 THE TOTAL NUMBER OF ERRORS DETECTED BY SELF-CHECK SINCE THE LAST MAN-
 R0069 INITIATED FRESH START (SLAPI).
 R0073 SHOW-BANKSUM STARTING WITH BANK 0 DISPLAYS IN R1 THE BANK SUM (A +-NUMBER EQUAL TO THE BANK NUMBER), IN R2
 R0075 THE BANK NUMBER, AND IN R3 THE BUGGER WORD.

R0076 ERASABLE INITIALIZATION REQUIRED

R0077 ACCOMPLISHED BY FRESH START

R0078 SMODE SET TO +0

R0079 DEBRIS

R0080 ALL EXITS FROM THE CHECK OF ERASABLE (ERASCHK) RESTORE ORIGINAL CONTENTS TO REGISTERS UNDER CHECK.
 R0082 EXCEPTION IS A RESTART. RESTART THAT OCCURS DURING ERASCHK RESTORES ERASABLE, UNLESS THERE IS EVIDENCE TO DOUBT
 R0084 E MEMORY. IN WHICH CASE PROGRAM THEN DOES A FRESH START (DOFSTART).

0085		25,3770	BANK 25
0086	REF 1	43,2000	SETLOC SELFCHC
0087		43,3232	BANK

0088	REF 1		COUNT* \$3/SELF
0089	REF 51	LAST 1099 4753	SBIT1 EQUALS BIT1
0090	REF 48	LAST 1099 4752	SBIT2 EQUALS BIT2
0091	REF 34	LAST 1099 4751	SBIT3 EQUALS BIT3
0092	REF 41	LAST 1099 4750	SBIT4 EQUALS BIT4
0093	REF 37	LAST 1014 4747	SBIT5 EQUALS BIT5
0094	REF 45	LAST 1056 4746	SBIT6 EQUALS BIT6
0095	REF 41	LAST 1096 4745	SBIT7 EQUALS BIT7
0096	REF 37	LAST 1267 4744	SBIT8 EQUALS BIT8
0097	REF 26	LAST 983 4743	SBIT9 EQUALS BIT9
0098	REF 37	LAST 1099 4742	SBIT10 EQUALS BIT10
0099	REF 27	LAST 1099 4741	SBIT11 EQUALS BIT11
0100	REF 32	LAST 1099 4740	SBIT12 EQUALS BIT12
0101	REF 41	LAST 1099 4737	SBIT13 EQUALS BIT13
0102	REF 70	LAST 1261 4736	SBIT14 EQUALS BIT14
0103	REF 40	LAST 1099 4735	SBIT15 EQUALS BIT15

0104	REF 228	LAST 1153 4755	S+ZERO EQUALS ZERO
0105	REF 52	LAST 1285 4753	S+1 EQUALS BIT1
0106	REF 49	LAST 1285 4752	S+2 EQUALS BIT2
0107	REF 35	LAST 1263 6245	S+3 EQUALS THREE
0108	REF 26	LAST 1267 4751	S+4 EQUALS FOUR
0109	REF 21	LAST 1034 4756	S+5 EQUALS FIVE
0110	REF 24	LAST 1264 6242	S+6 EQUALS SIX

L AGC-BLOCK-TWO-SELF-CHECK

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0111	REF	17	LAST	1099	4757	S+7	EQUALS	SEVEN		
0112	REF	16	LAST	1265	4357	S8BITS	EQUALS	LOW8	00377	
0113	REF	2	LAST	304	4771	CNTRCON	=	OCT50	USED IN CNTRCHK	
0114					43,3232	00061	0	ERASCON1	OCTAL 00061	USED IN ERASCHK
0115					43,3233	01373	1	ERASCON2	OCTAL 01373	USED IN ERASCHK
0116	REF	9	LAST	1265	5007			ERASCON6	= OCT1400	USED IN ERASCHK
0117					43,3234	01461	0	ERASCON3	OCTAL 01461	USED IN ERASCHK
0118					43,3235	01773	0	ERASCON4	OCTAL 01773	USED IN ERASCHK
0119	REF	20	LAST	1024	5012	S10BITS	EQUALS	LOW10	01777, USED IN ERASCHK	
0120	REF	3	LAST	907	5020	SBNK03	EQUALS	PR156	06000, USED IN ROPECHK	
0121	REF	7	LAST	1099	4350	-MAXADRS	=	H15	FOR ROPECHK	
0122					43,3236	00060	1	SIXTY	OCTAL 00060	
0123					43,3237	60017	1	SUPRCN	OCTAL 60017	USED IN ROPECHK
0124					43,3240	17777	0	S13BITS	OCTAL 17777	
0125					43,3241	25252	0	CONC+S1	OCTAL 25252	USED IN CYCLSHFT
0126					43,3242	52400	1	CONC+S2	OCTAL 52400	USED IN CYCLSHFT
0127					43,3243	76777	1	ERASCON5	OCTAL 76777	
0128	REF	2	LAST	232	5660	S-7	=	OCT77770		
0129	REF	2	LAST	1008	6112	S-4	EQUALS	NEG4		
0130	REF	3	LAST	890	7745	S-3	EQUALS	NEG3		
0131	REF	6	LAST	1103	7746	S-2	EQUALS	NEG2		
0132	REF	12	LAST	1099	7747	S-1	EQUALS	NEGONE		
0133	REF	27	LAST	996	4754	S-ZERO	EQUALS	NEGO		
0134	REF	46	LAST	1132	E3,1400			EBANK=LST1		
0135	REF	3	LAST	291	43,3244	01371	0	ADRS1	ADRES SKEEP1	
0136	REF	4	LAST	1116	43,3245	03336	1	SELFADRS	ADRES SELFCHK	
A0137									SELFCHK RETURN ADDRESS. SHOULD BE PUT	
A0138									IN SELFRET WHEN GOING FROM SELFCHK TO	
A0139									SHOWSUM AND PUT IN SKEEP1 WHEN GOING	
									FROM SHOWSUM TO SELF-CHECK.	
0140	REF	6	LAST	215	43,3246	3 1360	0	PRERORS	CA EKESTORE	IS IT NECESSARY TO RESTORE ERASABLE
0141					43,3247	0 0006	1	EXTEND		
0142	REF	1			43,3250	1 3257	0	BZF	ERRORS	NO
0143					43,3251	0 0006	1	EXTEND		
0144	REF	3	LAST	215	43,3252	3 1376	1	DCA	SKEEP5	
0145	REF	3	LAST	215	43,3253	51 377	0	INDEX	SKEEP7	
0146					43,3254	52 001	1	DXCH	0000	RESTORE THE TWO ERASABLE REGISTERS
0147	REF	2	LAST	290	43,3255	3 4755	1	CA	S+ZERO	
0148	REF	7	LAST	1286	43,3256	55 360	1	TS	ERSTORE	
0149					43,3257	0 0004	0	ERRORS	INHINT	
0150	REF	324	LAST	1213	43,3260	3 0002	0	CA	Q	
0151	REF	5	LAST	471	43,3261	55 357	0	TS	SFAIL	SAVE Q FOR FAILURE LOCATION
0152	REF	3	LAST	305	43,3262	55 363	1	TS	ALMCADR	FOR DISPLAY WITH BBANK AND PCOUNT
0153	REF	3	LAST	211	43,3263	25 365	0	INCR	ERCOUNT	KEEP TRACK OF NUMBER OF MALFUNCTIONS.
0154	REF	1			43,3264	0 5571	1	TGALARM2	TG ALARM2	
0155					43,3265	01102	0	OCT	01102	SELF-CHECK MALFUNCTION INDICATOR
0156	REF	5	LAST	305	43,3266	11 362	0	CCS	SNODE	
0157	REF	3	LAST	1286	43,3267	3 4755	1	SIDLOOP	CA S+ZERO	
0158	REF	6	LAST	1286	43,3270	55 362	0	TS	SNODE	

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0159	REF	5	LAST 1286	43,3271	0 3326 1	TC	SELFCHK	GO TO IDLE LOOP
0160	REF	4	LAST 1286	43,3272	0 1357 1	TC	SFAIL	CONTINUE WITH SELF-CHECK
0161	REF	380	LAST 1264	43,3273	10 000 0	-1CHK	CCS	A
0162	REF	1		43,3274	1 3246 0		TCF	PRERRORS
0163	REF	2	LAST 1287	43,3275	1 3246 0		TCF	PRERRORS
0164	REF	381	LAST 1287	43,3276	10 000 0		CCS	A
0165	REF	3	LAST 1287	43,3277	1 3246 0		TCF	PRERRORS
0166	REF	325	LAST 1286	43,3300	0 0002 0		TC	Q
0167				43,3301	0 0006 1	SMODECHK	EXTEND	
0168	REF	4	LAST 1286	43,3302	23 371 0		QXCH	SKEEP1
0169	REF	1		43,3303	0 3332 0		TC	CHECKNJ
0170	REF	7	LAST 1286	43,3304	11 362 0		CCS	SMODE
0171	REF	1		43,3305	0 3312 1		TC	SOPTIONS
0172	REF	1		43,3306	0 3303 1		TC	SMODECHK +2
0173	REF	2	LAST 1287	43,3307	0 3312 1		TC	SOPTIONS
0174	REF	2	LAST 108	43,3310	25 366 0		INCR	SCOUNT
0175	REF	5	LAST 1287	43,3311	0 1371 0		TC	SKEEP1
								CONTINUE WITH SELF-CHECK
0176	REF	1		43,3312	6 5660 1	SOPTIONS	AD	S-7
0177				43,3313	0 0006 1		EXTEND	
0178				43,3314	6 3316 0		BZMF	+2
0179	REF	1		43,3315	0 3267 1	BNKOPTN	TC	SIDLOOP
0180	REF	3	LAST 1287	43,3316	25 366 0		INCR	SCOUNT
0181	REF	1		43,3317	6 4757 0		AD	S+7
0182	REF	382	LAST 1287	43,3320	50 000 1		INDEX	A
0183	REF	1		43,3321	0 3322 1		TC	SOPTION1
0184	REF	6	LAST 1287	43,3322	0 1371 0	SOPTION1	TC	SKEEP1
0185	REF	7	LAST 1287	43,3323	0 1371 0	SOPTION2	TC	SKEEP1
0186	REF	8	LAST 1287	43,3324	0 1371 0	SOPTION3	TC	SKEEP1
0187	REF	1		43,3325	0 3337 0	SOPTION4	TC	ERASCHK
0188	REF	1		43,3326	0 3520 0	SOPTION5	TC	R-PECHK
0189	REF	9	LAST 1287	43,3327	0 1371 0	SOPTION6	TC	SKEEP1
0190	REF	10	LAST 1287	43,3330	0 1371 0	SOPTION7	TC	SKEEP1
0191	REF	11	LAST 1287	43,3331	0 1371 0	SOPTION10	TC	SKEEP1
								CONTINUE WITH SELF-CHECK
0192				43,3332	0 0006 1	CHECKNJ	EXTEND	
0193	REF	7	LAST 1116	43,3333	23 361 1		QXCH	SELFRET
0194	REF	55	LAST 1157	43,3334	0 4635 0		TC	POSTJUMP
0195	REF	2	LAST 1110	43,3335	03214 0		CADR	ADVAN
0196	REF	2	LAST 1287	43,3336	0 3301 0	SELFCHK	TC	SMODECHK
								** CHARLEY, COME IN HERE

R0197 SKEEP7 HOLDS LOWEST OF TWO ADDRESSES BEING CHECKED.

R0198 SKEEP6 HOLDS B(X+1).

R0199 SKEEP5 HOLDS B(X).

R0200 SKEEP4 HOLDS C(EBANK) DURING ERASLOOP AND CHECKNJ.

R0201 SKEEP3 HOLDS LAST ADDRESS BEING CHECKED (HIGHEST ADDRESS).

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R0202 SKEEP2 CONTROLS CHECKING OF NON-SWITCHABLE ERASABLE MEMORY WITH BANK NUMBERS IN EB.

R0204 ERASCHK TAKES APPROXIMATELY 7 SECONDS

0205	REF	2	LAST	290	43,3337	3 4753 1	ERASCHK	CA	S+1	
0206	REF	3	LAST	290	43,3340	55'372 1		TS	SKEEP2	
0207	REF	4	LAST	1286	43,3341	3 4755 1	OE BANK	CA	S+ZERO	
0208	REF	64	LAST	1267	43,3342	54 003 0		TS	EBANK	
0209	REF	1			43,3343	3 3234 1		CA	ERASCON3	01461
0210	REF	4	LAST	1286	43,3344	55'377 1		TS	SKEEP7	STARTING ADDRESS
0211	REF	1			43,3345	3 5012 1		CA	8 001TS	01777
0212	REF	3	LAST	290	43,3346	55'373 0		TS	SKEEP3	LAST ADDRESS CHECKED
0213	REF	1			43,3347	0 3367 0		TC	ERASLOOP	
0214	REF	1			43,3350	3 5007 0	E134567B	CA	ERASCON6	01400
0215	REF	5	LAST	1288	43,3351	55'377 1		TS	SKEEP7	STARTING ADDRESS
0216	REF	2	LAST	1288	43,3352	3 5012 1		CA	810BITS	01777
0217	REF	4	LAST	1288	43,3353	55'373 0		TS	SKEEP3	LAST ADDRESS CHECKED
0218	REF	2	LAST	1288	43,3354	0 3367 0		TC	ERASLOOP	
0219	REF	2	LAST	1288	43,3355	3 5007 0	2E BANK	CA	ERASCON6	01400
0220	REF	6	LAST	1288	43,3356	55'377 1		TS	SKEEP7	STARTING ADDRESS
0221	REF	1			43,3357	3 3235 0		CA	ERASCON4	01773
0222	REF	5	LAST	1288	43,3360	55'373 0		TS	SKEEP3	LAST ADDRESS CHECKED
0223	REF	3	LAST	1288	43,3361	0 3367 0		TC	ERASLOOP	
0224	REF	4	LAST	1288	43,3362	55'372 1	NOE BANK	TS	SKEEP2	+0
0225	REF	1			43,3363	3 3232 1		CA	ERASCON1	00061
0226	REF	7	LAST	1288	43,3364	55'377 1		TS	SKEEP7	STARTING ADDRESS
0227	REF	1			43,3365	3 3233 0		CA	ERASCON2	01373
0228	REF	6	LAST	1288	43,3366	55'373 0		TS	SKEEP3	LAST ADDRESS CHECKED
0229					43,3367	0 0004 0	ERASLOOP	INHINT		
0230	REF	65	LAST	1288	43,3370	3 0003 1		CA	EBANK	STORES C(EBANK)
0231	REF	3	LAST	215	43,3371	55'374 1		TS	SKEEP4	
0232					43,3372	0 0006 1		EXTEND		
0233	REF	8	LAST	1288	43,3373	5 1377 0		NDX	SKEEP7	
0234					43,3374	3 0001 0		DCA	0000	
0235	REF	4	LAST	1286	43,3375	53'376 0		DXCH	SKEEP5	STORES C(X) AND C(X+1) IN SKEEP6 AND 5.
0236	REF	9	LAST	1288	43,3376	3 1377 0		CA	SKEEP7	
0237	REF	8	LAST	1286	43,3377	55'360 1		TS	ERESTORE	IF RESTANT, RESTORE C(X) AND C(X+1)
0238	REF	220	LAST	1128	43,3400	54 001 1		TS	L	
0239	REF	221	LAST	1288	43,3401	24 001 0		INCR	L	
0240	REF	383	LAST	1287	43,3402	50 000 1		NDX	A	
0241					43,3403	52 001 1		DXCH	0000	PUTS OWN ADDRESS IN X AND X +1
0242	REF	10	LAST	1288	43,3404	51'377 0		NDX	SKEEP7	
0243					43,3405	4 0001 1		CS	0001	CS X+1
0244	REF	11	LAST	1288	43,3406	51'377 0		NDX	SKEEP7	
0245					43,3407	6 0000 1		AD	0000	AD X
0246	REF	1			43,3410	0 3273 1		TC	-1CHK	
0247	REF	9	LAST	1288	43,3411	3 1360 0		CA	ERESTORE	HAS ERASABLE BEEN RESTORED
0248					43,3412	0 0006 1		EXTEND		

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0249	RLF	1	43,3413	1 3437 0	BZF	ELOOPFIN	YES, EXIT ERASLOOP.
0250			43,3414	0 0006 1	EXTEND		
0251	REF	12	LAST 1288	43,3415	5 1377 0	NDX	SKEEP7
0252				43,3416	4 0001 1	DCS	0000
0253	REF	13	LAST 1289	43,3417	51 377 0	NDX	SKEEP7
0254				43,3420	52 001 1	DXCH	0000
0255	REF	14	LAST 1289	43,3421	51 377 0	NDX	SKEEP7
0256				43,3422	4 0000 0	CS	0000
0257	REF	15	LAST 1289	43,3423	51 377 0	NDX	SKEEP7
0258				43,3424	6 0001 0	AD	0001
0259	REF	2	LAST 1288	43,3425	0 3273 1	TC	-1CHK
0260	REF	10	LAST 1288	43,3426	3 1360 0	CA	ERESTORE
0261				43,3427	0 0006 1	EXTEND	
0262	REF	2	LAST 1289	43,3430	1 3437 0	BZF	ELOOPFIN
0263				43,3431	0 0006 1	EXTEND	
0264	REF	5	LAST 1288	43,3432	3 1376 1	DCA	SKEEP5
0265	REF	16	LAST 1289	43,3433	51 377 0	NDX	SKEEP7
0266				43,3434	52 001 1	DXCH	0000
0267	REF	5	LAST 1288	43,3435	3 4755 1	CA	S+ZERO
0268	REF	11	LAST 1289	43,3436	55 360 1	TS	ERESTORE
0269				43,3437	0 0003 1	ELOOPFIN	RELINT
0270	REF	2	LAST 1287	43,3440	0 3332 0	TC	CHECKNJ
0271	REF	4	LAST 1288	43,3441	3 1374 0	CA	SKEEP4
0272	REF	66	LAST 1288	43,3442	54 003 0	TS	EBANK
0273	REF	17	LAST 1289	43,3443	25 377 0	INCR	SKEEP7
0274	REF	18	LAST 1289	43,3444	4 1377 1	CS	SKEEP7
0275	REF	7	LAST 1288	43,3445	6 1373 1	AD	SKEEP3
0276				43,3446	0 0006 1	EXTEND	
0277				43,3447	1 3451 0	BZF	+2
0278	REF	4	LAST 1288	43,3450	0 3367 0	TC	ERASLOOP
0279	REF	5	LAST 1288	43,3451	11 372 1	CCS	SKEEP2
0280	REF	1		43,3452	0 3362 0	TC	NUEBANK
0281	REF	6	LAST 1289	43,3453	25 372 0	INCR	SKEEP2
0282	REF	67	LAST 1289	43,3454	3 0003 1	CA	EBANK
0283	REF	1		43,3455	6 4743 0	AD	SBIT9
0284	REF	68	LAST 1289	43,3456	54 003 0	TS	EBANK
0285	REF	1		43,3457	6 3243 1	AD	ERASCON5
0286				43,3460	0 0006 1	EXTEND	
0287	REF	1		43,3461	1 3355 0	BZF	2EBANK
0288	REF	69	LAST 1289	43,3462	10 003 0	CCS	EBANK
0289	REF	1		43,3463	0 3350 1	TC	E1345678
0290	REF	3	LAST 1288	43,3464	3 5007 0	CA	ERASCON6
0291	REF	70	LAST 1289	43,3465	54 003 0	TS	EBANK
0292	CNTRCHK PERFORMS A CS OF ALL REGISTERS FROM OCT. 60 THROUGH OCT. 10.						
0293	INCLUDED ARE ALL COUNTERS, T6-1, CYCLE AND SHIFT, AND ALL RUPT REGISTERS						
0294	REF	1		43,3466	3 4771 1	CNTRCHK	CA
0295	REF	7	LAST 1289	43,3467	55 372 1	CNTRLOOP	TS
0296	REF	1		43,3470	6 4750 1	AD	SBIT4
0297	REF	384	LAST 1288	43,3471	50 000 1	INDEX	A
0298				43,3472	4 0000 0	CS	0000

GO TO EBANKS 1,3,4,5,6, AND 7
END OF ERASCHK

+10 OCTAL

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0299 REF 8 LAST 1289 43,3475 11'372 1
 0300 REF 1 43,3474 0 3467 1

CCS SKEEP2
 TC CNTRLOOP

R0301 CYCLSHFT CHECKS THE CYCLE AND SHIFT REGISTERS

0302 REF 1 43,3475 3 3241 0 CYCLSHFT CA CONC+S1 25252
 0303 REF 42 LAST 1091 43,3476 54 020 1 TS CYR C(CYR) = 12525
 0304 REF 22 LAST 1081 43,3477 54 022 0 TS CYL C(CYL) = 52524
 0305 REF 20 LAST 1081 43,3500 54 021 0 TS SR C(SR) = 12525
 0306 REF 12 LAST 1267 43,3501 54 023 1 TS EDOP C(EDOP) = 00125
 0307 REF 43 LAST 1290 43,3502 6 0020 0 AD CYR 37777 C(CYR) = 45252
 0308 REF 23 LAST 1290 43,3503 6 0022 1 AD CYL 00-12524 C(CYL) = 25251
 0309 REF 21 LAST 1290 43,3504 6 0021 1 AD SR 00-25251 C(SR) = 05252
 0310 REF 13 LAST 1290 43,3505 6 0023 0 AD EDOP 00-25376 C(EDOP) = +0
 0311 REF 1 43,3506 6 3242 0 AD CONC+S2 C(CONC+S2) = 52400
 0312 REF 3 LAST 1289 43,3507 0 3273 1 TC -1CHK
 0313 REF 44 LAST 1290 43,3510 6 0020 0 AD CYR 45252
 0314 REF 24 LAST 1290 43,3511 6 0022 1 AD CYL 72523
 0315 REF 22 LAST 1290 43,3512 6 0021 1 AD SR 77775
 0316 REF 14 LAST 1290 43,3513 6 0023 0 AD EDOP 77775
 0317 REF 3 LAST 1288 43,3514 6 4753 1 AD S+1 77776
 0318 REF 4 LAST 1290 43,3515 0 3273 1 TC -1CHK

0319 REF 4 LAST 1287 43,3516 25'367 1
 0320 REF 3 LAST 1287 43,3517 0 3301 0

INCR SCOUNT +1
 TC SMODECHK

R0321 SKEEP1 HOLDS SUM

R0322 SKEEP2 HOLDS PRESENT CONTENTS OF ADDRESS IN ROPECHK AND SHOWSUM ROUTINES

R0323 SKEEP2 HOLDS BANK NUMBER IN LOW ORDER BITS DURING SHOWSUM DISPLAY

R0324 SKEEP3 HOLDS PRESENT ADDRESS (00000 TO 01777 IN COMMON FIXED BANKS)

R0325 (04000 TO 07777 IN FFX BANKS)

R0326 SKEEP3 HOLDS BUGGER WORD DURING SHOWSUM DISPLAY

R0327 SKEEP4 HOLDS BANK NUMBER AND SUPER BANK NUMBER

R0328 SKEEP5 COUNTS 2 SUCCESSIVE TC SELF WORDS

R0329 SKEEP6 CONTROLS ROPECHK OR SHOWSUM OPTION

R0330 SKEEP7 CONTROLS WHEN ROUTINE IS IN COMMON FIXED OR FIXED FIXED BANKS

0331 REF 1 43,3520 3 4754 0 ROPECHK CA S-ZERO
 03311 REF 4 LAST 291 43,3521 55'376 0 TS SKELP6
 03312 REF 6 LAST 1289 43,3522 3 4755 1 STSHOWSUM CA S+ZERO

*
 * -0 FOR ROPECHK.
 * SHOULD BE ROPECHK

0332 REF 5 LAST 1289 43,3523 55'374 1 TS SKEEP4 BANK NUMBER
 0333 REF 4 LAST 1290 43,3524 3 4753 1 CA S+
 0334 REF 19 LAST 1289 43,3525 55'377 1 COMAFX TS SKEEP7
 0335 REF 7 LAST 1290 43,3526 3 4755 1 CA S+ZERO
 0336 REF 12 LAST 1287 43,3527 55'371 1 TS SKEEP1
 0337 REF 8 LAST 1289 43,3530 55'373 0 TS SKEEP3
 0338 REF 5 LAST 1290 43,3531 3 4753 1 CA S+1
 0339 REF 6 LAST 1289 43,3532 55'375 0 TS SKEEP5 COUNTS DOWN 2 TC SELF WORDS
 0340 REF 6 LAST 1290 43,3533 3 1374 0 COMADRS CA SKEEP4
 0341 REF 222 LAST 1288 43,3534 54 001 1 TS L TO SET SUPER BANK
 0342 REF 8 LAST 1286 43,3535 7 4350 1 MASK HI5

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0343	REF	9	LAST 1290	43,3536	6 1373 1	AD	SKEEP3	
0344	REF	2	LAST 440	43,3537	0 4651 1	TC	SUPDACAL	SUPER DATA CALL
0345	REF	1		43,3540	0 3563 1	TC	ADSUM	
0346	REF	1		43,3541	6 4741 1	AD	SBIT11	02000
0347	REF	1		43,3542	0 3574 1	TC	ADRSCHK	
0348	REF	385	LAST 1289	43,3543	4 0000 0	CS	A	
0349	REF	20	LAST 1290	43,3544	55 377 1	TS	SKEEP7	
0350				43,3545	0 0006 1	EXTEND		
0351				43,3546	1 3551 1	BZF	+3	
0352	REF	1		43,3547	3 4740 0	CA	SBIT12	04000, STARTING ADDRESS OF BANK 02
0353				43,3550	0 3552 0	TC	+2	
0354	REF	1		43,3551	3 5020 0	CA	SBANK03	06000, STARTING ADDRESS OF BANK 03
0355	REF	10	LAST 1291	43,3552	55 373 0	TS	SKEEP3	
0356	REF	8	LAST 1290	43,3553	3 4755 1	CA	S+ZERO	
0357	REF	13	LAST 1290	43,3554	55 371 1	TS	SKEEP1	
0358	REF	6	LAST 1290	43,3555	3 4753 1	CA	S+1	
0359	REF	7	LAST 1290	43,3556	55 375 0	TS	SKEEP5	COUNTS DOWN 2 TC SELF WORDS
0360	REF	11	LAST 1291	43,3557	51 373 1	FXADRS INDEX	SKEEP3	
0361				43,3560	3 0000 1	CA	0000	
0362	REF	2	LAST 1291	43,3561	0 3563 1	TC	ADSUM	
0363	REF	2	LAST 1291	43,3562	0 3574 1	TC	ADRSCHK	
0364	REF	9	LAST 1290	43,3563	55 372 1	ADSUM	TS	SKEEP2
0365	REF	14	LAST 1291	43,3564	6 1371 0	AD	SKEEP1	
0366	REF	15	LAST 1291	43,3565	55 371 1	TS	SKEEP1	
0367	REF	9	LAST 1291	43,3566	3 4755 1	CAF	S+ZERO	
0368	REF	16	LAST 1291	43,3567	6 1371 0	AD	SKEEP1	
0369	REF	17	LAST 1291	43,3570	55 371 1	TS	SKEEP1	
0370	REF	10	LAST 1291	43,3571	4 1372 1	CS	SKEEP2	
0371	REF	12	LAST 1291	43,3572	6 1373 1	AD	SKEEP3	
0372	REF	326	LAST 1287	43,3573	0 0002 0	TC	Q	
0373	REF	386	LAST 1291	43,3574	22 000 1	ADRSCHK	LXCH	A
0374	REF	13	LAST 1291	43,3575	3 1373 1	CA	SKEEP3	
0375	REF	21	LAST 1286	43,3576	7 5012 0	MASK	LOW10	RELATIVE ADDRESS
0376	REF	1		43,3577	6 4350 0	AD	-MAXADRS	SUBTRACT MAX RELATIVE ADDRESS = 777.
0377				43,3600	0 0006 1	EXTEND		
0378	REF	1		43,3601	1 3670 1	BZF	SOPTION	CHECKSUM FINISHED IF LAST ADDRESS.
0379	REF	8	LAST 1291	43,3602	11 375 0	CCS	SKEEP5	IS CHECKSUM FINISHED
0380				43,3603	0 3606 1	TC	+3	NO
0381				43,3604	0 3606 1	TC	+2	NO
0382	REF	2	LAST 1291	43,3605	0 3670 0	TC	SOPTION	GO TO ROPECHK SHOWSUM OPTION
0383	REF	223	LAST 1290	43,3606	10 001 1	CCS	L	-0 MEANS A TC SELF WORD.
0384	REF	1		43,3607	0 3616 0	TC	CONTINU	
0385	REF	2	LAST 1291	43,3610	0 3616 0	TC	CONTINU	
0386	REF	3	LAST 1291	43,3611	0 3616 0	TC	CONTINU	
0387	REF	9	LAST 1291	43,3612	11 375 0	CCS	SKEEP5	
0388	REF	4	LAST 1291	43,3613	0 3617 1	TC	CONTINU +1	
0389	REF	1		43,3614	3 7747 1	CA	S-1	

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0390	REF	5	LAST 1291	43,3615	0 3617 1		TC	CONTINU +1	AD IN THE BUGGER WORD
0391	REF	7	LAST 1291	43,3616	3 4753 1	CONTINU	CA	S+1	MAKE SURE TWO CONSECUTIVE TC SELF WORDS
0392	REF	10	LAST 1291	43,3617	55'375 0		TS	SKEEP5	
03921	REF	5	LAST 1290	43,3620	11'376 0		CCS	SKEEP6	*
03922	REF	21	LAST 1116	43,3621	10 067 1		CCS	NEWJOB	* +1, SHOWSUM
03923	REF	4	LAST 717	43,3622	0 5122 0		TC	CHANG1	*
03924				43,3623	0 3625 0		TC	+2	*
0393	REF	3	LAST 1289	43,3624	0 3332 0		TC	CHECKNJ	-0 IN SKEEP6 FOR ROPECHK
0394	REF	14	LAST 1291	43,3625	25'373 1	ADRS+1	INCR	SKEEP3	
0395	REF	21	LAST 1291	43,3626	11'377 1		CCS	SKEEP7	
0396	REF	1		43,3627	0 3533 1		TC	COMADRS	
0397	REF	2	LAST 1292	43,3630	0 3533 1		TC	COMADRS	
0398	REF	1		43,3631	0 3557 0		TC	FXADRS	
0399	REF	2	LAST 1292	43,3632	0 3557 0		TC	FXADRS	
0400	REF	7	LAST 1290	43,3633	4 1374 1	NXTBNK	CS	SKEEP4	
0401	REF	1		43,3634	6 3723 1		AD	LSTBNKCH	LAST BANK TO BE CHECKED
0402				43,3635	0 0006 1		EXTEND		
0403	REF	1		43,3636	1 3131 0		BZF	ENDSUMS	END OF SUMMING OF BANKS.
0404	REF	8	LAST 1292	43,3637	3 1374 0		CA	SKEEP4	
0405	REF	2	LAST 1291	43,3640	6 4741 1		AD	SBIT11	
0406	REF	9	LAST 1292	43,3641	55'374 1		TS	SKEEP4	37 TO 40 INCRMTS SKEEP4 BY END RND CARRY
0407	REF	1		43,3642	0 3646 0		TC	CHKSUPR	
0408	REF	1		43,3643	3 4735 1	17TO20	CA	SBIT15	
0409	REF	10	LAST 1292	43,3644	27'374 1		ADS	SKEEP4	SET FOR BANK 20
0410	REF	1		43,3645	0 3662 0		TC	GONXTBNK	
0411	REF	9	LAST 1290	43,3646	7 4350 1	CHKSUPR	MASK	H15	
0412				43,3647	0 0006 1		EXTEND		
0413	REF	1		43,3650	1 3660 0		BZF	NXTSUPR	INCREMENT SUPER BANK
0414	REF	1		43,3651	6 3240 1	27TO30	AD	S13BITS	
0415				43,3652	0 0006 1		EXTEND		
0416				43,3653	1 3655 0		BZF	+2	BANK SET FOR 30
0417	REF	2	LAST 1292	43,3654	0 3662 0		TC	GONXTBNK	
0418	REF	1		43,3655	3 3236 0		CA	SIXTY	FIRST SUPER BANK
0419	REF	11	LAST 1292	43,3656	27'374 1		ADS	SKEEP4	
0420	REF	3	LAST 1292	43,3657	0 3662 0		TC	GONXTBNK	
0421	REF	1		43,3660	6 3237 1	NXTSUPR	AD	SUPRCON	SET BNK 30 + INCR SUPR BNK AND CANCEL
0422	REF	12	LAST 1292	43,3661	27'374 1		ADS	SKEEP4	ERC BIT OF THE 37 TO 40 ADVANCE.
0423	REF	22	LAST 1292	43,3662	11'377 1	GONXTBNK	CCS	SKEEP7	
0424	REF	1		43,3663	0 3525 0		TC	COMMF	
0425	REF	8	LAST 1292	43,3664	3 4753 1		CA	S+1	
0426	REF	1		43,3665	0 3543 0		TC	FXFX	
0427	REF	1		43,3666	3 4745 0		CA	SBIT7	HAS TO BE LARGER THAN NO OF FXSW BANKS.
0428	REF	2	LAST 1292	43,3667	0 3525 0		TC	COMMF	
0429	REF	13	LAST 1292	43,3670	3 1374 0	SOPTION	CA	SKEEP4	
0430	REF	10	LAST 1292	43,3671	7 4350 1		MASK	H15	= BANK BITS
0431	REF	5	LAST 437	43,3672	0 4331 1		TC	LEFT5	
0432	REF	224	LAST 1291	43,3673	54 001 1		TS	L	BANK NUMBER BEFORE SUPER BANK

L AGC-BLOCK-TWO-SELF-CHECK

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0433	REF	14	LAST	1292	43,3674	3	1374	0	CA	SKEEP4	
0434	REF	1			43,3675	7	4357	0	MASK	S8BITS	= SUPER-BANK-BITS
0435					43,3676	0	0006	1	EXTEND		
0436	REF	1			43,3677	1	3705	1	BZF	SRPT	BEFORE SUPER BANK
0437	REF	23	LAST	1290	43,3700	54	021	0	TS	SR	SUPER-BANK-NECESSARY
0438	REF	225	LAST	1292	43,3701	3	0001	0	CA	L	
0439	REF	18	LAST	1286	43,3702	7	4757	1	MASK	SEVEN	
0440	REF	24	LAST	1293	43,3703	6	0021	1	AD	SE	
0441	REF	226	LAST	1293	43,3704	54	001	1	TS	L	BANK-NUMBER-WITH-SUPER-BANK
0442	REF	6	LAST	1292	43,3705	3	1376	1	CA	SKEEP6	*
0443					43,3706	0	0006	1	EXTEND		*
0444					43,3707	1	3711	1	BZF	+	* ON -0 CONTINUE WITH ROPE CHECK.
0445	REF	1			43,3710	0	3113	1	TC	SDISPLAY	* ON +1 GO TO DISPLAY OF SUM.
0446	REF	18	LAST	1291	43,3711	11	371	1	CCS	SKEEP1	FORCE SUM TO ABSOLUTE VALUE.
04461					43,3712	0	3714	0	TC	+	
04462					43,3713	0	3715	1	TC	+2	
04463	REF	9	LAST	1292	43,3714	6	4753	1	AD	S+1	
04464	REF	19	LAST	1293	43,3715	55	371	1	TS	SKEEP1	
0447	REF	227	LAST	1293	43,3716	4	0001	1	CS	L	= - BANK NUMBER
0448	REF	20	LAST	1293	43,3717	6	1371	0	AD	SKEEP1	
0449	REF	2	LAST	1291	43,3720	6	7747	1	AD	S-1	
0450	REF	5	LAST	1290	43,3721	0	3273	1	TC	-1CHK	CHECK SUM
0451	REF	2	LAST	290	43,3722	0	3633	1	TC	NXTBNK	
0454	REF	22	LAST	1292	0067				EBANK=	NEWJOB	
0455					43,3723	66100	0		LSTBNKCH	BBCON*	* CONSTANT, LAST BANK.

L PHASE-TABLE MAINTENANCE

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P0001 SUBROUTINE TO UPDATE THE PROGRAM NUMBER DISPLAY ON THE DSKY.

0002	REF	1				COUNT* \$\$/PHASE		
0003				5311		BLOCK 02		
0004	REF	1		4000		SETLOC FFTAG1		
0005				5311		BANK		
0006	REF	327	LAST 1291	5311	50 002 0	NEWMODEX INDEX 0		UPDATE MODREG. ENTRY FOR MODE IN FIXED.
0007				5312	3 0000 1	CAF 0		
0008	REF	328	LAST 1294	5313	24 002 0	INCR 0		
0009	REF	21	LAST 1231	5314	55 011 1	NEWMODEX TS MODREG		ENTRY FOR MODE IN A.
0014				5315	3 5320 0	MMDSPLAY CAF +3		DISPLAY MAJOR MODE.
0015	REF	40	LAST 1213	5316	22 006 1	PREBJUMP LXCH BBANK		PUTS BBANK IN L
0016	REF	17	LAST 1224	5317	1 4640 0	TCF BANKJUMP		PUTS Q INTO A
0017	REF	1		5320	20213 0	CAD1 SETUPDSP		

R0018 RETURN TO CALLER +3 IF MODE = THAT AT CALLER +1. OTHERWISE RETURN TO CALLER +2.

0020	REF	329	LAST 1294	5321	50 002 0	CHECKMM INDEX 0		
0021				5322	4 0000 0	CS 0		
0022	REF	22	LAST 1294	5323	6 1011 0	AD MODREG		
0023				5324	0 0006 1	EXTEND		
0024	REF	3	LAST 1105	5325	1 6741 1	BZF Q+2		
0025	REF	4	LAST 521	5326	1 6737 0	TCF Q+1		NO MATCH
0026	REF	4	LAST 1294	6742		TCQ = Q+2 +1		
0027				14,3774		BANK 14		
0028	REF	1		10,2000		SETLOC PHASETAB		
0029				10,2213		BANK		
0030	REF	1				COUNT* \$\$/PHASE		
0031				10,2213	0 0004 0	SETUPDSP INHINT		
0032	REF	44	LAST 904	10,2214	52 071 0	DXCH RUPTREG1		SAVE CALLER-S RETURN 2CADR
0033	REF	11	LAST 1099	10,2215	3 4355 0	CAF PRI030		EITHER A TASK OR JOB CAN COME TO
0034	REF	26	LAST 1121	10,2216	0 5072 1	TC NOVAC		NEWMODEX
0035	REF	23	LAST 1294	1011		EBANK= MODREG		
0036	REF	1		10,2217	03534 0	2CADR DSPMMJOB		
0036	REF	1		10,2220	60102 1			
0037	REF	45	LAST 1294	10,2221	52 071 0	DXCH RUPTREG1		
0038				10,2222	0 0003 1	RELINT		
0039	REF	23	LAST 1267	10,2223	52 006 0	DXCH Z		RETURN
0040	REF	2	LAST 457	40,3534		DSPMMJOB EQUALS DSPMMJB		
0041				5327		BLOCK 02		
0042	REF	2	LAST 1294	4000		SETLOC FFTAG1		
0043				5327		BANK		

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R0044 PHASCHNG IS THE MAIN WAY OF MAKING PHASE CHANGES FOR RESTARTS. THERE ARE THREE FORMS OF PHASCHNG, KNOWN AS TYPE
 R0046 A, TYPE B, AND TYPE C. THEY ARE ALL CALLED AS FOLLOWS, WHERE OCT XXXXX CONTAINS THE PHASE INFORMATION.

A0048 TC PHASCHNG
 A0049 OCT XXXXX

R0050 TYPE A IS CONCERNED WITH FIXED PHASE CHANGES, THAT IS, PHASE INFORMATION THAT IS STORED PERMANENTLY. THESE
 R0052 OPTIONS ARE, WHERE G STANDS FOR A GROUP AND X FOR THE PHASE.

R0053 G.0 INACTIVE, WILL NOT PERMIT A GROUP G RESTART
 R0055 G.1 WILL CAUSE THE LAST DISPLAY TO BE REACTIVATED, USED MAINLY IN MANNED FLIGHTS
 R0057 G.EVEN A DOUBLE TABLE RESTART, CAN CAUSE ANY COMBINATION OF TWO JOBS, TASKS, AND/OR
 R0059 LONGCALL TO BE RESTARTED.
 R0060 G.ODD NOT .1 A SINGLE TABLE RESTART, CAN CAUSE EITHER A JOB, TASK, OR LONGCALL RESTART

R0062 THIS INFORMATION IS PUT INTO THE OCTAL WORD AFTER TC PHASCHNG AS FOLLOWS

R0063 TLO OOP PPP PPP GGG

R0065 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G'S STAND FOR THE GROUP, OCTAL 1 - 7, THE P'S FOR THE PHASE,
 R0067 OCTAL 0 - 127. O'S MUST BE 0. IF ONE WISHES TO HAVE THE TBASE OF GROUP G TO BE SET AT THIS TIME,
 R0069 T IS SET TO 1, OTHERWISE IT IS SET TO 0. SIMILARLY IF ONE WISHES TO SET LONGBASE, THEN L IS SET TO 1, OTHERWISE
 R0071 IT IS SET TO 0. SOME EXAMPLES.

A0072 TC PHASCHNG THIS WILL CAUSE GROUP 3 TO BE SET TO 0.
 A0073 OCT 00003 MAKING GROUP 3 INACTIVE

A0074 TC PHASCHNG IF A RESTART OCCURS THIS WOULD CAUSE
 A0075 OCT 00012 GROUP 2 TO RESTART THE LAST DISPLAY

A0076 TC PHASCHNG THIS SETS THE TBASE OF GROUP 4 AND IN
 A0077 OCT 40064 CASE OF A RESTART WOULD START UP THE TWO
 A0078 THINGS LOCATED IN THE DOUBLE 4.6 RESTART
 A0079 LOCATION
 A0080 TC PHASCHNG THIS SETS LONGBASE AND UPON A RESTART
 A0081 OCT 20135 CAUSES 5.13 TO BE RESTARTED (SINCE
 A0082 LONGBASE WAS SET THIS SINGLE ENTRY
 A0083 SHOULD BE A LONGCALL)

A0084 TC PHASCHNG SINCE BOTH TBASE4 AND LONGBASE ARE SET.
 A0085 OCT 60124 4.12 SHOULD CONTAIN BOTH A TASK AND A
 A0086 LONGCALL TO BE RESTARTED

R0087 TYPE C PHASCHNG CONTAINS THE VARIABLE TYPE OF PHASCHNG INFORMATION. INSTEAD OF THE INFORMATION BEING IN A
 R0089 PERMANENT FORM, ONE STORES THE DESIRED RESTART INFORMATION IN A VARIABLE LOCATION. THE BITS ARE AS FOLLOWS,

R0091 TLO 1AD XXX CJW GGG

R0092 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G'S STAND FOR THE GROUP, OCTAL 1 - 7. IF THE RESTART IS TO
 R0094 BE BY WAITLIST, W IS SET TO 1, IF IT IS A JOB, J IS SET TO 1, IF IT IS A LONGCALL, C IS SET TO 1. ONLY ONE OF
 R0096 THESE THREE BITS MAY BE SET. X'S ARE IGNORED 1 MUST BE 1, AND 0 MUST BE 0. AGAIN T STANDS FOR THE TBASE,

L PHASE TABLE MAINTENANCE

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R0098 AND L FOR LUNGBASE. THE BITS A AND D ARE CONCERNED WITH THE VARIABLE INFORMATION. IF D IS SET TO 1, A PRIORITY
 R0100 OR DELTA TIME WILL BE READ FROM THE NEXT LOCATION AFTER THE OCTAL INFORMATION, IF THIS IS TO BE INDIRECT, THAT
 R0102 IS, THE NAME OF A LOCATION COMBINING THE INFORMATION (DELTA TIME ONLY). THEN THIS IS GIVEN AS THE -GENADR OF
 R0104 THAT LOCATION WHICH CONTAINS THE DELTA TIME. IF THE OLD PRIORITY OR DELTA TIME IS TO BE USED, THAT WHICH IS
 R0106 ALREADY IN THE VARIABLE STORAGE, THEN D IS SET TO 0. NEXT THE A BIT IS USED. IF IT IS SET TO 0, THE ADDRESS
 R0108 THAT WOULD BE RESTARTED DURING A RESTART IS THE NEXT LOCATION AFTER THE PHASE INFORMATION, THAT IS, EITHER
 R0110 (TC PHASCHNG) +2 OR +3, DEPENDING ON WHETHER D HAD BEEN SET OR NOT. IF A IS SET TO 1, THEN THE ADDRESS THAT
 R0112 WOULD BE RESTARTED IS THE 2CADR THAT IS READ FROM THE NEXT TWO LOCATIONS. EXAMPLES.

A0114	AD	TC	PHASCHNG	THIS WOULD CAUSE LOCATION AD +3 TO BE
A0115	AD+1	OCT	05023	RESTARTED BY GROUP THREE WITH A PRIORITY
A0116	AD+2	OCT	23000	OF 23. NOTE UPON RETURNING IT WOULD
A0117	AD+3			ALSO GO TO AD+3

A0118	AD	TC	PHASCHNG	GROUP 1 WOULD CAUSE CALLCALL TO
A0119	AD+1	OCT	27441	BE STARTED AS A LONGCALL FROM THE TIME
A0120	AD+2	-GENADR	DELTIME	STORED IN LUNGBASE (LUNGBASE WAS SET) BY
A0121	AD+3	2CADR	CALLCALL	A DELTATIME STORED IN DELTIME. THE
A0122	AD+4			BBCON OF THE 2CADR SHOULD CONTAIN THE E
A0123	AD+5			BANK OF DELTIME. PHASCHNG RETURNS TO
A0124				LOCATION AD+5

R0125 NOTE THAT IF A VARIABLE PRIORITY IS GIVEN FOR A JOB, THE JOB WILL BE RESTARTED AS A NOVAC IF THE PRIORITY IS
 R0127 NEGATIVE. AS A FINDVAC IF THE PRIORITY IS POSITIVE.

R0128 TYPE B PHASCHNG IS A COMBINATION OF VARIABLE AND FIXED PHASE CHANGES. IT WILL START UP A JOB AS INDICATED
 R0130 BELOW AND ALSO START UP ONE FIXED RESTART, THAT IS EITHER AN G.1 OR A G.000 OR THE FIRST ENTRY OF G.EVEN
 R0132 DOUBLE-ENTRY. THE BIT INFORMATION IS AS FOLLOWS,

R0133 TL1-DAP-PPP-PPP-GGG

R0124 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G:S STAND FOR THE GROUP, OCTAL 1 - 7. THE P:S FOR THE FIXED
 R0136 PHASE INFORMATION, OCTAL 0 - 127. 1 MUST BE 1. AND AGAIN T STANDS FOR THE TBASE AND L FOR LUNGBASE. D THIS
 R0138 TIME STANDS ONLY FOR PRIORITY SINCE THIS WILL BE CONSIDERED A JOB, AND IT MUST BE GIVEN DIRECTLY IF GIVEN.
 R0140 AGAIN A STANDS FOR THE ADDRESS OF THE LOCATION TO BE RESTARTED, 1 IF THE 2CADR IS GIVEN, OR 0 IF IT IS TO BE
 R0142 THE NEXT LOCATION. (THE RETURN LOCATION OF PHASCHNG) EXAMPLES.

A0143	AD	TC	PHASCHNG	TBASE IS SET AND A RESTART CAUSE GROUP 3
A0144	AD+1	OCT	56043	TO START THE JOB AJOBAJOB WITH PRIORITY
A0145	AD+2	OCT	31000	31 AND THE FIRST ENTRY OF 3.4SPOT (WE CAN
A0146	AD+3	2CADR	AJOBAJOB	ASSUME IT IS A TASK SINCE WE SET TBASE3)
A0147	AD+4			UPON RETURN FROM PHASCHNG CONTROL WOULD
A0148	AD+5			GO TO AD+5

A0149	AD	TC	PHASCHNG	UPON A RESTART THE LAST DISPLAY WOULD BE
A0150	AD+1	OCT	10015	RESTARTED AND A JOB WITH THE PREVIOUSLY
A0151	AD+2			STORED PRIORITY WOULD BE BEGUN AT AD+2
A0152				BY MEANS OF GROUP 5

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R0153 THE NOVAC-FINDVAC CHOICE FOR JOBS HOLDS HERE ALSO - NEGATIVE PRIORITY CAUSES A NOVAC CALL, POSITIVE A FINDVAC.

R0155 SUMMARY OF BITS

R0156 TYPE A TLO OOP PPP PPP GGG

~~R0157 TYPE B TL1 DAP PPP PPP GGG~~

R0158 TYPE C TLO 1AD XXX CJW GGG

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R0159 2PHSCHNG IS USED WHEN ONE WISHES TO START UP A GROUP OR CHANGE A GROUP WHILE UNDER THE CONTROL OF A DIFFERENT
 R0161 GROUP. FOR EXAMPLE, CHANGE THE PHASE OF GROUP 3 WHILE THE PORTION OF THE PROGRAM IS UNDER GROUP 5. ALL 2PHSCHNG
 R0163 CALLS ARE MADE IN THE FOLLOWING MANNER.

A0164 TC 2PHSCHNG
 A0165 OCT XXXXX
 A0166 OCT YYYYY

R0167 WHERE OCT XXXXX MUST BE OF TYPE A AND OCT YYYYY MAY BE OF EITHER TYPE A OR TYPE B OR TYPE C. THERE IS ONE
 R0169 DIFFERENCE --- NOTE- IF LONGBASE IS TO BE SET THIS INFORMATION IS GIVEN IN THE OCT YYYYY INFORMATION. IT WILL
 R0171 BE DISREGARDED IF GIVEN WITH THE OCT XXXXX INFORMATION. A COUPLE OF EXAMPLES MAY HELP.

A0173		AD	TC	2PHSCHNG	SET TBASE3 AND IF A RESTART OCCURS START
A0174		AD+1	OCT	40083	THE TWO ENTRIES IN 3.8 TABLE LOCATION
A0175		AD+2	OCT	05025	THIS IS OF TYPE C. SET THE JOB TO BE
A0176		AD+3	OCT	18000	TO BE LOCATION AD+4. WITH A PRIORITY 18.
A0177		AD+4			FOR GROUP 5 PHASE INFORMATION

0178	REF	1		5327	0 0004 0	2PHSCHNG	COUNT# 11/PHASE	
0179				5330	50 002 0	INHINT		THE ENTRY FOR A DOUBLE PHASE CHANGE
0180	REF	330	LAST 1294	5331	3 0000 1	NDX	Q	
0181				5332	24 002 0	CA	0	
0182	REF	331	LAST 1298	5333	54 072 0	INCR	Q	
0183	REF	1				TS	TEMP2	
0184	REF	1		5334	7 4757 1	MASK	OCT7	
0185				5335	6 0000 1	DOUBLE		
0186	REF	1		5336	54 071 0	TS	TEMP2	
0187	REF	2	LAST 1298	5337	3 0072 1	CA	TEMP2	
0188	REF	1		5340	7 5030 0	MASK	OCT17770	NEED ONLY 1770, BUT WHY GET A NEW CONST.
0189				5341	0 0006 1	EXTEND		
0190	REF	33	LAST 1285	5342	7 4740 1	HP	BIT12	
0191	REF	3	LAST 1298	5343	56 072 1	XCH	TEMP2	
0192	REF	41	LAST 1285	5344	7 4735 0	MASK	BIT15	
0193	REF	1		5345	54 066 0	TS	TEMP2	INDICATES WHETHER TO SET TBASE OR NOT
01932	REF	332	LAST 1298	5346	50 002 0	INDEX	Q	
01934				5347	3 0000 1	CA	0	
01936	REF	333	LAST 1298	5350	24 002 0	INCR	Q	
01938	REF	1		5351	54 065 0	TS	TEMP2	
0194	REF	1		5352	1 5363 0	TCF	PHASJUMP	
0195				5353	0 0004 0	PHASCHNG	INHINT	NORMAL PHASCHNG ENTRY POINT.
0196	REF	334	LAST 1298	5354	50 002 0	INDEX	Q	
0197				5355	3 0000 1	CA	0	
0198	REF	335	LAST 1298	5356	24 002 0	INCR	Q	
0199				5357	0 0004 0	PHSCHNGA	INHINT	FIRST OCTAL PARAMETER IN A.

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0200	REF	2	LAST 1298	5360	54 065 0	TS	TEMPSW	
0201	REF	128	LAST 1263	5361	3 4753 1	CA	ONE	
02015	REF	2	LAST 1298	5362	54 066 0	TS	TEMPSW2	
0202				5363	0 0006 1	PHASJUMP	EXTEND	
0203	REF	1		5364	3 5367 0	DCA	ADRPCHN2	OFF TO SWITCHED BANK
0204				5365	52 006 0	DTCB		
0205	REF	47	LAST 1286	E3,1400		EBANK=	LST1	
0206	REF	1		5366	02224 1	ADRPCHN2	2CADR	PHSCHNG2
0206	REF	1		5367	20103 1			
0207	REF	1		5370	22 073 0	ONEORTWO	LXCH	TEMPB8CN
0208	REF	41	LAST 1294	5371	22 006 1		LXCH	BBANK
0209	REF	2	LAST 1299	5372	22 073 0		LXCH	TEMPB8CN
0210	REF	1		5373	7 5024 0	MASK	0CT14000	SEE WHAT KIND OF PHASE CHANGE IT IS
0211	REF	387	LAST 1291	5374	10 000 0	CCS	A	
0212	REF	1		5375	1 7750 0	TCF	CHECKB	IT IS OF TYPE :B:
0213	REF	1		5376	3 0062 0	CA	TEMPP	
0214	REF	42	LAST 1285	5377	7 4745 1	MASK	BIT7	
0215	REF	388	LAST 1299	5400	10 000 0	CCS	A	SHALL WE USE THE OLD PRIORITY
0216	REF	1		5401	1 5423 0	TCF	GETPRIO	NO GET A NEW PRIORITY (OR DELTA T)
0217	REF	1		5402	50 061 0	OLDPRIO	NDX	USE THE OLD PRIORITY (OR DELTA T)
0218	REF	1		5403	3 1052 1	CA	PHSPRDT1	2
0219	REF	1		5404	54 070 1	TS	TEMPPR	
0220	REF	2	LAST 1299	5405	3 0062 0	CON1	CA	TEMPP
0221	REF	38	LAST 1285	5406	7 4744 0	MASK	BIT8	SEE IF A 2CADR IS GIVEN
0222	REF	389	LAST 1299	5407	10 000 0	CCS	A	
0223	REF	1		5410	1 5427 1	TCF	GETNEWM	
0224	REF	336	LAST 1298	5411	3 0002 0	CA	Q	
0225	REF	1		5412	54 063 0	TS	TEMPNM	
0226	REF	1		5413	3 0006 1	CA	BB	
0227				5414	0 0006 1	EXTEND		PICK UP USERS SUPERBANK
0228	REF	24	LAST 1129	5415	04 007 1	ROR	SUPERBNK	
0229	REF	1		5416	54 064 1	TS	TEMPBB	
0230	REF	1		5417	3 5422 0	TOCON2	CA	CON2ADR
0231	REF	3	LAST 1299	5420	22 073 0	LXCH	TEMPB8CN	BACK TO SWITCHED BANK
0232				5421	52 006 0	DTCB		
0233	REF	1		5422	02312 0	CON2ADR	GENADR	CON2
0234	REF	337	LAST 1299	5423	50 002 0	GETPRIO	NDX	Q
0235				5424	3 0000 1	CA	O	DON'T CARE IF DIRECT OR INDIRECT
0236	REF	338	LAST 1299	5425	24 002 0	INCR	Q	LEAVE THAT DECISION TO RESTARTS
								OBTAIN RETURN ADDRESS

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0237	REF	1	5426	1	5404	0	TCF	CON1 -1
0238			5427	0	0006	1	GETNEWM	EXTEND
0239	REF	339	5430	5	0002	0	INDEX	0
0240			5431	3	0001	0	DCA	0
0241	REF	2	5432	52	064	1	DXCH	TEMPNM
0242	REF	78	5433	3	4752	0	CA	TWO
0243	REF	340	5434	26	002	1	ADS	Q
								OBTAIN RETURN ADDRESS
0244	REF	1	5435	1	5417	1	TCF	TOCON2
0245	REF	2	5024				OCT14000	EQUALS PRI014
0246	REF	40	0061				TEMPG	EQUALS ITEMP1
0247	REF	20	0062				TEMPP	EQUALS ITEMP2
0248	REF	26	0063				TEMPNM	EQUALS ITEMP3
0249	REF	12	0064				TEMPBB	EQUALS ITEMP4
0250	REF	50	0065				TEMPSW	EQUALS ITEMP5
0251	REF	7	0066				TEMPSW2	EQUALS ITEMP6
0252	REF	46	0070				TEMPPR	EQUALS RUPTREG1
0253	REF	9	0071				TEMPG2	EQUALS RUPTREG2
0254	REF	12	0072				TEMPP2	EQUALS RUPTREG3
0255	REF	5	0073				TEMPBBCN	EQUALS RUPTREG4
0256	REF	42	0006				BB	EQUALS BBANK
0257			14,3774				BANK	14
0258	REF	2	10,2000				SETLOC	PHASETAB
0259			10,2224				BANK	
0260	REF	1	E3,1436				EBANK=	PHSNAME1
0261	REF	2	LAST 1294 TO 1295:	9	9*		COUNT*	41/PHASE
0262	REF	4	10,2224	22	073	0	PHSCHNG2	LXCH
0263	REF	3	10,2225	3	0065	1	CA	TEMPSW
0264	REF	2	10,2226	7	4757	1	MASK	OCT7
0265			10,2227	6	0000	1	DOUBLE	
0266	REF	2	10,2230	54	061	1	TS	TEMPG
0267	REF	4	10,2231	3	0065	1	CA	TEMPSW
0268	REF	2	10,2232	7	5030	0	MASK	OCT17770
0269			10,2233	0	0006	1	EXTEND	
0270	REF	34	10,2234	7	4740	1	MP	BIT12
0271	REF	3	10,2235	54	062	1	TS	TEMPP
0272	REF	5	10,2236	3	0065	1	CA	TEMPSW
0273	REF	1	10,2237	7	4101	1	MASK	OCT60000
0274	REF	6	10,2240	56	065	1	XCH	TEMPSW
0275	REF	2	10,2241	7	5024	0	MASK	OCT14000
0276	REF	390	10,2242	10	000	0	CCS	A

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0277	REF	1		10,2243	1 5370 1	TCF	ONEORTWO	
0278	REF	4	LAST 1300	10,2244	3 0062 0	CA	TEMPP	START STORING THE PHASE INFORMATION
0279	REF	3	LAST 1300	10,2245	50 061 0	NDX	TEMPPG	
0280	REF	2	LAST 217	10,2246	54 751 0	TS	PHASE1 -2	
0281	REF	3	LAST 1299	10,2247	10 066 0	CCS	TEMPSW2	IS IT A PHASCHNG OR A 2PHSCHNG
0282	REF	1		10,2250	1 2264 1	TCF	BELOW2	IT'S A PHASCHNG
0283				10,2251	1 2252 1	TCF	+1	IT'S A 2PHSCHNG
0284	REF	4	LAST 1298	10,2252	4 0072 0	CS	TEMPP2	
0285	REF	5	LAST 1301	10,2253	22 072 1	LXCH	TEMPP2	
0286	REF	2	LAST 1298	10,2254	50 071 1	NDX	TEMPPG2	
0287	REF	6	LAST 865	10,2255	52 751 0	DXCH	-PHASE1 -2	
0288	REF	4	LAST 1301	10,2256	10 066 0	CCS	TEMPSW2	
0289				10,2257	12 260 0	NOOP		CAN'T GET HERE
0290	REF	2	LAST 1301	10,2260	1 2264 1	TCF	BELOW2	
0291	REF	17	LAST 996	10,2261	4 0025 1	CS	TIME1	
0292	REF	3	LAST 1301	10,2262	50 071 1	NDX	TEMPPG2	
0293	REF	2	LAST 736	10,2263	55 051 0	TS	TBASE1 -2	
0294	REF	7	LAST 1300	10,2264	10 065 0	CCS	TEMPSW	SEE IF WE SHOULD SET TBASE OR LONGBASE
0295	REF	1		10,2265	1 2300 1	TCF	BELOW3	SET LONGBASE ONLY
0296	REF	1		10,2266	1 2303 1	TCF	BELOW4	SET NEITHER
0297	REF	18	LAST 1301	10,2267	4 0025 1	CS	TIME1	SET TBASE TO BEGIN WITH
0298	REF	4	LAST 1301	10,2270	50 061 0	NDX	TEMPPG	
0299	REF	3	LAST 1301	10,2271	55 051 0	TS	TBASE1 -2	
0300	REF	8	LAST 1301	10,2272	3 0065 1	CA	TEMPSW	SHALL WE NOW SET LONGBASE
0301	REF	1		10,2273	6 2276 0	AD	BIT14COM	
0302	REF	391	LAST 1300	10,2274	10 000 0	CCS	A	
0303				10,2275	12 276 1	NOOP		***** CANT GET HERE *****
0304				10,2276	17777 0	OCT	17777	***** CANT GET HERE *****
0305	REF	2	LAST 1301	10,2277	1 2303 1	TCF	BELOW4	NO WE NEED ONLY SET TBASE
0306				10,2300	0 0006 1	EXTEND		SET LONGBASE
0307	REF	31	LAST 1224	10,2301	3 0025 0	DCA	TIME2	
0308	REF	1		10,2302	53 152 1	DXCH	LONGBASE	
0309	REF	5	LAST 1301	10,2303	4 0062 1	CS	TEMPP	AND STORE THE FINAL PART OF THE PHASE
0310	REF	5	LAST 1301	10,2304	50 061 0	NDX	TEMPPG	
0311	REF	7	LAST 1301	10,2305	54 750 1	TS	-PHASE1 -2	
0312	REF	341	LAST 1300	10,2306	3 0002 0	CA		
0313	REF	5	LAST 1300	10,2307	22 073 0	LXCH	TEMPBBCN	
0314				10,2310	0 0003 1	RELINT		
0315				10,2311	52 006 0	DTCB		

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0316	REF	6	LAST 1301	10,2312	22 073 0	CON2	LXCH	TEMP88CN
0317	REF	6	LAST 1301	10,2313	3 0062 0		CA	TEMPP
0318	REF	6	LAST 1301	10,2314	50 061 0		NDX	TEMPP
0319	REF	3	LAST 1301	10,2315	54 751 0		TS	PHASE1 -2
0320	REF	2	LAST 1299	10,2316	3 0070 0		CA	TEMPPR
0321	REF	7	LAST 1302	10,2317	50 061 0		NDX	TEMPP
0322	REF	2	LAST 1299	10,2320	55 052 0		TS	PHSPRDT1 -2
0323				10,2321	0 0006 1		EXTEND	
0324	REF	3	LAST 1300	10,2322	3 0064 0		DCA	TEMPNM
0325	REF	8	LAST 1302	10,2323	50 061 0		NDX	TEMPP
0326	REF	2	LAST 1300	10,2324	53 435 0		DXCH	PHSNAME1 -2
0327	REF	1		10,2325	1 2247 0		TCF	BELOW1
0328				7750			BLOCK	03
0329	REF	3	LAST 750	6000			SETLOC	FFTAG6
0330				7750			BANK	
0331	REF	1					COUNT#	11/PHASE
0332	REF	35	LAST 1300	7750	7 4740 1	CHECK8	MASK	BIT12
0333	REF	392	LAST 1301	7751	10 000 0		CCS	A
0334	REF	2	LAST 1299	7752	1 5423 0		TCF	GETPRIO
0335	REF	1		7753	1 5402 0		TCF	OLDPRIO

SINCE THIS IS OF TYPE B, THIS BIT SHOULD
BE HERE IF WE ARE TO GET A NEW PRIORITY
IT IS, SO GET NEW PRIORITY

IT ISN'T, USE THE OLD PRIORITY

L RESTARTS ROUTINE

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0001				01,3526		BANK 01	
0002	REF	2	LAST 239	01,2000		SETLOC RESTART	
0003				01,3526		BANK	
0004	REF	3	LAST 1302	E3,1436		EBANK= PHSNAME1	GOPROG MUST SWITCH TO THIS EBANK
0005	REF	1				COUNT* \$\$/RSROU	
0006	REF	771	LAST 1267	01,3526	3 0161 1	CA MPAC +5	GET GROUP NUMBER -1
0007				01,3527	6 0000 1	DOUBLE	SAVE FOR INDEXING
0008	REF	1		01,3530	54-155 1	TS TEMP2G	
0009	REF	1		01,3531	3 3770 1	CA PHS2CADR	SET UP EXIT IN CASE IT IS AN EVEN
0010	REF	1		01,3532	54-157 0	TS TEMPSWCH	TABLE PHASE
0011	REF	1		01,3533	3 3565 1	CA RTRNCADR	TO SAVE TIME ASSUME IT WILL GET NEXT
0012	REF	1		01,3534	54 707 0	TS GOLOC +2	GROUP AFTER THIS
0013	REF	1		01,3535	3 0154 1	CA TEMPPHS	
0014	REF	10	LAST 1286	01,3536	7 5007 1	MASK OCT1400	
0015	REF	393	LAST 1302	01,3537	10 000 0	CCS A	IS IT A VARIABLE OR TABLE RESTART
0016	REF	1		01,3540	1 3551 1	TCF ITSAVAR	IT'S A VARIABLE RESTART
0017	REF	2	LAST 1303	01,3541	10 154 0	CCS TEMPPHS	IS IT AN X.1 RESTART
0018	REF	394	LAST 1303	01,3542	10 000 0	CCS A	
0019	REF	1		01,3543	1 3651 1	TCF ITSATBL	NO, ITS A TABLE RESTART
0020	REF	3	LAST 1300	01,3544	3 5024 1	CA PFI014	IT IS AN X.1 RESTART. THEREFORE START
0021	REF	42	LAST 1209	01,3545	0 5105 0	TC FINDVAC	THE DISPLAY RESTART JOB
0022	REF	48	LAST 1299	E3,1400		EBANK= LSTI	
0023	REF	1		01,3546	03037 0	2CADR INITDSP	
0023	REF	1		01,3547	20103 1		
0024	REF	2	LAST 1303	01,3550	0 3565 1	TC RTRNCADR	FINISHED WITH THIS GROUP. GET NEXT ONE
0025	REF	11	LAST 1303	01,3551	7 5007 1	ITSAVAR MASK OCT1400	IS IT TYPE B ?
0026	REF	395	LAST 1303	01,3552	10 000 0	CCS A	
0027	REF	1		01,3553	1 3622 0	TCF ITSLIKEB	YES, IT IS TYPE B
0028				01,3554	0 0006 1	EXTEND	STORE THE JOB (OR TASK) 2CADR FOR EXIT
0029	REF	2	LAST 1303	01,3555	5 0155 0	NDX TEMP2G	
0030	REF	4	LAST 1303	01,3556	3 1437 0	DCA PHSNAME1	
0031	REF	2	LAST 1303	01,3557	52 706 1	DXCH GOLOC	
0032	REF	3	LAST 1303	01,3560	3 0154 1	CA TEMPPHS	SEE IF THIS IS A JOB, TASK, OR A LONGCAL
0033	REF	3	LAST 1300	01,3561	7 4757 1	MASK OCT7	
0034	REF	3	LAST 1155	01,3562	6 7746 0	AD MINUS2	
0035	REF	396	LAST 1303	01,3563	10 000 0	CCS A	
0036	REF	1		01,3564	1 3734 0	TCF ITSLNGCL	ITS A LONGCALL
0037	REF	7	LAST 1267	01,3565	0 4631 1	RTRNCADR TC SWRETURN	CANT GET HERE

L-----RESTARTS ROUTINE-----

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0038 REF 1 01,3566 1 3570 1 TCF ITSAWAIT
0039 REF 1 01,3567 1 3635 0 TCF ITSAJOB ITS A JOB
0040 REF 1 01,3570 3 3774 0 ITSAWAIT CA WTLTCADR SET UP WAITLIST CALL
0041 REF 3 LAST 1303 01,3571 54 704 0 TS GOLOC -1
0042 REF 3 LAST 1303 01,3572 50 155 0 NDX TEMP2G DIRECTLY STORED
0043 REF 3 LAST 1302 01,3573 3 1054 1 CA PHSPRDT1
0044 REF 397 LAST 1303 01,3574 10 000 0 TIMETEST CCS A IS IT AN IMMEDIATE RESTART
0045 REF 398 LAST 1304 01,3575 24 000 1 INCR A NO.
0046 REF 1 01,3576 1 3601 1 TCF FINDTIME FIND OUT WHEN IT SHOULD BEGIN
0047 REF 1 01,3577 1 5436 1 TCF ITSINDIR STORED INDIRECTLY
0048 REF 1 01,3600 1 3620 1 TCF IMEDIATE IT WANTS AN IMMEDIATE RESTART

```

R0049-----***** THIS MUST BE IN FIXED FIXED *****-----

```

0050 5436 BLOCK 02
0051 REF 1 4000 SETLOC FFTAG2
0052 5436 BANK
0053 REF 1 COUNT* $$/RSROU
0054 REF 4 LAST 1304 5436 22 706 0 ITSINDIR LXCH GOLOC +1 GET THE CORRECT E BANK IN CASE THIS IS
0055 REF 2 LAST 1299 5437 22 006 1 LXCH BB SWITCHED ERRASIBLE
0056 REF 399 LAST 1304 5440 50 000 1 NDX A GET THE TIME INDIRECTLY
0057 5441 3 0001 0 CA 1
0058 REF 3 LAST 1304 5442 22 006 1 LXCH BB RESTORE THE BB AND GOLOC
0059 REF 5 LAST 1304 5443 22 706 0 LXCH GOLOC +1
0060 REF 2 LAST 1304 5444 1 3601 1 TCF FINDTIME FIND OUT WHEN IT SHOULD BEGIN

```

R0061-----***** YOU MAY RETURN TO SWITCHED FIXED *****-----

```

0062 01,3601 BANK 01
0063 REF 3 LAST 1303 01,2000 SETLOC RESTART
0064 01,3601 BANK
0065 REF 2 LAST 1303 TO 1304: 43 43* COUNT* $$/RSROU
0066 01,3601 4 0000 0 FINDTIME COM MAKE NEGITIVE SINCE IT WILL BE SUBTRACTO
0067 REF 228 LAST 1293 01,3602 54 001 1 TS L AND SAVE
0068 REF 4 LAST 1304 01,3603 50 155 0 NDX TEMP2G
0069 REF 4 LAST 1301 01,3604 4 1053 1 CS TBASE1
0070 01,3605 0 0006 1 EXTEND
0071 REF 19 LAST 1301 01,3606 60 025 0 SU TIME1
0072 REF 400 LAST 1304 01,3607 10 000 0 CCS A
0073 01,3610 4 0000 0 COM

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L RESTARTS ROUTINE

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0074	REF 2	LAST 159	01,3611	6 7731 0	AD	OCT37776	
0075	REF 129	LAST 1299	01,3612	6 4753 1	AD	ONE	
0076	REF 229	LAST 1304	01,3613	6 0001 0	AD	L	
0077	REF 401	LAST 1304	01,3614	10 000 0	CCS	A	
0078	REF 229	LAST 1285	01,3615	3 4755 1	CA	ZERG	
0079			01,3616	1 3620 1	TCF	+2	
0080			01,3617	1 3620 1	TCF	+1	
0081	REF 130	LAST 1305	01,3620	6 4753 1	IMEDIATE AD	ONE	
0082	REF 6	LAST 1304	01,3621	0 0704 1	TC	GOLOC -1	
0083	REF 3	LAST 1303	01,3622	3 3565 1	ITS LIKE B CA	RTRNCADR	TYPE B, SO STORE RETURN IN
0084	REF 2	LAST 1303	01,3623	54 157 0	TS	TEMPSWCH	TEMPSWCH IN CASE OF AN EVEN PHASE
0085	REF 1		01,3624	3 3771 0	CA	PRT2CADR	SET UP EXIT TO GET TABLE PART OF THIS
0086	REF 7	LAST 1305	01,3625	54 707 0	TS	GOLOC +2	VARIABLE TYPE OF PHASE
0087	REF 4	LAST 1303	01,3626	3 0154 1	CA	TEMPPHS	MAKE THE PHASE LOOK RIGHT FOR THE TABLE
0088	REF 1		01,3627	7 6074 0	MASK	OCT177	PART OF THIS VARIABLE PHASE
0089	REF 5	LAST 1305	01,3630	54 154 0	TS	TEMPPHS	
0090			01,3631	0 0006 1	EXTEND		
0091	REF 5	LAST 1304	01,3632	5 0155 0	NDX	TEMP2G	OBTAIN THE JOB'S 2CADR
0092	REF 5	LAST 1303	01,3633	3 1437 0	DCA	PHSNAME1	
0093	REF 8	LAST 1305	01,3634	52 706 1	DXCH	GOLOC	
0094	REF 6	LAST 1305	01,3635	50 155 0	ITSAJOB NDX	TEMP2G	NOW ADD THE PRIORITY AND LET'S GO
0095	REF 4	LAST 1304	01,3636	3 1054 1	CA	PHSPRDT1	
0096	REF 9	LAST 1305	01,3637	54 704 0	CHKNOVAC TS	GOLOC -1	SAVE PRIO UNTIL WE SEE IF ITS
0097			01,3640	0 0006 1	EXTEND		A FINDVAC OR A NOVAC
0098	REF 1		01,3641	6 3645 0	BZMF	ITSNOVAC	
0099	REF 1		01,3642	3 3773 1	CAF	FVACCADR	POSITIVE, SET UP FINDVAC CALL.
0100	REF 10	LAST 1305	01,3643	56 704 1	XCH	GOLOC -1	PICK UP PRIO.
0101	REF 11	LAST 1305	01,3644	0 0704 1	TC	GOLOC -1	AND GO
0102	REF 1		01,3645	3 3775 1	ITSNOVAC CAF	NOVACADR	NEGATIVE,
0103	REF 12	LAST 1305	01,3646	56 704 1	XCH	GOLOC -1	SET UP NOVAC CALL.
0104			01,3647	4 0000 0	COM		CORRECT PRIO.
0105	REF 13	LAST 1305	01,3650	0 0704 1	TC	GOLOC -1	AND GO
0106	REF 45	LAST 1290	01,3651	54 020 1	ITSATBL TS	CYR	FIND OUT IF THE PHASE IS ODD OR EVEN
0107	REF 46	LAST 1305	01,3652	10 020 1	CCS	CYR	
0108			01,3653	1 3654 1	TCF	+1	IT'S EVEN
0109	REF 1		01,3654	1 3752 0	TCF	ITSEVEN	
0110	REF 4	LAST 1305	01,3655	3 3565 1	CA	RTRNCADR	IN CASE THIS IS THE SECOND PART OF A
0111	REF 14	LAST 1305	01,3656	54 707 0	TS	GOLOC +2	TYPE B RESTART, WE NEED PROPER EXIT
0112	REF 6	LAST 1305	01,3657	3 0154 1	CA	TEMPPHS	SET UP POINTER FOR FINDING OUR PLACE IN
0113	REF 25	LAST 1293	01,3660	54 021 0	TS	SR	THE RESTART TABLES
0114	REF 26	LAST 1305	01,3661	6 0021 1	AD	SR	

L RESTARTS ROUTINE

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0115	REF 7	LAST 1305	01,3662	50 155 0	NDX	TEMP2G	
0116	REF 1		01,3663	6 2003 0	AD	SIZFTAB +1	
0117	REF 1		01,3664	54 156 1	TS	POINTER	
0118			01,3665	0 0006 1	CONTBL2	EXTEND	FIND OUT WHAT'S IN THE TABLE
0119	REF 2	LAST 1306	01,3666	5 0156 0	NDX	POINTER	
0120	REF 1		01,3667	3 2002 1	DCA	CADR TAB	GET THE 2CADR
0121	REF 15	LAST 1305	01,3670	22 706 0	LXCH	GOLOC +1	STORE THE BB INFORMATION
0122	REF 402	LAST 1305	01,3671	10 000 0	CCS	A	IS IT A JOB OR IS IT TIMED
0123	REF 403	LAST 1306	01,3672	24 000 1	INCR	A	POSITIVE. MUST BE A JOB
0124	REF 1		01,3673	1 3746 0	TCF	ITSAJOB2	
0125	REF 404	LAST 1306	01,3674	24 000 1	INCR	A	MUST BE EITHER A WAITLIST OR LONGCALL
0126	REF 16	LAST 1306	01,3675	54 705 1	TS	GOLOC	LET-S STORE THE CORRECT CADR
0127	REF 2	LAST 1304	01,3676	3 3774 0	CA	WTLTCADR	SET UP OUR EXIT TO WAITLIST
0128	REF 17	LAST 1306	01,3677	54 704 0	TS	GOLOC -1	
0129	REF 18	LAST 1306	01,3700	3 0706 0	CA	GOLOC +1	NOW FIND OUT IF IT IS A WAITLIST CALL
0130	REF 38	LAST 1285	01,3701	7 4742 0	MASK	BIT 6	THIS SHOULD BE ONE IF WE HAVE -BB
0131	REF 405	LAST 1306	01,3702	10 000 0	CCS		FOR THAT MATTER SO SHOULD BE BITS 9,8,7,
A0132							6,5, AND LAST BUT NOT LEAST (PERHAPS NOT
A0133							IN IMPORTANCE ANYWAY. BIT 4
0134	REF 1		01,3703	1 3741 1	TCF	ITSWTLST	IT IS A WAITLIST CALL
0135	REF 3	LAST 1306	01,3704	50 156 0	NDX	POINTER	OBTAIN THE ORIGINAL DELTA T
0136	REF 1		01,3705	3 2000 0	CA	PRDTTAB	ADDRESS FOR THIS LONGCALL
0137	REF 1		01,3706	1 5445 0	TCF	ITSLGCL1	NOW GO GET THE DELTA TIME
R0138	***** THIS MUST BE IN FIXED FIXED *****						
0139			5445		BLOCK	02	
0140	REF 2	LAST 1304	4000		SETLOC	FFTAG2	
0141			5445		BANK		
0142	REF 2	LAST 1304 TO 1304:	7	7*	COUNT*	\$/RSROU	
0143	REF 19	LAST 1306	5445	22 706 0	ITSLGCL1	LXCH	GOLOC +1
0144	REF 4	LAST 1304	5446	22 006 1	LXCH	BB	OBTAIN THE CORRECT E BANK
0145	REF 20	LAST 1306	5447	22 706 0	LXCH	GOLOC +1	AND PRESERVE OUR E AND F BANKS
0146			5450	0 0006 1	EXTEND		GET THE DELTA TIME
0147	REF 406	LAST 1306	5451	5 0000 1	NDX	A	
0148			5452	3 0001 0	DCA	0	
0149	REF 21	LAST 1306	5453	22 706 0	LXCH	GOLOC +1	RESTORE OUR E AND F BANK
0150	REF 5	LAST 1306	5454	22 006 1	LXCH	BB	RESTORE THE TASKS E AND F BANKS
0151	REF 22	LAST 1306	5455	22 706 0	LXCH	GOLOC +1	AND PRESERVE OUR L

L RESTARTS-ROUTINE

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0152	REF	1		5456 1 3707 0	TCF	ITSLGCL2	NOW LET'S PROCESS THIS LONGCALL
R0153 ***** YOU MAY RETURN TO SWITCHED FIXED *****							
0154				01,3707	BANK	01	
0155	REF	4	LAST 1304	01,2000	SETLOC	RESTART	
0156				01,3707	BANK		
0157	REF	3	LAST 1304 TO 1306:	70 113*	COUNT*	\$/RSROU	
0158	REF	8	LAST 1132	01,3707 53'154 1	ITSLGCL2	DXCH	LONGTIME
0159				01,3710 0 0006 1	EXTEND		CALCULATE TIME LEFT
0160	REF	32	LAST 1301	01,3711 4 0025 1	DCS	TIME2	
0161	REF	9	LAST 1307	01,3712 21'154 1	DAS	LONGTIME	
0162				01,3713 0 0006 1	EXTEND		
0163	REF	2	LAST 1301	01,3714 3 1152 0	DCA	LONGBASE	
0164	REF	10	LAST 1307	01,3715 21'154 1	DAS	LONGTIME	
0165	REF	11	LAST 1307	01,3716 11'153 0	CCS	LONGTIME	FIND OUT HOW THIS SHOULD BE RESTARTED
0166	REF	1		01,3717 1 3727 1	TCF	LONGCLCL	
0167				01,3720 1 3722 1	TCF	+2	
0168	REF	2	LAST 1304	01,3721 1 3615 1	TCF	IMEDIATE -3	
0169	REF	12	LAST 1307	01,3722 11'154 1	CCS	LONGTIME +1	
0170	REF	2	LAST 1307	01,3723 1 3727 1	TCF	LONGCLCL	
0171				01,3724 13 725 0	NOOP		CAN'T GET HERE *****
0172	REF	3	LAST 1307	01,3725 1 3615 1	TCF	IMEDIATE -3	
0173	REF	4	LAST 1307	01,3726 1 3620 1	TCF	IMEDIATE	
0174	REF	1		01,3727 3 3772 0	LONGCLCL	CA	LGCLCADR WE WILL GO TO LONGCALL
0175	REF	23	LAST 1306	01,3730 54 704 0	TS	GOLOC -1	
0176				01,3731 0 0006 1	EXTEND		PREPARE OUR ENTRY TO LONGCALL
0177	REF	13	LAST 1307	01,3732 3 1154 0	DCA	LONGTIME	
0178	REF	24	LAST 1307	01,3733 0 0704 1	TC	GOLOC -1	
0179	REF	3	LAST 1306	01,3734 3 3774 0	ITSLNGCL	CA	WTLTCADR ASSUME IT WILL GO TO WAITLIST
0180	REF	25	LAST 1307	01,3735 54 704 0	TS	GOLOC -1	
0181	REF	8	LAST 1306	01,3736 50 155 0	NDX	TEMP2G	
0182	REF	5	LAST 1305	01,3737 4 1054 0	CS	PHSPRDT1	GET THE DELTA T ADDRESS
0183	REF	2	LAST 1306	01,3740 1 5445 0	TCF	ITSLGCL1	NOW GET THE DELTA TIME
0184	REF	26	LAST 1307	01,3741 4 0706 1	ITSWTLST	CS	GOLOC +1 CORRECT THE BBON INFORMATION
0185	REF	27	LAST 1307	01,3742 54 706 1	TS	GOLOC +1	
0186	REF	4	LAST 1306	01,3743 50 156 0	NDX	POINTER	GET THE DT AND FIND OUT IF IT WAS STORED
0187	REF	2	LAST 1306	01,3744 3 2000 0	CA	PRDTTAB	DIRECTLY OR INDIRECTLY
0188	REF	1		01,3745 1 3574 0	TCF	TIMESTEST	FIND OUT HOW THE TIME IS STORED

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0189	REF	28	LAST 1307	01,3746	56 705 0	ITSAJOB2	XCH	GOLOC	STORE THE CADR
0190	REF	5	LAST 1307	01,3747	50 156 0		NDX	POINTER	ADD THE PRIORITY AND LET:S GO
0191	REF	3	LAST 1307	01,3750	3-2000 0		CA	PRDTTAB	
0192	REF	1		01,3751	1 3637 1		TCF	CHKNOVAC	
0193	REF	3	LAST 1305	01,3752	3 0157 1	ITSEVEN	CA	TEMPSWCH	SET UP FOR EITHER THE SECOND PART OF THE
0194	REF	29	LAST 1308	01,3753	54 707 0		TS	GOLOC +2	TABLE, OR A RETURN FOR THE NEXT GROUP
0195	REF	9	LAST 1307	01,3754	50 155 0		NDX	TEMP2G	SET UP POINTER FOR OUR LOCATION WITHIN
0196	REF	2	LAST 1306	01,3755	3 2002 1		CA	SIZETAB	THE TABLE
0197	REF	7	LAST 1305	01,3756	6 0154 1		AD	TEMPPHS	THIS MAY LOOK BAD BUT LET:S SEE YOU DO
0198	REF	8	LAST 1308	01,3757	6 0154 1		AD	TEMPPHS	BETTER IN TIME OR NUMBERR OF LOCATIONS
0199	REF	9	LAST 1308	01,3760	6 0154 1		AD	TEMPPHS	
0200	REF	6	LAST 1308	01,3761	54 156 1		TS	POINTER	
0201	REF	1		01,3762	1 3665 0		TCF	CONTRL2	NOW PROCESS WHAT IS IN THE TABLE
0202	REF	36	LAST 1285	01,3763	3 6245 1	PHSPART2	CA	THREE	SET THE POINTER FOR THE SECOND HALF OF
0203	REF	7	LAST 1308	01,3764	26 156 1		ADS	POINTER	THE TABLE
0204	REF	5	LAST 1305	01,3765	3 3565 1		CA	RTRNCADR	THIS WILL BE OUR LAST TIME THROUGH THE
0205	REF	30	LAST 1308	01,3766	54 707 0		TS	GOLOC +2	EVEN TABLE, SO AFTER IT GET THE NEXT
0206									GROUP
0207	REF	2	LAST 1308	01,3767	1 3665 0		TCF	CONTRL2	SO LET:S GET THE SECOND ENTRY IN THE TBL
0208	REF	772	LAST 1303	0154			TEMPPHS	EQUALS MPAC	
0209	REF	773	LAST 1308	0155			TEMP2G	EQUALS MPAC +1	
0210	REF	774	LAST 1308	0156			POINTER	EQUALS MPAC +2	
0211	REF	775	LAST 1308	0157			TEMPSWCH	EQUALS MPAC +3	
0212	REF	1		0705			GOLOC	EQUALS VAC5 +20D	
0213	REF	7	LAST 1286	7746			MINUS2	EQUALS NEG2	
0214	REF	9	LAST 1110	6074			OCT177	EQUALS LOW7	
0215	REF	1		01,3770	03763 0	PHS2CADR	GENADR	PHSPART2	
0216	REF	1		01,3771	03541 1	PRT2CADR	GENADR	GETPART2	
0217	REF	5	LAST 1210	01,3772	05277 0	LGCLCADR	GENADR	LONGCALL	
0218	REF	43	LAST 1303	01,3773	05105 0	FVACCADR	GENADR	FINDVAC	
0219	REF	39	LAST 1132	01,3774	05203 0	WTLTCADR	GENADR	WAITLIST	
0220	REF	27	LAST 1294	01,3775	05072 1	NOVACADR	GENADR	NOVAC	

L IMU MODE SWITCHING ROUTINES

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0001 5457 BLOCK 02
0002 REF 1 4000 SETLOC FFTAG3
0003 5457 BANK

0004 REF 1 E3.1471 EBANK= COMMAND

R0005 FIXED-FIXED ROUTINES.

0006 REF 1 COUNT* \$\$/IMODE
0007 REF 230 LAST 1305 5457 3 4755 1 ZEROICDU CAF ZERO ZERO ICPU COUNTERS.
0008 REF 18 LAST 1259 5460 54 032 1 TS CDUX
0009 REF 9 LAST 1259 5461 54 033 0 TS CDUY
0010 REF 12 LAST 1260 5462 54 034 1 TS CDUZ
0011 REF 342 LAST 1301 5463 0 0002 0 TC Q
0012 REF 27 LAST 1285 4743 SPSCODE = BIT9

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P0013 IMU ZEROING ROUTINE.

0014				11,3776		BANK	11	
0015	REF	1		07,2000		SETLOG	MODESW	
0016				07,2714		BANK		
0017	REF	1				COUNT*	\$\$/IMODE	
0018				07,2714	0 0004 0	IMUZERO	INHINT	ROUTINE TO ZERO ICDUS.
0019	REF	42	LAST	525	07,2715	4 1036 1	CS	DSPTAB +11D
0020	REF	4	LAST	212	07,2716	7 4771 0	MASK	BITS4&6
0021	REF	407	LAST	1306	07,2717	10 000 0	CCS	A
0022	REF	1		07,2720	1 2724 0	TCF	IMUZEROA	
0023	REF	44	LAST	1254	07,2721	0 5567 0	TC	ALARM
0024				07,2722	00206 0	OCT	00206	IF SO.
0025	REF	1		07,2723	1 3657 1	TCF	CAGETSTJ +4	IMMEDIATE FAILURE.
0032	REF	2	LAST	1310	07,2724	0 3653 1	IMUZEROA	TC CAGETSTJ
R0033			DELETE					
0034	REF	41	LAST	907	07,2725	4 1303 1	CS	IMODES33
0035	REF	2	LAST	857	07,2726	7 4773 1	MASK	SUPER011
0036	REF	42	LAST	1310	07,2727	27 303 1	ADS	IMODES33
0037	REF	47	LAST	983	07,2730	4 1302 0	CS	IMODES30
0038	REF	1		07,2731	7 5751 0	MASK	BITS3&4	INHIBIT ICDUFALL AND IMUFALL (IN CASE WE JUST CAME OUT OF COARSE ALIGN).
0039	REF	48	LAST	1310	07,2732	27 302 0	ADS	IMODES30
0040	REF	5	LAST	1310	07,2733	4 4771 0	CS	BITS4&6
0041				07,2734	0 0006 1	EXTEND		SEND ZERO ENCODE WITH COARSE AND ERROR COUNTER-DISABLED.
0042	REF	54	LAST	907	07,2735	03 012 1	WAND	CHAN12
0043	REF	3	LAST	166	07,2736	0 3266 0	TC	NOATTOFF
0044	REF	38	LAST	1285	07,2737	3 4747 1	CAF	BIT5
0045				07,2740	0 0006 1	EXTEND		
0046	REF	55	LAST	1310	07,2741	05 012 1	WOR	CHAN12
00461	REF	3	LAST	166	07,2742	0 5457 1	TC	ZEROICDU
0047	REF	46	LAST	1285	07,2743	3 4746 0	CAF	BIT6
0048	REF	40	LAST	1308	07,2744	0 5203 0	TC	WAITLIST
0049	REF	3	LAST	170	E3,1474		EBANK=	COUIND
0050	REF	1		07,2745	02757 0	2CADR	IMUZERO2	
0050	REF	1		07,2746	16103 1			
0051	REF	49	LAST	1310	07,2747	4 1302 0	CS	IMODES30
0052	REF	28	LAST	1309	07,2750	7 4743 1	MASK	BIT9
0053	REF	408	LAST	1310	07,2751	10 000 0	CCS	A
0054	REF	1		07,2752	1 2755 0	TCF	MODEEXIT	SEE IF IMU OPERATING AND ALARM IF NOT.

L IMU MODE SWITCHING ROUTINES

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0055	REF 45	LAST 1310	07,2753	0 5567 0	TC	ALARM	
0056			07,2754	00210 1	OCT	210	
0057			07,2755	0 0003 1	MODEEXIT	RELINT	GENERAL MODE SWITCHING EXIT.
0058	REF 8	LAST 1303	07,2756	1 4631 0	TCF	SWRETURN	
0059	REF 1		07,2757	0 3641 1	IMUZERO2	TC	CAGETEST
0061	REF 4	LAST 1310	07,2760	0 5457 1	TC	ZEROICDU	ZERO CDUX, CDUY, CDUZ
0062	REF 39	LAST 1310	07,2761	4 4747 0	CS	BIT5	REMOVE ZERO DISCRETE.
0063			07,2762	0 0006 1	EXTEND		
0064	REF 56	LAST 1310	07,2763	03 012 1	WAND	CHAN12	
0065	REF 28	LAST 1285	07,2764	3 4741 1	CAF	BIT11	WAIT 10 SECS FOR CTRS TO FIND GIMBALS
0066	REF 10	LAST 902	07,2765	0 5224 0	TC	VARDELAY	
0067	REF 2	LAST 1311	07,2766	0 3641 1	IMUZERO3	TC	CAGETEST
0069	REF 2	LAST 1310	07,2767	4 5751 0	CS	BITS3&4	REMOVE IMUFAIL AND ICDUFAIL INHIBIT.
0070	REF 50	LAST 1310	07,2770	7 1302 0	MASK	IMODES30	
0071	REF 51	LAST 1311	07,2771	55 302 0	TS	IMODES30	
0072	REF 3	LAST 1310	07,2772	4 4773 1	CS	SUPER011	ENABLE DAP AUTO AND HOLD MODES
0073	REF 43	LAST 1310	07,2773	7 1303 1	MASK	IMODES33	BIT5 FOR GROUND
0074	REF 44	LAST 1311	07,2774	55 303 1	TS	IMODES33	
0075	REF 47	LAST 966	07,2775	0 4674 0	TC	IBNKCALL	SET ISS WARNING IF EITHER OF ABOVE ARE
0076	REF 5	LAST 180	07,2776	14703 0	CADR	SETISSW	PRESENT.
0077	REF 1		07,2777	1 3631 1	TCF	ENDIMU	

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P0078 IMU COARSE ALIGN MODE.

0079				07,3000	0 0004 0	IMUCOARS	INHINT		
0080	REF	3	LAST 1310	07,3001	0 3653 1	TC	CAGETSTJ		
0081	REF	2	LAST 169	07,3002	0 3144 0	TC	SETCOARS		
0082	REF	25	LAST 1285	07,3003	3 6242 0	CAF	SIX		
0083	REF	41	LAST 1310	07,3004	0 5203 0	TC	WAITLIST		
0084	REF	4	LAST 1310	E3,1474		EBANK=	CDUIND		
0085	REF	1		07,3005	03010 0	PCADR	COARS		
0085	REF	1		07,3006	16103 1				
0086	REF	2	LAST 1310	07,3007	1 2755 0	TCF	MODELXIT		
0087	REF	3	LAST 1311	07,3010	0 3641 1	TC	CAGETEST		
0088	REF	47	LAST 1310	07,3011	3 4746 0	CAF	BIT6	ENABLE ALL THREE ISS CDU ERROR COUNTERS	
0089				07,3012	0 0006 1	EXTEND			
0090	REF	57	LAST 1311	07,3013	05 012 1	WOR	CHAN12		
0091	REF	79	LAST 1300	07,3014	3 4752 0	CAF	TWO	SET CDU INDICATOR	
0092	REF	5	LAST 1312	07,3015	55 474 0	TS	CDUIND		
0093	REF	6	LAST 1312	07,3016	51 474 1	INDEX	CDUIND	COMPUTE THETAD - THETAA IN 1:S	
0094	REF	21	LAST 1254	07,3017	3 0321 1	CA	THETAD	COMPLEMENT FORM	
0095				07,3020	0 0006 1	EXTEND			
0096	REF	7	LAST 1312	07,3021	5 1474 1	INDEX	CDUIND		
0097	REF	19	LAST 1309	07,3022	20 032 1	MSU	CDUX		
0098				07,3023	0 0006 1	EXTEND			
0099	REF	42	LAST 1285	07,3024	7 4737 1	MP	BIT13	SHIFT RIGHT 2	
0100	REF	230	LAST 1305	07,3025	56 001 0	XCH	L	ROUND	
0101				07,3026	6 0000 1	DOUBLE			
0102	REF	41	LAST 1300	07,3027	54 061 1	TS	ITEMPL		
0103				07,3030	1 3032 1	TCF	+2		
0104	REF	231	LAST 1312	07,3031	26 001 1	ADS	L		
0105	REF	8	LAST 1312	07,3032	51 474 1	INDEX	CDUIND	DIFFERENCE TO BE COMPUTED	
0106	REF	2	LAST 1309	07,3033	23 471 1	LXCH	COMMAND		
0107	REF	9	LAST 1312	07,3034	11 474 0	CCS	CDUIND		
0108	REF	1		07,3035	0 3015 0	TC	COARS1		
0109	REF	80	LAST 1312	07,3036	3 4752 0	CAF	TWO	MINIMUM OF 4 MS WAIT	
0110	REF	11	LAST 1311	07,3037	0 5224 0	TC	VARDELAY		

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0111	REF	4	LAST 1312	07,3040	0 3641 1	COARS2	TC	CAGETEST	DONT CONTINUE IF CAGED.
0112	REF	42	LAST 1312	07,3041	54 061 1		TS	ITEMP1	SETS TO +0.
0113	REF	81	LAST 1312	07,3042	3 4752 0		CAF	TWO	SET CDU INDICATOR
0114	REF	10	LAST 1312	07,3043	55 474 0	+3	TS	CDUIND	
0115	REF	11	LAST 1313	07,3044	51 474 1		INDEX	CDUIND	
0116	REF	3	LAST 1312	07,3045	11 471 0		CCS	COMMAND	NUMBER OF PULSES REQUIRED
0117	REF	1		07,3046	0 3052 0		TC	COMPOS	GREATER THAN MAX ALLOWED
0118	REF	1		07,3047	0 3061 0		TC	NEXTCDU +1	
0119	REF	1		07,3050	0 3117 0		TC	COMNEG	
0120	REF	2	LAST 1313	07,3051	0 3061 0		TC	NEXTCDU +1	
0121	REF	1		07,3052	6 3745 1	COMPOS	AD	-COMMAX	COMMAX = MAX NUMBER OF PULSES ALLOWED
0122				07,3053	0 0006 1		EXTEND		MINUS ONE
0123	REF	1		07,3054	6 3127 0		BZMF	COMZERO	
0124	REF	12	LAST 1313	07,3055	51 474 1		INDEX	CDUIND	
0125	REF	4	LAST 1313	07,3056	55 471 0		TS	COMMAND	REDUCE COMMAND BY MAX NUMBER OF PULSES
0126	REF	1		07,3057	4 3746 0		CS	-COMMAX-	ALLOWED
0127	REF	43	LAST 1313	07,3060	24 061 0	NEXTCDU	INCR	ITEMP1	
0128	REF	28	LAST 1286	07,3061	6 4754 0		AD	NEGO	
0129	REF	13	LAST 1313	07,3062	51 474 1		INDEX	CDUIND	
0130	REF	3	LAST 282	07,3063	54 050 0		TS	CDUXCMD	SET UP COMMAND REGISTER.
0131	REF	14	LAST 1313	07,3064	11 474 0		CCS	CDUIND	
0132	REF	1		07,3065	0 3043 0		TC	COARS2 +3	
0133	REF	44	LAST 1313	07,3066	10 061 1		CCS	ITEMP1	SEE IF ANY PULSES TO GO OUT.
0134	REF	1		07,3067	1 3133 1		TCF	SENDPULS	
0135	REF	16	LAST 1121	07,3070	0 5221 0		TC	FIXDELAY	WAIT FOR GIMBALS TO SETTLE.
0136				07,3071	00226 1		DEC	150	
0137	REF	82	LAST 1313	07,3072	3 4752 0		CAF	TWO	AT END OF COMMAND, CHECK TO SEE THAT
0138	REF	45	LAST 1313	07,3073	54 061 1	CHKCORS	TS	ITEMP1	GIMBALS ARE WITHIN 2 DEGREES OF THETAD.
0139	REF	409	LAST 1310	07,3074	50 000 1		INDEX	A	
0140	REF	20	LAST 1312	07,3075	3 0032 0		CA	CDUX	
0141				07,3076	0 0006 1		EXTEND		
0142	REF	46	LAST 1313	07,3077	5 0061 0		INDEX	ITEMP1	
0143	REF	22	LAST 1312	07,3100	20 321 0		MSU	THETAD	
0144	REF	410	LAST 1313	07,3101	10 000 0		CCS	A	
0145	REF	1		07,3102	1 3110 0		TCF	COARSERR	
0146	REF	1		07,3103	1 3105 1		TCF	CORSCHK2	
0147	REF	2	LAST 1313	07,3104	1 3110 0		TCF	COARSERR	

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0148	REF	47	LAST 1313	07,3105	10 061 1	CORSCHK2 CCS	ITEMP1	
0149	REF	1		07,3106	1 3073 1	TCF	CHKCORS	
0150	REF	2	LAST 1311	07,3107	1 3631 1	TCF	ENDIMU	END OF COARSE ALIGNMENT.
0151	REF	1		07,3110	6 3116 1	COARSERR AD	COARSTOL	2 DEGREES.
0152				07,3111	0 0006 1	EXTEND		
0153	REF	2	LAST 1313	07,3112	6 3105 0	BZMF	CORSCHK2	
0154	REF	46	LAST 1311	07,3113	0 5567 0	TC	ALARM	COARSE ALIGN ERROR.
0155				07,3114	00211 0	OCT	211	
0156	REF	2	LAST 165	07,3115	1 3637 1	TCF	IMUBAD	
0157				07,3116	77511 1	COARSTOL DEC	-.01111	2 DEGREES SCALED AT HALF-REVOLUTIONS
0158	REF	2	LAST 1313	07,3117	6 3745 1	COMNEG AD	-COMMAX	
0159				07,3120	0 0006 1	EXTEND		
0160	REF	2	LAST 1313	07,3121	6 3127 0	BZMF	COMZERO	
0161				07,3122	4 0000 0	COM		
0162	REF	15	LAST 1313	07,3123	51 474 1	INDEX	CDUIND	
0163	REF	5	LAST 1313	07,3124	55 471 0	TS	COMMAND	
0164	REF	2	LAST 1313	07,3125	3 3746 1	CA	-COMMAX	
0165	REF	3	LAST 1313	07,3126	0 3060 1	TC	NEXTCDU	
0166	REF	231	LAST 1309	07,3127	3 4755 1	COMZERO CAF	ZERO	
0167	REF	16	LAST 1314	07,3130	51 474 1	INDEX	CDUIND	
0168	REF	6	LAST 1314	07,3131	57 471 1	XCH	COMMAND	
0169	REF	4	LAST 1314	07,3132	0 3060 1	TC	NEXTCDU	
0170	REF	3	LAST 532	07,3133	3 7740 0	SENDPULS CAF	13,14,15	
0171				07,3134	0 0006 1	EXTEND		
0172	REF	16	LAST 907	07,3135	05 014 1	WOR	CHAN14	
0173	REF	1		07,3136	3 3747 0	CAF	600HS	
0174	REF	2	LAST 1313	07,3137	1 3037 1	TCF	COARS2 -1	THEN TO VARDELAY
0175	REF	48	LAST 1312	07,3140	3 4746 0	CA+ECE CAF	BIT6	ENABLE ALL THREE ISS CDU ERROR COUNTERS
0176				07,3141	0 0006 1	EXTEND		
0177	REF	58	LAST 1312	07,3142	05 012 1	WOR	CHAN12	
0178	REF	73	LAST 1209	07,3143	0 5261 1	TC	TASKOVER	

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0179	REF 42	LAST 1285	07,3144	3 4750 1	SETCOARS	CAF	BIT4	BYPASS IF ALREADY IN COARSE ALIGN
0180			07,3145	0 0006 1		EXTEND		
0181	REF 59	LAST 1314	07,3146	02 012 0		RAND	CHAN12	
0182	REF 411	LAST 1313	07,3147	10 000 0		CCS	A	
0183	REF 343	LAST 1309	07,3150	0 0002 0		TC	Q	
0184	REF 49	LAST 1314	07,3151	4 4746 1		CS	BIT6	CLEAR ISS ERROR COUNTERS
0185			07,3152	0 0006 1		EXTEND		
0186	REF 60	LAST 1315	07,3153	03 012 1		WAND	CHAN12	
0187	REF 39	LAST 1306	07,3154	4 4742 0		CS	BIT10	KNOCK DOWN GYRO ACTIVITY
0188			07,3155	0 0006 1		EXTEND		
0189	REF 17	LAST 1314	07,3156	03 014 1		WAND	CHAN14	
0190	REF 232	LAST 1314	07,3157	4 4755 0		CS	ZERO	
0191	REF 2	LAST 175	07,3160	54 047 0		TS	GYROCMD	
0192	REF 43	LAST 1315	07,3161	3 4750 1		CAF	BIT4	PUT ISS IN COARSE ALIGN
0193			07,3162	0 0006 1		EXTEND		
0194	REF 61	LAST 1315	07,3163	05 012 1		WOR	CHAN12	
0195	REF 43	LAST 1310	07,3164	4 1036 1		CS	DSPTAB +11D	TURN ON NO ATT LAMP
0196	REF 1		07,3165	7 3207 0		MASK	OCT40010	
0197	REF 44	LAST 1315	07,3166	27 036 1		ADS	DSPTAB +11D	
0198	REF 45	LAST 1311	07,3167	4 1303 1		CS	IMODES33	DISABLE DAP AUTO AND HOLD MODES
0199	REF 50	LAST 1315	07,3170	7 4746 1		MASK	BIT6	
0200	REF 46	LAST 1315	07,3171	27 303 1		ADS	IMODES33	
0201	REF 52	LAST 1311	07,3172	4 1302 0		CS	IMODES30	DISABLE IMUFAIL
0202	REF 44	LAST 1315	07,3173	7 4750 0		MASK	BIT4	
0203	REF 53	LAST 1315	07,3174	27 302 0		ADS	IMODES30	
0204	REF 14	LAST 518	07,3175	4 4747 0	RNDREFDR	CS	TRACKBIT	CLEAR TRACK FLAG
0205	REF 32	LAST 907	07,3176	7 0075 1		MASK	FLAGWRD1	
0206	REF 33	LAST 1315	07,3177	54 075 1		TS	FLAGWRD1	
0207	REF 3	LAST 857	07,3200	4 4735 0		CS	DRFTBIT	CLEAR DRIFT FLAG
0208	REF 29	LAST 1121	07,3201	7 0076 1		MASK	FLAGWRD2	
0209	REF 30	LAST 1315	07,3202	54 076 1		TS	FLAGWRD2	
0210	REF 6	LAST 976	07,3203	4 4737 1		CS	REFSMBIT	CLEAR REFSMMAT FLAG
0211	REF 18	LAST 976	07,3204	7 0077 0		MASK	FLAGWRD3	
0212	REF 19	LAST 1315	07,3205	54 077 0		TS	FLAGWRD3	
0213	REF 344	LAST 1315	07,3206	0 0002 0		TC	Q	
0214			07,3207	40010 1	OCT40010	OCT	40010	

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P0215 IMU FINE ALIGN MODE SWITCH.

0216				07,3210	0 0004 0	IMUFINE	INHINT	
0217	REF	4	LAST 1312	07,3211	0 3653 1	TC	CAGETSTJ	SEE IF IMU BEING CAGED.
0218	REF	1		07,3212	4 3744 1	CS	BITS4-5	RESET ZERO AND COARSE
0219				07,3213	0 0006 1	EXTEND		
0220	REF	62	LAST 1315	07,3214	03 012 1	WAND	CHAN 2	
0221	REF	51	LAST 1315	07,3215	4 4746 1	CS	BIT6	INSURE DAP AUTO AND HOLD MODES ENABLED
0222	REF	47	LAST 1315	07,3216	7 1303 1	MASK	IMODES33	
0223	REF	48	LAST 1316	07,3217	55 303 1	TS	IMODES33	
0224	REF	4	LAST 1310	07,3220	0 3266 0	TC	NOATTOFF	
0225	REF	40	LAST 1315	07,3221	3 4742 1	GAF	BIT 0	IMU FAIL WAS INHIBITED DURING THE
0226	REF	42	LAST 1312	07,3222	0 5203 0	TC	WAITLIST	PRESUMABLY PRECEDING COARSE ALIGN. LEAVE
0227	REF	17	LAST 1314	E3,1474		EBANK=	CDJIND	
0228	REF	1		07,3223	03234 1	2CADR	IFAILOK	IT ON FOR THE FIRST 5 SECS OF FINE ALIGN
0228	REF	1		07,3224	16103 1			
0229	REF	8	LAST 966	07,3225	3 5000 1	GAF	2SEGS	
0230	REF	43	LAST 1316	07,3226	0 5203 0	TC	WAITLIST	
0231	REF	18	LAST 1316	E3,1474		EBANK=	CDUIND	
0232	REF	1		07,3227	03232 1	2CADR	IMJFINED	
0232	REF	1		07,3230	16103 1			
0233	REF	3	LAST 1312	07,3231	1 2755 0	TCF	MODEEXIT	
0234	REF	5	LAST 1313	07,3232	0 3641 1	IMUFINE	TC	CAGETEST
0235	REF	3	LAST 1314	07,3233	1 3631 1	TCF	ENDIMU	SEE THAT NO ONE HAS CAGED THE IMU.

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0236	REF 1		07,3234	0 3646 0	IFAILOK	TC	CAGETSTQ	ENABLE IMU FIAL UNLESS IMU BEING CAGED.
0237	REF 74	LAST 1314	07,3235	1 5261 0		TCF	TASKOVER	IT IS.
0238	REF 45	LAST 1315	07,3236	3 4750 1		CAF	BIT4	DONT RESET IMU FAIL INHIBIT IF SOMEONE
0239			07,3237	0 0006 1		EXTEND		HAS GONE INTO COARSE ALIGN.
0240	REF 63	LAST 1316	07,3240	02 012 0		RAND	CHAN12	
0241	REF 412	LAST 1315	07,3241	10 000 0		CCS	A	
0242	REF 75	LAST 1317	07,3242	1 5261 0		TCF	TASKOVER	
0243	REF 54	LAST 1315	07,3243	4 1302 0		CS	IMODES30	RESET IMUFAIL.
0244	REF 43	LAST 1312	07,3244	7 4737 1		MASK	BIT13	
0245	REF 55	LAST 1317	07,3245	27 302 0		ADS	IMODES30	
0246	REF 46	LAST 1317	07,3246	4 4750 0		CS	BIT4	
0247	REF 56	LAST 1317	07,3247	7 1302 0	PFAILOK2	MASK	IMODES30	
0248	REF 57	LAST 1317	07,3250	55 302 0		TS	IMODES30	
0249	REF 48	LAST 1311	07,3251	0 4674 0		TC	IBNKCALL	THE ISS WARNING LIGHT MAY COME ON NOW
0250	REF 6	LAST 1311	07,3252	14703 0		CADR	SETISSW	THAT THE INHIBIT HAS BEEN REMOVED.
0251	REF 76	LAST 1317	07,3253	1 5261 0		TCF	TASKOVER	
0252	REF 2	LAST 1317	07,3254	0 3646 0	PFAILOK	TC	CAGETSTQ	ENABLE PIP FAIL PROG ALARM.
0253	REF 77	LAST 1317	07,3255	1 5261 0		TCF	TASKOVER	
0254	REF 58	LAST 1317	07,3256	4 1302 0		CS	IMODES30	RESET IMU AND PIPA FAIL BITS.
0255	REF 41	LAST 1316	07,3257	7 4742 0		MASK	BIT10	
0256	REF 59	LAST 1317	07,3260	27 302 0		ADS	IMODES30	
0257	REF 49	LAST 1316	07,3261	4 1303 1		CS	IMODES33	
0258	REF 44	LAST 1317	07,3262	7 4737 1		MASK	BIT13	
0259	REF 50	LAST 1317	07,3263	27 303 1		ADS	IMODES33	
0260	REF 40	LAST 1311	07,3264	4 4747 0		CS	BIT5	
0261	REF 1		07,3265	1 3247 1		TCF	PFAILOK2	
0262	REF 2	LAST 1315	07,3266	4 3207 0	NOATTOFF	CS	ECT40010	SUBROUTINE TO TURN OFF NO ATT LAMP.
0263	REF 45	LAST 1315	07,3267	7 1036 1		MASK	DSPTAB +11D	
0264	REF 42	LAST 1298	07,3270	6 4735 1		AD	BIT15	
0265	REF 46	LAST 1317	07,3271	55 036 1		TS	DSPTAB +11D	
0266	REF 345	LAST 1315	07,3272	0 0002 0		TC	Q	

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P0267 ROUTINES TO INITIATE AND TERMINATE PROGRAM USE OF THE PIPAS. NO IMUSTALL REQUIRED IN EITHER CASE.

0272	REF 233	LAST 1315	07,3273	4 4755 0	PIPUSE	CS	ZERO	
0273	REF 15	LAST 952	07,3274	54 037 1		TS	PIPAX	
0274	REF 6	LAST 952	07,3275	54 040 1		TS	PIPAY	
0275	REF 9	LAST 952	07,3276	54 041 0		TS	PIPAZ	
02752	REF 3	LAST 1317	07,3277	0 3646 0	PIPUSE1	TC	CAGETSTQ	DO NOT ENABLE PIPA FAIL IF IMU IS CAGED
02754	REF 9	LAST 1311	07,3300	1 4631 0		TCF	SWRETURN	
02756			07,3301	0 0004 0		INHINT		
0276	REF 53	LAST 1285	07,3302	4 4753 0		CS	BIT1	IF PIPA FAILS FROM NOW ON (UNTIL
0277	REF 60	LAST 1317	07,3303	7 1302 0		MASK	IMODES30	PIPFREE). LIGHT ISS WARNING.
0278	REF 61	LAST 1318	07,3304	55 1302 0		TS	IMODES30	
0279	REF 49	LAST 1317	07,3305	0 4674 0	PIPFREE2	TC	IBNKCALL	ISS WARNING MIGHT COME ON NOW.
0280	REF 7	LAST 1317	07,3306	14703 0		CADR	SETISSW	(OR GO OFF ON PIPFREE).
0281	REF 4	LAST 1316	07,3307	1 2755 0		TCF	MODEEXIT	
0282			07,3310	0 0004 0	PIPFREE	INHINT		PROGRAM DONE WITH PIPAS. DONT LIGHT
0283	REF 62	LAST 1318	07,3311	4 1302 0		CS	IMODES30	ISS WARNING.
0284	REF 54	LAST 1318	07,3312	7 4753 0		MASK	BIT1	
0285	REF 63	LAST 1318	07,3313	27 1302 0		ADS	IMODES30	
0286	REF 42	LAST 1317	07,3314	7 4742 0		MASK	BIT10	IF PIP FAIL ON, DO PROG ALSRM AND RESET
0287	REF 413	LAST 1317	07,3315	10 000 0		CCS	A	ISS WARNING.
0288	REF 5	LAST 1318	07,3316	1 2755 0		TCF	MODEEXIT	
0289	REF 47	LAST 1314	07,3317	0 5567 0		TC	ALARM	
0290			07,3320	00212 0		OCT	212	
0291			07,3321	0 0004 0		INHINT		
0292	REF 1		07,3322	1 3305 0		TCF	PIPFREE2	

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P0293 THE FOLLOWING ROUTINE TORQUES THE IRIGS ACCORDING TO DOUBLE PRECISION INPUTS IN THE SIX REGISTERS
 R0295 BEGINNING AT THE ECADR ARRIVING IN A. THE MINIMUM SIZE OF ANY PULSE TRAIN IS 16 PULSES (.25 CDU COUNTS). THE
 R0297 UNSENT PORTION OF THE COMMAND IS LEFT INTACT IN THE INPUT COMMAND REGISTERS.

0299			E3,1400		EBANK= 1400		VARIABLE, ACTUALLY.
0300	REF 776	LAST 1308	07,3323	54 161 0	IMUPULSE	TS	MPAC +5
0301	REF 5	LAST 1316	07,3324	0 3653 1		TC	CAGETSTJ
							SAVE ARRIVING ECADR. DONT PROCEED IF IMU BEING CAGED.
0302	REF 2	LAST 222	07,3325	11 314 1		CCS	LGYRO
0303	REF 1		07,3326	0 3367 0		TC	GYROBUSY
							SEE IF GYROS BUSY. SLEEP.
0304	REF 777	LAST 1319	07,3327	54 156 1		TS	MPAC +2
0305	REF 52	LAST 1316	07,3330	3 4746 0		CAF	BIT6
0306			07,3331	0 0006 1		EXTEND	
0307	REF 18	LAST 1315	07,3332	05 014 1		WOR	CHAN14
							ENABLE THE POWER SUPPLY.
0308	REF 27	LAST 1285	07,3333	3 4751 0		CAF	FOUR
0310	REF 44	LAST 1316	07,3334	0 5203 0	GWAKE2	TC	WAITLIST
0311	REF 19	LAST 1316	E3,1474			EBANK=	CDUIND
0312	REF 1		07,3335	03405 0		2CADR	STRGTGYRO
0312	REF 1		07,3336	16103 1			
							(IF A JOB WAS PUT TO SLEEP, THE POWER SUPPLY IS LEFT ON BY THE WAKING JOB).
0313	REF 778	LAST 1319	07,3337	3 0161 1		CA	MPAC +5
0314	REF 71	LAST 1289	07,3340	56 003 1		XCH	EBANK
0315	REF 779	LAST 1319	07,3341	56 161 1		XCH	MPAC +5
0316	REF 3	LAST 1319	07,3342	55 314 1		TS	LGYRO
0317	REF 17	LAST 1286	07,3343	7 4357 0		MASK	LOW8
0318	REF 48	LAST 1314	07,3344	54 061 1		TS	ITEMP1
							RESERVES GYROS.
0319	REF 83	LAST 1313	07,3345	3 4752 0		CAF	TWO
0320	REF 780	LAST 1319	07,3346	54 157 0	GYROAGRE	TS	MPAC +3
0321			07,3347	6 0000 1		DOUBLE	
0322	REF 49	LAST 1319	07,3350	6 0061 0		AD	ITEMP1
0323	REF 781	LAST 1319	07,3351	54 160 1		TS	MPAC +4
0324			07,3352	0 0006 1		EXTEND	
0325	REF 414	LAST 1318	07,3353	5 0000 1		INDEX	A
0326			07,3354	3 1401 0		DCA	1400
0327	REF 782	LAST 1319	07,3355	52 155 1		DXCH	MPAC
0328	REF 15	LAST 1224	07,3356	0 7257 0		TC	TPAGREE
0329	REF 783	LAST 1319	07,3357	52 155 1		DXCH	MPAC
0330	REF 784	LAST 1319	07,3360	50 160 0		INDEX	MPAC +4
0331			07,3361	53 401 1		DXCH	1400
							FORCE SIGN AGREEMENT ON INPUTS.
0332	REF 785	LAST 1319	07,3362	10 157 0		CCS	MPAC +3
0333	REF 1		07,3363	1 3346 1		TCF	GYROAGRE
0334	REF 786	LAST 1319	07,3364	3 0161 1		CA	MPAC +5
0335	REF 72	LAST 1319	07,3365	54 003 0		TS	EBANK
0336	REF 6	LAST 1318	07,3366	1 2755 0		TCF	MODEEXIT
							RESTORE CALLER'S EBANK.

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P0337 ROUTINES TO ALLOW TORQUING BY ONLY ONE JOB AT A TIME.

0338			07,3367	0 0006 1	GYROBUSY	EXTEND	SAVE RETURN 2FCADR.
0339	REF 23	LAST 1085	07,3370	3 0134 1	DCA	BUF2	
0340	REF 787	LAST 1319	07,3371	52 155 1	DXCH	MPAC	
0341	REF 1		07,3372	3 3404 1	REGSLEEP	CAF	LGWAKE
0342	REF 5	LAST 1220	07,3373	1 5133 1	TCF	JOBSLEEP	
0343	REF 4	LAST 1319	07,3374	11 314 1	GWAKE	CCS	LGYRO
0344	REF 1		07,3375	1 3372 0	TCF	REGSLEEP	WHEN AWAKENED, SEE IF GYROS STILL BUSY. IF-SO, SLEEP-SOME MORE.
0345	REF 788	LAST 1320	07,3376	54 156 1	TS	MPAC +2	
0346			07,3377	0 0006 1	EXTEND		
0347	REF 789	LAST 1320	07,3400	3 0155 0	DCA	MPAC	
0348	REF 24	LAST 1320	07,3401	52 134 0	DXCH	BUF2	RESTORE SWRETURN INFO.
0349	REF 131	LAST 1305	07,3402	3 4753 1	CAF	ONE	
0350	REF 1		07,3403	1 3334 1	TCF	GWAKE2	
0351	REF 1		07,3404	17374 1	LGWAKE	CADR	GWAKE

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P0352

GYRO-TORQUING WAITLIST TASKS.

0353	REF	1		07,3405	4 3626 1	STRITGYRO CS	GDESELCT	DE-SELECT LAST GYRO.
0354				07,3406	0 0006 1	EXTEND		
0355	REF	19	LAST 1319	07,3407	03 014 1	WAND	CHAN14	
0356	REF	6	LAST 1316	07,3410	0 3641 1	TC	CAGETEST	
0357	REF	5	LAST 1320	07,3411	3 1314 0	STRITGYR2 CA	LGYRO	JUMP ON PHASE COUNTER IN BITS 13-14.
0358				07,3412	0 0006 1	EXTEND		
0359	REF	47	LAST 1317	07,3413	7 4750 0	MP	BIT4	
0360	REF	415	LAST 1319	07,3414	50 000 1	INDEX	A	
0361				07,3415	1 3416 0	TCF	+1	
0362	REF	1		07,3416	0 3433 0	TC	GSELECT	=0. DO Y GYRO.
0363				07,3417	00202 1	OCT	00202	
0364	REF	2	LAST 1321	07,3420	0 3433 0	TC	GSELECT	=1. DO Z GYRO.
0365				07,3421	00302 0	OCT	00302	
0366	REF	3	LAST 1321	07,3422	0 3431 1	TC	GSELECT -2	=2. DO X GYRO.
0367				07,3423	00100 0	OCT	00100	
0368	REF	234	LAST 1318	07,3424	3 4755 1	CAF	ZERO	=3. DONE
0369	REF	6	LAST 1321	07,3425	55 314 1	TS	LGYRO	
0370	REF	2	LAST 1320	07,3426	3 3404 1	CAF	LGWAKE	WAKE A POSSIBLE SLEEPING JOB.
0371	REF	6	LAST 1220	07,3427	0 5137 1	TC	JOBWAKE	
0372	REF	2	LAST 1316	07,3430	1 3232 0	NORESET TCF	IMUFINE	DO NOT RESET POWER SUPPLY

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0373	REF	28	LAST	1319	07,3431	4 4751 1	-2	CS	FOUR	SPECIAL ENTRY TO REGRESS LGYRO FOR X.
0374	REF	7	LAST	1321	07,3432	27 314 1		ADS	LGYRO	
0375	REF	346	LAST	1317	07,3433	50 002 0	GSELECT	INDEX	Q	SELECT GYRO.
0376					07,3434	3 0000 1		CAF	0	PACKED WORD CONTAINS GYRO SELECT BITS
0377	REF	13	LAST	1300	07,3435	54 064 1		TS	ITEMP4	AND INCREMENT TO LGYRO.
0378	REF	19	LAST	1293	07,3436	7 4757 1		MASK	SEVEN	
0379	REF	45	LAST	1317	07,3437	6 4737 0		AD	BIT13	
0380	REF	8	LAST	1322	07,3440	27 314 1		ADS	LGYRO	
0381	REF	73	LAST	1319	07,3441	54 003 0		TS	EBANK	
0382	REF	18	LAST	1319	07,3442	7 4357 0		MASK	LOW8	
0383	REF	50	LAST	1319	07,3443	54 061 1		TS	ITEMP1	
0384	REF	20	LAST	1322	07,3444	4 4757 1		CS	SEVEN	
0385	REF	14	LAST	1322	07,3445	7 0064 1		MASK	ITEMP4	
0386	REF	15	LAST	1322	07,3446	54 064 1		TS	ITEMP4	
0387					07,3447	0 0006 1		EXTEND		MOVE DP COMMAND TO RUPTREGS FOR TESTING.
0388	REF	51	LAST	1322	07,3450	5 0061 0		INDEX	ITEMP1	
0389					07,3451	3 1401 0		DCA	1400	
0390	REF	47	LAST	1300	07,3452	52 071 0		DXCH	RUPTREG1	
0391	REF	48	LAST	1322	07,3453	10 070 1		CCS	RUPTREG1	
0392	REF	1			07,3454	1 3467 0		TCF	MAJ+	
0393					07,3455	1 3457 0		TCF	+2	
0394	REF	1			07,3456	1 3607 1		TCF	MAJ-	
0395	REF	10	LAST	1300	07,3457	10 071 0		CCS	RUPTREG2	
0396	REF	1			07,3460	1 3464 0		TCF	MIN+	
0397	REF	1			07,3461	1 3411 1		TCF	STRGTYR2	
0398	REF	1			07,3462	1 3604 1		TCF	MIN-	
0399	REF	2	LAST	1322	07,3463	1 3411 1		TCF	STRGTYR2	

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0400	REF	1		07,3464	6 3520 0	MIN+	AD	-GYROMIN	SMALL POSITIVE COMMAND. SEE IF AT LEAST
0401				07,3465	0 0006 1		EXTEND		16 GYRO PULSES.
0402	REF	3	LAST 1322	07,3466	6 3411 0		BZMF	STRTGYR2	
0403				07,3467	0 0006 1	MAJ+	EXTEND		DEFINITE POSITIVE OUTPUT.
0404	REF	1		07,3470	3 3630 1		DCA	GYROFRAC	
0405	REF	49	LAST 1322	07,3471	20 071 0		DAS	RUPTREG1	
0406	REF	16	LAST 1322	07,3472	3 0064 0		CA	ITEMP4	SELECT POSITIVE TORQUING FOR THIS GYRO.
0407				07,3473	0 0006 1		EXTEND		
0408	REF	20	LAST 1321	07,3474	05 014 1		WOR	CHAN14	
0409	REF	10	LAST 1308	07,3475	3 6074 1		CAF	LOW7	LEAVE NUMBER OF POSSIBLE 8192 AUGMENTS
0410	REF	11	LAST 1322	07,3476	7 0071 0		MASK	RUPTREG2	TO INITIAL COMMAND IN MAJOR PART OF LONG
0411	REF	12	LAST 1323	07,3477	56 071 1		XCH	RUPTREG2	TERM STORAGE AND TRUNCATED FRACTION
0412				07,3500	0 0006 1	GMERGE	EXTEND		IN MINOR PART. THE MAJOR PART WILL BE
0413	REF	39	LAST 1299	07,3501	7 4744 0		MP	BIT8	COUNTED DOWN TO ZERO IN THE COURSE OF
0414	REF	21	LAST 1300	07,3502	54 062 1		TS	ITEMP2	PUTTING OUT THE ENTIRE COMMAND.
0415	REF	50	LAST 1323	07,3503	3 0070 0		CA	RUPTREG1	
0416				07,3504	0 0006 1		EXTEND		
0417	REF	29	LAST 1310	07,3505	7 4743 1		MP	BIT9	
0418	REF	51	LAST 1323	07,3506	54 070 1		TS	RUPTREG1	
0419	REF	232	LAST 1312	07,3507	3 0001 0		CA	L	
0420				07,3510	0 0006 1		EXTEND		
0421	REF	71	LAST 1285	07,3511	7 4736 0		MP	BIT14	
0422	REF	22	LAST 1323	07,3512	26 062 1		ADS	ITEMP2	INITIAL COMMAND.
0423				07,3513	0 0006 1		EXTEND		SEE IF MORE THAN ONE PULSE TRAIN NEEDED
0424	REF	52	LAST 1323	07,3514	3 0071 1		DCA	RUPTREG1	(MORE THAN 16383 PULSES).
0425	REF	1		07,3515	6 7747 1		AD	MINUS1	
0426	REF	416	LAST 1321	07,3516	10 000 0		CCS	A	
0427	REF	1		07,3517	1 3543 1		TCF	LONGGYRD	
0428				07,3520	77601 0	-GYROMIN	OCT	-176	MAY BE ADJUSTED TO SPECIFY MINIMUM CMD
0429				07,3521	1 3525 1		TCF	+4	
0430	REF	72	LAST 1323	07,3522	3 4736 1		CAF	BIT14	
0431	REF	23	LAST 1323	07,3523	26 062 1		ADS	ITEMP2	
0432	REF	235	LAST 1321	07,3524	3 4755 1		CAF	ZERO	
0433	REF	52	LAST 1322	07,3525	50 061 0	+4	INDEX	ITEMP1	
0434				07,3526	53 401 1		DXCH	1400	

L IMU MODE SWITCHING ROUTINES

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0435	REF	24	LAST 1323	07,3527	3 0062 0	CA	ITEMP2	ENTIRE COMMAND.
0436	REF	3	LAST 1315	07,3530	54 047 0	TS	GYROCMD	
0437				07,3531	0 0006 1	EXTEND		
0438	REF	43	LAST 1318	07,3532	7 4742 0	MP	BIT10	WAITLIST DT
0439	REF	37	LAST 1308	07,3533	6 6245 1	AD	THREE	TRUNCATION AND PHASE UNCERTAINTIES.
0440	REF	45	LAST 1319	07,3534	0 5203 0	TC	WAITLIST	
0441	REF	20	LAST 1319	E3,1474		EBANK=	CDUIND	
0442	REF	2	LAST 1319	07,3535	03405 0	2CADR	STRTRYRO	
0442				07,3536	16103 1			
0448	REF	44	LAST 1324	07,3537	3 4742 1	GYROEXIT	CAF	BIT10
0449				07,3540	0 0006 1	EXTEND		
0450	REF	21	LAST 1323	07,3541	05 014 1	WOR	CHAN14	
0451	REF	78	LAST 1317	07,3542	1 5261 0	TCF	TASKOVER	
0452	REF	53	LAST 1323	07,3543	50 061 0	LONGGYRO	INDEX	ITEMP1
0453				07,3544	53 401 1	DXCH	1400	INITIAL COMMAND OUT PLUS N AUGMENTS OF
0454	REF	73	LAST 1323	07,3545	3 4736 1	CAF	BIT14	8192. INITIAL COMMAND IS AT LEAST 8192.
0455	REF	25	LAST 1324	07,3546	6 0062 0	AD	ITEMP2	
0456	REF	4	LAST 1324	07,3547	54 047 0	TS	GYROCMD	
0457				07,3550	0 0006 1	AUG3	EXTEND	GET WAITLIST DT TO TIME WHEN TRAIN IS
0458	REF	45	LAST 1324	07,3551	7 4742 0	MP	BIT10	ALMOST OUT.
0459	REF	4	LAST 1286	07,3552	6 7745 0	AD	NEG3	
0460	REF	46	LAST 1324	07,3553	0 5203 0	TC	WAITLIST	
0461	REF	21	LAST 1324	E3,1474		EBANK=	CDUIND	
0462	REF	1		07,3554	03557 0	2CADR	8192AUG	
0462	REF	1		07,3555	16103 1			
0463	REF	1		07,3556	1 3537 1	TCF	GYROEXIT	
0464	REF	7	LAST 1321	07,3557	0 3641 1	8192AUG	TC	CAGETEST
04641	REF	48	LAST 1321	07,3560	3 4750 1	CAF	BIT4	
04642				07,3561	0 0006 1	EXTEND		
04643	REF	64	LAST 1317	07,3562	02 012 0	RAND	CHAN12	
04644	REF	417	LAST 1323	07,3563	10 000 0	CCS	A	
04645	REF	3	LAST 1314	07,3564	1 3637 1	TCF	IMUBAD	
0465	REF	9	LAST 1322	07,3565	3 1314 0	CA	LGYRO	ADD 8192 PULSES TO GYROCMD
0466	REF	74	LAST 1322	07,3566	54 003 0	TS	EBANK	
0467	REF	19	LAST 1322	07,3567	7 4357 0	MASK	LOW8	
0468	REF	54	LAST 1324	07,3570	54 061 1	TS	ITEMP1	
0469	REF	55	LAST 1324	07,3571	50 061 0	INDEX	ITEMP1	SEE IF THIS IS THE LAST AUG.
0470				07,3572	11 400 0	CCS	1400	
0471	REF	1		07,3573	1 3577 0	TCF	AUG2	MORE TO COME.
0472	REF	74	LAST 1324	07,3574	3 4736 1	CAF	BIT14	
0473	REF	5	LAST 1324	07,3575	26 047 0	ADS	GYROCMD	
0474	REF	1		07,3576	1 3531 1	TCF	LASTSEG +1	

L IMU MODE SWITCHING ROUTINES

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0475	REF	56	LAST 1324	07.3577	50 061 0	AUG2	INDEX	ITEMP1
0476				07.3600	55.400 0		TS	1400
0477	REF	75	LAST 1324	07.3601	3 4736 1		CAF	BIT14
0478	REF	6	LAST 1324	07.3602	26 047 0		ADS	GYROCHD
0479	REF	1		07.3603	1 3550 0		TCF	AUG3

COMPUTE DT.

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0480	REF	2	LAST 1323	07,3604	6 3520 0	MIN-	AD	-GYROMIN	POSSIBLE NEGATIVE OUTPUT.
0481				07,3605	0 0006 1		EXTEND		
0482	REF	4	LAST 1323	07,3606	6 3411 0		BZMF	STRIGYR2	
0483				07,3607	0 0006 1	MAJ-	EXTEND		DEFINITE NEGATIVE OUTPUT.
0484	REF	2	LAST 1323	07,3610	4 3630 0		DCS	GYROFRAC	
0485	REF	53	LAST 1323	07,3611	20 071 0		DAS	RUPTREG1	
0486	REF	17	LAST 1323	07,3612	3 0064 0		CA	ITEMP4	SELECT NEGATIVE TORQUING FOR THIS GYRO.
0487	REF	30	LAST 1323	07,3613	6 4743 0		AD	BIT9	
0488				07,3614	0 0006 1		EXTEND		
0489	REF	22	LAST 1324	07,3615	05 014 1		WOR	CHAN14	
0490	REF	54	LAST 1326	07,3616	4 0070 1		CS	RUPTREG1	SET UP RUPTREGS TO FALL INTO GMERGE.
0491	REF	55	LAST 1326	07,3617	54 070 1		TS	RUPTREG1	ALL NUMBERS PUT INTO GYROCMD ARE
0492	REF	13	LAST 1323	07,3620	4 0071 0		CS	RUPTREG2	POSITIVE - BIT9 OF CHAN 14 DETERMINES
0493	REF	11	LAST 1323	07,3621	7 6074 0		MASK	LOW7	THE SIGN OF THE COMMAND.
0494				07,3622	4 0000 0		COM		
0495	REF	14	LAST 1326	07,3623	56 071 1		XCH	RUPTREG2	
0496				07,3624	4 0000 0		COM		
0497	REF	1		07,3625	1 3500 0		TCF	GMERGE	
0498				07,3626	01700 1	GDESELCT OCT	1700		TURN OFF SELECT AND ACTIVITY BITS.
0499				07,3627	00000 1	GYROFRAC 2DEC	.215 B	-21	
0499				07,3630	00034 0				

L IMU MODE SWITCHING ROUTINES

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P0500 IMU MODE SWITCHING ROUTINES COME HERE WHEN ACTION COMPLETE.

0501			07,3631	0 0006 1	ENDIMU	EXTEND		MODE IS BAD IF CAGE HAS OCCURED OR IF
0502	REF 33	LAST 1116	07,3632	00 011 1		READ	DSALMOUT	ISS WARNING IS ON.
0503	REF 55	LAST 1318	07,3633	7 4753 0		MASK	BIT1	
0504	REF 418	LAST 1324	07,3634	10 000 0		CCS	A	
0505	REF 4	LAST 1324	07,3635	1 3637 1		TCF	IMUBAD	
0506	REF 3	LAST 563	07,3636	1 3665 0	IMUGOOD	TCF	GOODEND	WITH C(A) = 0.
0507	REF 236	LAST 1323	07,3637	3 4755 1	IMUBAD	CAF	ZERO	
0508	REF 2	LAST 563	07,3640	1 3662 1		TCF	BADEND	
0509	REF 53	LAST 1319	07,3641	3 4746 0	CAGETEST	CAF	BIT6	SUBROUTINE TO TERMINATE IMU MODE
0510	REF 64	LAST 1318	07,3642	7 1302 0		MASK	IMODES30	SWITCH IF IMU HAS BEEN CAGED.
0511	REF 419	LAST 1327	07,3643	10 000 0		CCS	A	
0512	REF 5	LAST 1327	07,3644	1 3637 1		TCF	IMUBAD	DIRECTLY.
0513	REF 347	LAST 1322	07,3645	0 0002 0		TC	Q	WITH C(A) = +0.
0514	REF 65	LAST 1327	07,3646	4 1302 0	CAGETSTQ	CS	IMODES30	SKIP IF IMU NOT BEING CAGED.
0515	REF 54	LAST 1327	07,3647	7 4746 1		MASK	BIT6	
0516	REF 420	LAST 1327	07,3650	10 000 0		CCS	A	
0517	REF 348	LAST 1327	07,3651	24 002 0		INCR	Q	
0518	REF 349	LAST 1327	07,3652	0 0002 0		TC	Q	
0519	REF 66	LAST 1327	07,3653	4 1302 0	CAGETSTJ	CS	IMODES30	IF DURING MODE SWITCH INITIALIZATION
0520	REF 55	LAST 1327	07,3654	7 4746 1		MASK	BIT6	IT IS FOUND THAT THE IMU IS BEING CAGED,
0521	REF 421	LAST 1327	07,3655	10 000 0		CCS	F	SET IMUCADR TO -0 TO INDICATE OPERATION
0522	REF 350	LAST 1327	07,3656	0 0002 0		TC	Q	COMPLETE BUT FAILED. RETURN IMMEDIATELY
0523	REF 237	LAST 1327	07,3657	4 4755 0		CS	ZERO	TO SWRETURN.
0524	REF 4	LAST 1121	07,3660	55 304 0		TS	IMUCADR	
0525	REF 7	LAST 1319	07,3661	1 2755 0		TCF	MODEEXIT	

L IMU MODE SWITCHING ROUTINES

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P0526 GENERALIZED MODE SWITCHING TERMINATION. ENTER AT GOODEND FOR SUCCESSFUL COMPLETION OF AN I/O OPERATION
 R0528 - OR AT BADEND FOR A-N UNSUCCESSFUL ONE. C(A) OR ARRIVAL = 0 FOR IMU, 1 FOR OPTICS.

0530	REF 15	LAST 1326	07,3662	54 071 0	BADEND	TS	RUPTREG2	DEVICE INDEX.
0531	REF 238	LAST 1327	07,3663	4 4755 0		CS	ZERO	FOR FAILURE.
0532	REF 4	LAST 1327	07,3664	1 3667 1		TCF	GOODEND +2	
0533	REF 16	LAST 1328	07,3665	54 071 0	GOODEND	TS	RUPTREG2	
0534	REF 132	LAST 1320	07,3666	4 4753 0		CS	ONE	FOR SUCCESS.
0535	REF 13	LAST 1300	07,3667	54 072 0		TS	RUPTREG3	
0536	REF 17	LAST 1328	07,3670	50 071 1		INDEX	RUPTREG2	SEE IF USING PROGRAM ASLEEP.
0537	REF 5	LAST 274	07,3671	11 304 0		CCS	MODECADR	
0538			07,3672	1 3676 1		TCF	+4	YES - WAKE IT UP.
0539	REF 1		07,3673	1 3706 1		TCF	ENDMODE	IF 0, PROGRAM NOT IN YET.
05392			07,3674	0 0006 1		EXTEND		
05394	REF 2	LAST 1328	07,3675	1 3707 0		BZF	ENDMODE +1	BZF = TCF IF MODECADR = -0.
0540	REF 239	LAST 1328	07,3676	3 4755 1		CAF	ZERO	WAKE SLEEPING PROGRAM.
0541	REF 18	LAST 1328	07,3677	50 071 1		INDEX	RUPTREG2	
0542	REF 6	LAST 1328	07,3700	57 304 1		XCH	MODECADR	
0543	REF 7	LAST 1321	07,3701	0 5137 1		TC	JOBWAKE	
0544	REF 14	LAST 1328	07,3702	4 0072 0		CS	RUPTREG3	ADVANCE LOC IF SUCCESSFUL.
0545	REF 23	LAST 1220	07,3703	50 064 0		INDEX	LOCCTR	
0546	REF 44	LAST 1267	07,3704	26 164 0		ADS	LOC	
0547	REF 79	LAST 1324	07,3705	1 5261 0		TCF	TASKOVER	
0548	REF 15	LAST 1328	07,3706	3 0072 1	ENDMODE	CA	RUPTREG3	-0 INDICATES OPERATION COMPLETE BUT
0549	REF 19	LAST 1328	07,3707	50 071 1	+1	INDEX	RUPTREG2	UNSUCCESSFUL: -1 INDICATES COMPLETE AND
0550	REF 7	LAST 1328	07,3710	55 304 0		TS	MODECADR	SUCCESSFUL.
0551	REF 80	LAST 1328	07,3711	1 5261 0		TCF	TASKOVER	

L IMU MODE SWITCHING ROUTINES

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P0552 GENERAL STALLING ROUTINE. USING PROGRAMS COME HERE TO WAIT FOR I/O COMPLETION.

R0554 PROGRAM DESCRIPTION DATE- 21 FEB 1967

R0555 LOG SECTION IMU MODE SWITCHING

R0556 MOD BY- R.MELANSON TO ADD DOCUMENTATION ASSEMBLY SUNDISK REV. 82

R0557 FUNCTIONAL DESCRIPTION-

R0558 TO DELAY FURTHER EXECUTION OF THE CALLING ROUTINE UNTIL ITS SELECTED

R0559 I/O FUNCTION IS COMPLETE. THE FOLLOWING CHECKS ON THE CALLING ROUTINE: S

R0560 MODECADR ARE MADE AND ACTED UPON.

R0561 1) +0 INDICATES INCOMPLETE I/O OPERATION. CALLING ROUTINE IS PUT TO

R0562 SLEEP.

R0563 2) -1 INDICATES COMPLETED I/O OPERATION. STALL BYPASSES JOBSLEEP

R0564 CALL AND RETURNS TO CALLING ROUTINE AT L+3

R0565 3) -0 INDICATES COMPLETED I/O WITH FAILURE. STALL CLEARS MODECADR

R0566 AND RETURNS TO CALLING ROUTINE AT L+2.

R0567 4) VALUE GREATER THAN 0 INDICATES TWO ROUTINES CALLING FOR USE OF

R0568 SAME DEVICE. STALL EXITS TO ABORT WHICH EXECUTES A PROGRAM

R0569 RESTART WHICH IN TURN CLEARS ALL MODECADR REGISTERS.

R0570 CALLING SEQUENCE-

R0571 L TC BANKCALL

R0572 L+1 CADR (ONE OF 5 STALL ADDRESSES I.E. IMUSTALL, OPTSTALL, RADSTALL,

R0573 AOTSTALL, OR ATTSTALL)

R0574 NORMAL-EXIT MODE-

R0575 TCF JOBSLEEP OR TCF MODEEXIT

R0576 ALARM OR ABORT EXIT MODE-

R0577 TC ABORT

R0578 OUTPUT-

R0579 MODECADR= CADR IF JOBSLEEP

R0580 MODECADR=+0 IF I/O COMPLETE

R0581 BUF2=L+3 IF I/O COMPLETE AND GOOD.

R0582 BUF2=L+2 IF I/O COMPLETE BUT FAILED.

R0583 ERASABLE INITIALIZATION-

R0584 BUF2 CONTAINS RETURN ADDRESS PLUS 1. (L+2)

R0585 BUF2+1 CONTAINS FBANK VALUE OF CALLING ROUTINE.

R0586 MODECADR OF CALLING ROUTINE CONTAINS +0, -1, -0 OR CADR RETURN ADDRESS.

R0587 DEBRIS-

R0588 RUPTREG2 AND CALLING ROUTINE MODECADR.

0589 REF 133 LAST 1328 07,3712 3 4753 1 AOTSTALL CAF ONE AOT.

0590 REF 1 07,3713 0 3717 0 TC STALL

0591 REF 84 LAST 1319 07,3714 3 4752 0 RADSTALL CAF TWO

0592 REF 2 LAST 1329 07,3715 1 3717 1 TCF STALL

L IMU MODE SWITCHING ROUTINES

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0593	REF	3	LAST	960	07,3712		OPTSTALL	EQUALS	AOTSTALL	
0594	REF	240	LAST	1328	07,3716	3 4755 1	IMUSTALL	CAF	ZERO	IMU.
0595					07,3717	0 0004 0	STALL		INHINT	
0596	REF	20	LAST	1328	07,3720	54 071 0		TS	RUPTREG2	SAVE DEVICE INDEX.
0597	REF	422	LAST	1327	07,3721	50 000 1		INDEX	A	SEE IF OPERATION COMPLETE.
0598	REF	8	LAST	1328	07,3722	11 304 0		CCS	MODECADR	
0599	REF	1			07,3723	1 3741 1		TCF	MODABORT	ALLOWABLE STATES ARE +0, -1, AND -0.
0600	REF	1			07,3724	1 3735 1		TCF	MODESLP	OPERATION INCOMPLETE.
0601	REF	1			07,3725	1 3731 0		TCF	MODEGOOD	COMPLETE AND GOOD IF = -1.
0602	REF	21	LAST	1330	07,3726	50 071 1	MG2	INDEX	RUPTREG2	COMPLETE AND FAILED IF -0. RESET TO +0.
0603	REF	9	LAST	1330	07,3727	55 304 0		TS	MODECADR	RETURN TO CALLER.
0604	REF	8	LAST	1327	07,3730	1 2755 0		TCF	MODEEXIT	
0605	REF	423	LAST	1330	07,3731	10 000 0	MODEGOOD	CCS	A	MAKE SURE INITIAL STATE -1.
0606	REF	2	LAST	1330	07,3732	1 3741 1		TCF	MODABORT	
0607	REF	25	LAST	1320	07,3733	24 133 0		INCR	BUF2	IF SO, INCREMENT RETURN ADDRESS AND
0608	REF	1			07,3734	1 3726 0		TCF	MG2	RETURN IMMEDIATELY. SETTING CADR = +0.
0609	REF	13	LAST	937	07,3735	0 4645 1	MODESLP	TC	MAKECADR	CALL FROM SWITCHABLE FIXED ONLY.
0610	REF	22	LAST	1330	07,3736	50 071 1		INDEX	RUPTREG2	
0611	REF	10	LAST	1330	07,3737	55 304 0		TS	MODECADR	
0612	REF	6	LAST	1320	07,3740	1 5133 1		TCF	JOBSLEEP	
0613	REF	26	LAST	1330	07,3741	52 134 0	MODABORT	DXCH	BUF2	
06132	REF	6	LAST	1126	07,3742	0 5716 1		TC	BAILOUT1	TWO PROGRAMS USING THE SAME DEVICE.
0614					07,3743	01210 0		OCT	1210	

L IMU MODE SWITCHING ROUTINES

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P0615 CONSTANTS FOR MODE SWITCHING ROUTINES

0616	REF	4	LAST	972	5751	BITS3&4	=	OCT14	
0617	REF	3	LAST	1286	4771	BITS4&6	=	OCT50	
0618					07,3744	00030	1	IMUSEFLG	EQUALS BIT8
0619	REF	40	LAST	1323	4744				INTERPRETER SWITCH 7.
0620					07,3745	77500	1	-COMMAX	DEC -191
0621					07,3746	77477	0	-COMMAX-	DEC -192
0622					07,3747	00074	1	600MS	DEC 60
0623	REF	6	LAST	968	07,3210			IMUFIN20	= IMUFINE
0624	REF	4	LAST	369	07,3750	3	1307	1	GOMANUR CA ATTCADR
0625					07,3751	0	0006	1	EXTEND
0626					07,3752	1	3755	1	BZF +3
0627	REF	7	LAST	1233	07,3753	0	5652	0	TC POOD00 NO
0628					07,3754	0	1210	0	OCT 1210 2 TRYING TO USE SAME DEVICE
0629					07,3755	0	0006	1	+3 EXTEND
0630	REF	27	LAST	1330	07,3756	3	0134	1	DCA BUF2
0632	REF	5	LAST	1331	07,3757	53	310	0	DXCH ATTCADR SAVE FINAL RETURN FOR KALCMAN3
0633	REF	43	LAST	1300	07,3760	3	0006	1	CA BBANK
0634	REF	21	LAST	1322	07,3761	7	4757	1	MASK SEVEN
0635	REF	6	LAST	1331	07,3762	27	310	0	ADS ATTCADR +1
0642	REF	32	LAST	1113	07,3763	3	0167	1	CA PRIORITY
0643	REF	2	LAST	232	07,3764	7	7725	1	MASK PRI037
0644	REF	2	LAST	369	07,3765	55	311	1	TS ATTPRIO SAVE USERS PRIO
06452	REF	1			07,3766	3	3772	0	CAP KALEBCON SET EBANK FOR KALCMAN3
06453	REF	75	LAST	1324	07,3767	54	003	0	TS EBANK
06454	REF	56	LAST	1287	07,3770	0	4635	0	TC POSTJUMP
06455	REF	1			07,3771	4	4004	0	CADR KALCMAN3
06456	REF	13	LAST	485	07,3772	03276	1	KALEBCON	EGADR BCDA

L IMU MODE SWITCHING ROUTINES

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P0646 PROGRAM DESCRIPTION

R0647 IMU STATUS CHECK ROUTINE R02 (SUBROUTINE UTILITY)

R0648 MOD NO - 1

R0649 MOD BY - N. BRODEUR

R0650 FUNCTIONAL DESCRIPTION

R0651

R0652 TO CHECK WHETHER IMU IS ON AND IF ON WHETHER IT IS ALIGNED TO AN

R0653 ORIENTATION KNOWN BY THE CMC. TO REQUEST SELECTION OF THE APPROPRIATE

R0654 PROGRAM IF THE IMU IS OFF OR NOT ALIGNED TO AN ORIENTATION KNOWN BY THE

R0655 CMC. CALLED THROUGH BANKCALL

R0656 CALLING SEQUENCE-

R0657

R0658 L TC BANKCALL

R0659 L+1 CADR R02BOTH

R0660 SUBROUTINES CALLED

R0661

R0662 VARALARM

R0663 FLAGUP

R0664 NORMAL EXIT MODES

R0665

R0666 AT L+2 OF CALLING SEQUENCE

R0667 ALARM OR ABORT EXIT MODES

R0668 GOTOPDCH, WITH ALARM

R0673 ERASABLE INITIALIZATION REQUIRED

R0674

R0675 NONE

R0676 DEBRIS

R0677

R0678 CENTRALS-A,Q,L

0679 34,3775

BANK 34

0680 REF 1 04,2000

SETLOC R02

0681 04,3253

BANK

0682 REF 1 COUNT* \$\$/R02

0683 04,3253 00063 1 DEC51 DEC 51

0684 REF 7 LAST 1315 04,3254 3 4737 0 R02BOTH CAF REFSMBIT

0685 REF 20 LAST 1315 04,3255 7 0077 0 MASK FLAGWRD3

0686 REF 424 LAST 1330 04,3256 10 000 0 CGS A

0687 REF 1 04,3257 0 3270 1 TC R02ZERO ZERO IMUS

0688 REF 67 LAST 1327 04,3260 3 1302 1 CA IMODES30

0689 REF 31 LAST 1326 04,3261 7 4743 1 MASK BIT9 IS ISS INITIALIZED

0690 04,3262 0 0006 1 EXTEND

0691 04,3263 1 3265 1 BZF +2

0692 REF 49 LAST 1324 04,3264 4 4750 0 CS BIT4 SEND IMU ALARM CODE 210

0693 REF 1 04,3265 6 3273 1 AD OCT220 SEND REFSMM ALARM

0694 REF 4 LAST 621 04,3266 0 5744 0 TC VARALARM

0695 REF 67 LAST 983 04,3267 0 6001 0 TC GOTOPDCH

0700 REF 70 LAST 1254 04,3270 0 5504 0 R02ZERO TC UPFLAG

L IMU MODE SWITCHING ROUTINES

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0701	REF	6	LAST	983	04,3271	00007 0	ADRES	IMUSE
0702	REF	10	LAST	1318	04,3272	1 4631-0	TCF	SWRETURN
07025	-----				04,3273	00220 1	OCT220	OCT 220

L IMU MODE SWITCHING ROUTINES

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R0703 PROGRAM DESCRIPTION P06 10FEB67

R0704 TRANSFER THE ISS/CMC FROM THE OPERATE TO THE STANDBY CONDITION.

R0705 THE NORMAL CONDITION OF READINESS OF THE GNCS WHEN NOT IN USE IS STANDBY. IN THIS CONDITION THE IMU
R0707 HEATER POWER IS ON. THE IMU OPERATE POWER IS OFF. THE COMPUTER POWER IS ON. THE OPTICS POWER IS OFF. THE
R0709 CMC STANDBY ON THE MAIN AND LEB DISKYS IS ON.

R0710 CALLING SEQUENCE:

R0711 ASTRONAUT REQUEST THROUGH DSKY V37E 06E.

R0712 SUBROUTINES CALLED:

R0713 GOPERF1

R0716 BANKCALL

R0719 FLAGDOWN

L IMU MODE SWITCHING ROUTINES

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P0810 PRESTAND PREPARES FOR STANDBY BY SNAPSHOTTING THE SCALER AND TIME1 TIME2
 R0811 THE LOW 5 BITS OF THE SCALER ARE INSPECTED TO INSURE COMPATABILITY
 R0812 BETWEEN THE SCALER READING AND THE TIME1 TIME2 READING.

08125	REF	1		37,2000		SETLOC P05P06	
08126				37,3655		BANK	
0813	REF	2	LAST	99	0314	EBANK= TIME2SAV	
0814	REF	1				COUNT* \$1/P06	
08145	REF	71	LAST	1332	37,3655 0 5504 0	P06 TC UPFLAG	SET NODOV37 BIT
08146	REF	5	LAST	1210	37,3656 00054 0	ADRES NODOFLAG	
0815					37,3657 0 0004 0	PRESTAND INHINT	
0816					37,3660 0 0006 1	EXTEND	
0817	REF	33	LAST	1307	37,3661 3 0025 0	DCA TIME2	SNAPSHOT TIME1 TIME2
0818	REF	3	LAST	1335	37,3662 52 315 1	DXCH TIME2SAV	
0819	REF	1			37,3663 0 3714 0	TC SCALPREP	
0820	REF	1			37,3664 0 3657 0	TC PRESTAND	T1, T2, SCALER NOT COMPATIBLE
0821	REF	790	LAST	1320	37,3665 52 155 1	DXCH MPAC	T1, T2 AND SCALER OK
0822	REF	1			37,3666 52 317 0	DXCH SCALSAVE	STORE SCALER
0823					37,3667 0 0004 0	INHINT	
0824	REF	311	LAST	1265	37,3670 0 4616 1	TC BANKCALL	
0825	REF	3	LAST	176	37,3671 17175 1	CADR RNDREFDR	REFSMM, DRIFT, TRACK FLAGS DOWN
0826	REF	91	LAST	1210	37,3672 0 5516 0	TC DOWNFLAG	
0827	REF	7	LAST	1333	37,3673 00007 0	ADRES IMUSE	IMUSE DOWN
08271	REF	92	LAST	1335	37,3674 0 5516 0	TC DOWNFLAG	
08272	REF	6	LAST	838	37,3675 00010 0	ADRES RNDVZFLG	RNDVZFLG DOWN
0828	REF	29	LAST	1311	37,3676 3 4741 1	CAF BIT11	
0829					37,3677 0 0006 1	EXTEND	
0830	REF	20	LAST	997	37,3700 05 013 0	WOR CHAN13	SET STANDBY ENABLE BIT
0831	REF	113	LAST	1242	37,3701 0 5353 1	TC PHASCHNG	SET RESTART TO POSTAND WHEN STANDBY
0832					37,3702 07024 0	OCT 07024	RECOVERS
0833					37,3703 20000 0	OCT 20000	
08335	REF	2	LAST	1335	0316	EBANK= SCALSAVE	
0834	REF	1			37,3704 03734 1	2CADR POSTAND	
0834	REF	1			37,3705 76060 0		
0835	REF	1			37,3706 3 4774 1	CAF OCT62	
0836	REF	312	LAST	1335	37,3707 0 4616 1	TC BANKCALL	
0837	REF	10	LAST	972	37,3710 20623 1	CADR GOPERF1	
0838					37,3711 1 3706 1	TCF 3	
0839					37,3712 1 3706 1	TCF 4	
0840					37,3713 1 3706 1	TCF 5	
08405	REF	3	LAST	599	4774	OCT62 EQUALS .5SEC	DEC 50 = OCT 62

R0841 THE LOW 5 BITS OF THE SCALER READS 10000 FOR THE FIRST INTERVAL AFTER A

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R0842 T1 INCREMENT. IF SCALPREP DETECTS THIS INTERVAL THE T1,T2 AND SCALER
 R0843 DATA ARE NOT COMPATABLE AND RETURN IS TO L+1 FOR ANOTHER READING OF THE
 R0844 DATA. OTHERWISE, THE RETURN IS TO L+2 TO PROCEED. ROUTINE ALSO PREPARES
 R0845 THE SCALER READING FOR COMPUTATION OF THE INCREMENT TO UPDATE T1T2. (THE
 R0846 10 MS BIT (BIT 6) OF THE SCALER IS INCREMENTED 5 MS OUT OF PHASE FROM
 R0847 T1.) ADDITION OF 5 MS (BIT 5) TO THE SCALER READING HAS THE EFFECT OF
 R0848 ADJUSTING BIT 6 IN THE SCALER TO BE IN PHASE WITH BIT 1 OF T1. THE LOW 5
 R0849 BITS OF THE SCALER READING ARE THEN SET TO ZERO, TO TRUNCATE THE SCALER
 R0850 DATA TO 10 MS. RESULTS ARE STORED IN MPAC, +1.

0851		37,3714	0 0006 1	SCALPREP	EXTEND	
0852	REF 791	LAST 1335	37,3715	22 156 0	QXCH	MPAC +2
0853	REF 3	LAST 381	37,3716	0 4103 1	TC	FINETIME +1
0854			37,3717	0 0003 1	RELINT	
0855	REF 792	LAST 1336	37,3720	52 155 1	DXCH	MPAC
0856	REF 41	LAST 1317	37,3721	3 4747 1	CA	LITS ADD 5 MS TO THE SCALER READING.
0857	REF 233	LAST 1323	37,3722	54 001 1	TS	L
0858	REF 241	LAST 1330	37,3723	3 4755 1	CA	ZERO
0859	REF 793	LAST 1336	37,3724	20 155 1	DAS	MPAC
0860	REF 9	LAST 744	37,3725	4 4346 0	CS	LOW5 SET LOW 5 BITS OF (SCALER+5MS) TO ZERO
0861	REF 794	LAST 1336	37,3726	7 0155 1	MASK	MPAC +1 AND STORE RESULTS IN MPAC,+1.
0862	REF 795	LAST 1336	37,3727	56 155 0	XCH	MPAC +1
0863	REF 10	LAST 1336	37,3730	7 4346 0	MASK	LOW5 TEST LOW 5 BITS OF SCALER FOR THE FIRST
A0864						INTERVAL AFTER THE T1 INCREMENT
A0865						(NOW = 00000, SINCE BIT 5 ADDED).
0866	REF 425	LAST 1332	37,3731	10 000 0	CCS	A IS IT 1ST INTERVAL AFTER T1 INCREMENT
0867	REF 796	LAST 1336	37,3732	24 156 0	INCR	MPAC +2 NO
0868	REF 797	LAST 1336	37,3733	0 0156 0	TC	MPAC +2 YES

R0869 POSTAND RECOVERS TIME AFTER STANDBY. THE SCALER IS SNAPSHOTTED AND THE
 R0870 TIME1 TIME2 COUNTER IS SET TO ZERO. THE LOW 5 BITS OF THE SCALER ARE
 R0871 INSPECTED TO INSURE COMPATABILITY BETWEEN THE SCALER READING AND THE
 R0872 CLEARING OF THE TIME COUNTER. IT THEN COMPUTES THE DIFFERENCE IN SCALER
 R0873 VALUES (IN DP) AND ADDS THIS TO THE PREVIOUSLY SNAPSHOTTED VALUES OF
 R0874 TIME1 TIME2 AND PLACES THIS NEW TIME INTO THE TIME1 TIME2 COUNTER.

0875	REF 1				COUNT*	\$/P05
0876	REF 30	LAST 1335	37,3734	4 4741 0	POSTAND	CS BIT11 RECOVER TIME AFTER STANDBY.
0877			37,3735	0 0006 1	EXTEND	
0878	REF 21	LAST 1335	37,3736	03 013 0	WAND	CHAN13 CLEAR STANDBY ENABLE BIT
0879			37,3737	0 0004 0	INHINT	
0880	REF 242	LAST 1336	37,3740	3 4755 1	CA	ZERO
0881	REF 234	LAST 1336	37,3741	54 001 1	TS	L
0882	REF 34	LAST 1335	37,3742	52 025 1	DXCH	TIME2 CLEAR TIME1 TIME2
0883	REF 2	LAST 1335	37,3743	0 3714 0	TC	SCALPREP STORE SCALER IN MPAC, MPAC+1
0884	REF 2	LAST 1335	37,3744	0 3737 1	TC	POSTAND +3 T1,T2,SCALER NOT COMPATIBLE
0885			37,3745	0 0006 1	EXTEND	T1,T2 AND SCALER OK
0886	REF 3	LAST 1335	37,3746	4 0317 0	DCS	SCALSAVE
0887	REF 798	LAST 1336	37,3747	20 155 1	DAS	MPAC FORM DP DIFFERENCE OF POSTSTANDBY SCALER

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0888	REF 46	LAST 1324	37,3750	3 4742 1	CAF	BIT10	MINUS PRESTANDBY SCALER AND SHIFT RIGHT
0889	REF 11	LAST 884	37,3751	0 7307 1	TC	SHUKTMP	5 TO ALIGN BITS WITH TIME1TIME2.
0890	REF 243	LAST 1336	37,3752	3 4755 1	CAF	ZERO	
0891	REF 799	LAST 1336	37,3753	54 156 1	TS	MPAC +2	NEEDED FOR TP AGREE
0892	REF 16	LAST 1319	37,3754	0 7257 0	TC	TPAGREE	MAKE DP DIFF AGREE
0893	REF 800	LAST 1337	37,3755	10 154 0	CCS	MPAC	
0894	REF 1		37,3756	0 3763 0	TC	POSTCOM	IF DP DIFF NET +, NO SCALER OVERFLOW
0895	REF 2	LAST 1337	37,3757	0 3763 0	TC	POSTCOM	BETWEEN PRE AND POST STANDBY.
0896			37,3760	0 3761 1	TC	+1	IF DP DIFF NET -, SCALER OVERFLOWED. ADD
0897	REF 47	LAST 1337	37,3761	3 4742 1	CAF	BIT10	BIT 10 TO HIGH DIFF TO CORRECT.
0898	REF 801	LAST 1337	37,3762	26 154 0	ADS	MPAC	
0899			37,3763	0 0006 1	POSTCOM	EXTEND	C(MPAC,+1) IS MAGNITUDE OF DELTA SCALER.
0900	REF 4	LAST 1335	37,3764	3 0315 0	DCA	TIME2SAV	PRESTANDBY TIME1TIME2
0901	REF 802	LAST 1337	37,3765	20 155 1	DAS	MPAC	
0902	REF 17	LAST 1337	37,3766	0 7257 0	TC	TPAGREE	FORCE SIGN AGREEMENT
0903	REF 803	LAST 1337	37,3767	52 155 1	DXCH	MPAC	UPDATED VALUE FOR T1,T2.
0904	REF 35	LAST 1336	37,3770	20 025 1	DAS	TIME	LOAD UPDATED VALUE INTO T1,T2, WITH
09045	REF 93	LAST 1335	37,3771	0 5516 0	TC	DOWNFLAG	CLEAR NODOFLAG
09046	REF 6	LAST 1335	37,3772	00054 0	ADRES	NODOFLAG	
0905	REF 68	LAST 1332	37,3773	0 6001 0	TC	GOTOPDOH	

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0001				14,2774			BANK	14	
0002	REF	1		04,2000			SETLOC	KEYRUPT	
0003				04,3274			BANK		
0004	REF	1					COUNT	\$/KEYUP	
0005	REF	9	LAST 1129	04,3274	54 016 1	KEYRUPT1	TS	BANKRUPT	
0006	REF	351	LAST 1327	04,3275	56 002 0		XCH	0	
0007	REF	8	LAST 1129	04,3276	54 012 0		TS	QRUPT	
0008	REF	2	LAST 438	04,3277	0 4400 1		TC	LODSAMPT	TIME IS SNATCHED IN RUPT FOR NOUN 65.
0009	REF	11	LAST 1336	04,3300	3 4346 1		CAF	LGW5	
0010				04,3301	0 0006 1		EXTEND		
0011	REF	2	LAST 218	04,3302	02 015 1		RAND	MNKEYIN	CHECK IF KEYS 5M-1M ON
0012	REF	6	LAST 1300	04,3303	54 073 1	KEYCOM	TS	RUPTREG4	
0013	REF	28	LAST 915	04,3304	4 0101 0		CS	FLAGWRD5	
0014	REF	1		04,3305	7 4735 0		MASK	DSKYFBIT	
0015	REF	29	LAST 1338	04,3306	26 101 0		ADS	FLAGWRD5	
0016	REF	6	LAST 1099	04,3307	3 4355 0	ACCEPTUP	CAF	CHRPRID	(NOTE: RUPTREG4 = KEYTEMP1)
0017	REF	28	LAST 1308	04,3310	0 5072 1		TC	NOVAC	
0018	REF	66	LAST 458	0777			EBANK	DSPCOUNT	
0019	REF	1		04,3311	02077 0		2CADR	CHARIN	
0019	REF	1		04,3312	60101 1				
0020	REF	7	LAST 1338	04,3313	3 0073 0		CA	RUPTREG4	
0021	REF	24	LAST 1328	04,3314	50 064 0		INDEX	LOCCTR	
0022	REF	804	LAST 1337	04,3315	54 154 0		TS	MPAC	LEAVE 5 BIT KEY CDE IN MPAC FOR CHARIN
0023	REF	22	LAST 994	04,3316	0 5270 1		TC	RESUME	

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P0024 UPRUPT PROGRAM

0025	REF 10	LAST 1338	04,3317	54 016 1	UPRUPT	TS	BANKRUPT	
0026	REF 352	LAST 1338	04,3320	56 002 0		XCH	Q	
0027	REF 9	LAST 1338	04,3321	54 012 0		TS	QRUPT	
0028	REF 3	LAST 1338	04,3322	0 4400 1		TC	LODSAMPT	TIME IS SNATCHED IN RUPT FOR NOUN 65.
0029	REF 244	LAST 1337	04,3323	3 4755 1		CAF	ZERO	
0030	REF 2	LAST 222	04,3324	56 045 0		XCH	INLINK	
0031	REF 2	LAST 154	04,3325	54 073 1		TS	KEYTEMP1	
0032	REF 35	LAST 1285	04,3326	3 4751 0		CAF	BIT3	TURN ON UPACT LIGHT
0033			04,3327	0 0006 1		EXTEND		(BIT 3 OF CHANNEL 11)
0034	REF 34	LAST 1327	04,3330	05 011 1		WOR	DSALMOUT	
0035	REF 12	LAST 1338	04,3331	3 4346 1	UPRPT1	CAF	LOW5	TEST FOR TRIPLE CHAR REDUNDANCY
0036	REF 3	LAST 1339	04,3332	7 0073 1		MASK	KEYTEMP1	LOW5 OF WORD
0037	REF 4	LAST 1339	04,3333	56 073 0		XCH	KEYTEMP1	LOW5 INTO KEYTEMP1
0038			04,3334	0 0006 1		EXTEND		
0039	REF 48	LAST 1337	04,3335	7 4742 0		MP	BIT10	SHIFT RIGHT 5
0040	REF 1		04,3336	54 734 0		TS	KEYTEMP2	
0041	REF 13	LAST 1339	04,3337	7 4346 0		MASK	LOW5	MID 5
0042	REF 1		04,3340	6 3374 1		AD	HI10	
0043	REF 1		04,3341	0 3371 1		TC	UPTTEST	
0044	REF 49	LAST 1339	04,3342	3 4742 1		CAF	BIT10	
0045			04,3343	0 0006 1		EXTEND		
0046	REF 2	LAST 1339	04,3344	7 0734 0		MP	KEYTEMP2	SHIFT RIGHT 5
0047	REF 14	LAST 1339	04,3345	7 4346 0		MASK	LOW5	HIGH 5
0048			04,3346	4 0000 0		CDM		
0049	REF 2	LAST 1339	04,3347	0 3371 1		TC	UPTTEST	
0050	REF 1		04,3350	4 3377 0	UPOK	CS	ELRCODE	CODE IS GOOD. IF CODE = 'ERROR RESET',
0051	REF 5	LAST 1339	04,3351	6 0073 0		AD	KEYTEMP1	CLEAR UPLOCKFL (SET BIT 4 OF FLAGWRD7 = 0)
0052			04,3352	0 0006 1		EXTEND		IF CODE DOES NOT = 'ERROR RESET', ACCEPT
0053	REF 1		04,3353	1 3361 1		BZF	CLUPLOCK	CODE ONLY IF UPLOCKFL IS CLEAR (=0).
0054	REF 1		04,3354	3 4750 1		CAF	UPLOCBIT	TEST UPLOCKFL FOR 0 OR 1
0055	REF 26	LAST 898	04,3355	7 0103 1		MASK	FLAGWRD7	
0056	REF 426	LAST 1336	04,3356	10 000 0		CCS	A	
0057	REF 23	LAST 1338	04,3357	0 5270 1		TC	RESUME	UPLOCKFL = 1
0058	REF 1		04,3360	0 3307 0		TC	ACCEPTUP	UPLOCKFL = 0
0059	REF 2	LAST 1339	04,3361	4 4750 0	CLUPLOCK	CS	UPLOCBIT	CLEAR UPLOCKFL (I.E., SET BIT 4 OF)
0060	REF 27	LAST 1339	04,3362	7 0103 1		MASK	FLAGWRD7	FLAGWRD7 = 0)
0061	REF 28	LAST 1339	04,3363	54 103 1		TS	FLAGWRD7	
0062	REF 2	LAST 1339	04,3364	0 3307 0		TC	ACCEPTUP	
A0063								CODE IS BAD
0064	REF 29	LAST 1339	04,3365	4 0103 1	FMFAIL2	CS	FLAGWRD7	LOCK OUT FURTHER UPLINK ACTIVITY
0065	REF 3	LAST 1339	04,3366	7 4750 0		MASK	UPLOCBIT	(BY SETTING UPLOCKFL = 1) UNTIL
0066	REF 30	LAST 1339	04,3367	26 103 1		ADS	FLAGWRD7	'ERROR RESET' IS SENT VIA UPLINK.
0067	REF 24	LAST 1339	04,3370	0 5270 1		TC	RESUME	
0069	REF 6	LAST 1339	04,3371	6 0073 0	UPTTEST	AD	KEYTEMP1	

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0070	REF 427	LAST 1339	04,3372	10 000 0	CCS	A
0071	REF 1		04,3373	0 3365 1	TC	TMFAIL2
0072			04,3374	77740 1	OCT	77740
0073	REF 2	LAST 1340	04,3375	0 3365 1	TC	TMFAIL2
0074	REF 353	LAST 1339	04,3376	0 0002 0	TC	Q

0075			04,3377	00022 1	ELRCODE	OCT 22
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R0076 'UPLINK ACTIVITY LIGHT' IS TURNED OFF BY.....

R0077 1. VBRELDSP

R0078 2. ERROR RESET

R0079 3. UPDATE PROGRAM(P27) ENTERED BY V70,V71,V72,AND V73.

R0080

R0081 THE RECEPTION OF A BAD CODE(I.E. CCC FAILURE) LOCKS OUT FURTHER UPLINK ACTIVITY BY SETTING BIT4 OF FLAGWRD7 = 1.

R0082 THIS INDICATION WILL BE TRANSFERRED TO THE GROUND BY THE DOWNLINK WHICH DOWNLINKS ALL FLAGWORDS.

R0083 WHEN UPLINK ACTIVITY IS LOCKED OUT, IT CAN BE ALLOWED WHEN THE GROUND UPLINKS AND 'ERROR RESET' CODE.

R0084 (IT IS RECOMMENDED THAT THE 'ERROR LIGHT RESET' CODE IS PRECEDED BY 16 BITS THE FIRST OF WHICH IS 1 FOLLOWED

R0085 BY 15 ZEROES. THIS WILL ELIMINATE EXTRANEIOUS BITS FROM INLINK WHICH MAY HAVE BEEN LEFT OVER FROM THE ORIGINAL

R0086 FAILURE)

R0087

R0088

R0089

R0090

R0091

R0092 UPLINK ACTIVITY IS ALSO ALLOWED(UNLOCKED) DURING FRESH START WHEN FRESH START SETS BIT4 OF FLAGWRD7 = 0.

05124 REF 1 04,3400 4 4753 0 CS XDSPBIT

L DISPLAY INTERFACE ROUTINES

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R0001 DISPLAYS CAN BE CLASSIFIED INTO THE FOLLOWING CATEGORIES-

- R0002 1. PRIORITY DISPLAYS- DISPLAYS WHICH TAKE PRIORITY OVER ALL OTHER DISPLAYS. USUALLY THESE DISPLAYS ARE SENT
R0004 OUT UNDER CRITICAL ALARM CONDITIONS.
- R0005 2. EXTENDED VERB DISPLAYS- ALL EXTENDED VERBS AND MARK ROUTINES SHOULD USE EXTENDED VERB (MARK) DISPLAYS.
- R0007 3. NORMAL DISPLAYS- ALL MISSION PROGRAM DISPLAYS WHICH INTERFACE WITH THE ASTRONAUT DURING THE NORMAL
R0009 SEQUENCE OF EVENTS.
- R0010 4. MISC. DISPLAYS- ALL DISPLAYS NOT HANDLED BY THE DISPLAY INTERFACEROUTINES. THESE INCLUDE SUCH DISPLAYS AS
R0012 MM-DISPLAYS AND SPECIAL PURPOSE DISPLAYS HANDLED BY PINBALL.

R0013 5. ASTRONAUT INITIATED DISPLAYS- ALL DISPLAYS INITIATED EXTERNALLY.

R0014 THE FOLLOWING TERMS ARE USED TO DESCRIBE THE STATUS OF DISPLAYS-

- R0015 1. ACTIVE-THE DISPLAY WHICH IS (1) BEING DISPLAYED TO THE ASTRONAUT AND WAITING FOR A RESPONSE OR
R0017 (2) WAITING FIRST IN LINE FOR THE ASTRONAUT TO FINISH USING THE DSKY OR (3) BEING DISPLAYED ON THE DSKY
R0019 BUT NOT WAITING FOR A RESPONSE.
- R0020 2. INACTIVE -A DISPLAY WHICH HAS (1) BEEN ACTIVE BUT WAS INTERRUPTEDBY A DISPLAY OF HIGHER PRIORITY,
R0022 (2) BEEN PUT INTO THE WAITING LIST AT TIME IT WAS REQUESTED DUE TO THE FACT A HIGHER PRIORITY DISPLAY
R0024 WAS ALREADY GOING, (3) BEEN INTERRUPTED BY THE ASTRONAUT (CALLED A PINBRANCH CONDITION. SINCE THIS TYPE
R0026 OF INACTIVE DISPLAY IS USUALLY REACTIVATED ONLY BY PINBALL) OR (4) A DISPLAY WHICH HAS FINISHED BUT STILL
R0028 HAS INFO SAVED FOR RESTART PURPOSES.

R0029 DISPLAY PRIORITIES WORK AS FOLLOWS-

R0030 INTERRUPTS-

- R0031 1. THE ASTRONAUT CAN INTERRUPT ANY DISPLAY WITH AN EXTERNAL DISPLAY REQUEST.
- R0033 2. INTERNAL DISPLAYS CAN NOT BE SENT OUT WHEN THE ASTRONAUT IS USING THE DSKY.
- R0035 3. PRIORITY DISPLAYS INTERRUPT ALL OTHER TYPES OF INTERNAL DISPLAYS. A PRIORITY DISPLAY INTERRUPTING ANOTHER
R0037 PRIORITY DISPLAY WILL CAUSE AN ABORT UNLESS BIT14 IS SET FOR THE LINUS ROUTINE.
- R0039 4. A MARK DISPLAY INTERRUPTS ANY NORMAL DISPLAY.
- R0040 5. A MARK THAT INTERRUPTS A MARK COMPLETELY REPLACES IT.

R0041 ORDER OF WAITING DISPLAYS-

- R0042 1. ASTRONAUT EXTERNAL USE
- R0043 2. PRIORITY
- R0044 3. INTERRUPTED MARK
- R0045 4. INTERRUPTED NORMAL

R0046 5. MARK TO BE REQUESTED (SEE DESCRIPTION OF END MARK)

R0047 6. MARK WAITING

R0048 7. NORMAL WAITING

L DISPLAY INTERFACE ROUTINES

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R0049 THE DISPLAY ROUTINES ARE INTENDED TO SERVE AS AN INTERFACE BETWEEN THE USER AND PINBALL. THE
 R0051 FOLLOWING STATEMENTS CAN BE MADE ABOUT NORMAL DISPLAYS AND PRIORITY DISPLAYS (A DESCRIPTION OF MARK ROUTINES
 R0053 WILL FOLLOW LATER):

- R0054 1. ALL ROUTINES THAT END IN R HAVE AN IMMEDIATE RETURN TO THE USER. FOR ALL FLASHING DISPLAYS THIS RETURN
 R0056 IS TO THE USERS CALL CADR +4. FOR THE ONLY NON FLASHING IMMEDIATE RETURN DISPLAY (GODSPR) THIS RETURN
 R0058 IS TO THE USERS CALLING LOC +1.
- R0059 2. ALL ROUTINES NOT ENDING IN R DO NOT DO AN IMMEDIATE RETURN TO THE USER.
- R0061 3. ALL ROUTINES THAT END IN R START A SEPARATE JOB (MAKEPLAY) WITH USERS JOB PRIORITY.
- R0063 4. ALL ROUTINES NOT ENDING IN R BRANCH DIRECTLY TO MAKEPLAY WHICH MAKES THESE DISPLAYS A PART OF THE
 R0065 USERS JOB.
- R0066 5. ALL DISPLAY ROUTINES ARE CALLED VIA BANKCALL.
- R0067 6. TO RESTART A DISPLAY THE USER WILL GENERALLY USE A PHASE OF ONE WITH DESIRED RESTART GROUP (SEE
 R0069 DESCRIPTION OF RESTARTS).
- R0070 7. ALL FLASHING DISPLAYS HAVE 3 RETURNS TO THE USER FROM ASTRONAUT RESPONSES. A TERMINATE (V34) BRANCHES
 R0072 TO THE USERS CALL CADR +1. A PROCEED (V33) BRANCHES TO THE USERS CALL CADR +2. AN ENTER OR RECYCLE
 R0074 (V32) BRANCHES TO THE USERS CALL CADR +3.
- R0075 8. ALL ROUTINES MUST BE USED UNDER EXECUTIVE CONTROL.

R0076 A DESCRIPTION OF EACH ROUTINE WITH AN EXAMPLE FOLLOWS:

R0077 GODSP IS USED TO DISPLAY A VERB NOUN ARRIVING IN A. NO RETURN IS MADE TO THE USER.

- R0079 1. GODSP IS NOT RESTARTABLE
- R0080 2. A VERB PASTE WITH GODSP ALWAYS TURNS ON THE FLASH.

A0081	CAF	VXXNYY
A0082	TC	BANKCALL
A0083	CADR	GODSP

A0084	VXXNYY	OCT	OXXYY
-------	--------	-----	-------

R0085 GODSPR IS THE SAME AS GODSP ONLY RETURN IS TO THE USER.

A0086	CAF	VXXNYY
A0087	TC	BANKCALL
A0088	CADR	GODSPR

A0089 ... IMMEDIATE RETURN OF GODSPR

R0090 GOFFLASH DISPLAYS A FLASHING VERB NOUN WITH NO IMMEDIATE RETURN TO THE USER. 3 RETURNS ARE POSSIBLE FROM
 R0092 THE ASTRONAUT (SEE NO. 7 ABOVE).

A0093	CAF	VXXNYY	VXX NYY WILL BE A FLASHING VERB NOUN.
A0094	TC	BANKCALL	
A0095	CADR	GOFFLASH	
A0096	...	...	TERMINATE RETURN
A0097	...	...	PROCEED RETURN
A0098	...	...	ENTER OR RECYCLE RETURN

R0099 GUPERF1 IS ENTERED WITH DESIRED CHECKLIST VALUE IN A. G. PERF1 WILL DISPLAY THIS VALUE IN R1 BY MEANS OF A

L DISPLAY INTERFACE ROUTINES

USER'S PAGE NO. 3 EQ SP

R0101 V01 N25.A FLASHING PLEASE PERFORM ON CHECKLIST (V50 N25) IS THEN DISPLAYED. NO IMMEDIATE RETURN IS MADE TO
R0103 USER (SEE NO. 7 ABOVE).

R0104 GOPERF1 BLANKS REGISTERS R2 AND R3

A0105	CAF	UCTXX	CODE FOR CHECKLIST VALUE XX
A0106	TC	BANKCALL	
A0107	CADR	GOPERF1	
A0108	...	...	TERMINATE RETURN
A0109	...	...	PROCEED RETURN
A0110	...	...	ENTER RETURN

R0111 GOPERF2 IS ENTERED WITH A VARIABLE NOUN AND V01 (V00 FOR N10 OR N11) IN A. GOPERF2 WILL FIRST DISPLAY THE
R0113 REQUESTED NOUN BY MEANS OF A V01NYY OR A V00NYY. PLEASE PERFORM ON NOUN (V50 NYY) THEN BECOMES A FLASHING
R0115 DISPLAY. NO IMMEDIATE RETURN IS MADE TO THE USER (SEE NO. 7 ABOVE).

R0116 GOPERF2 DOES NOT BLANK ANY REGISTERS

A0117	CAF	VXXNYY	VARIABLE NOUN YY. XX=00 OR 01.
A0118	TC	BANKCALL	
A0119	CADR	GOPERF2	
A0120	...	...	TERMINATE RETURN
A0121	...	...	PROCEED RETURN
A0122	...	...	ENTER RETURN

R0123 GOPERF3 IS USED FOR A PLEASE PERFORM ON A PROGRAM NUMBER. THE DESIRED PROGRAM NO. IS ENTERED IN A. GOPERF3
R0125 DISPLAYS THE NO. BY MEANS OF A V06 N07 FOLLOWED BY A FLASHING V50 N07 FOR A PLEASE PERFORM. NO IMMEDIATE RETURN
R0127 IS MADE TO THE USER (SEE NO. 7 ABOVE).

R0128 GOPERF3 BLANKS REGISTERS R2 AND R3

A0129	CAF	DECXX	REQUEST PERFORM ON PXX
A0130	TC	BANKCALL	
A0131	CADR	GOPERF3	
A0132	...	...	TERMINATE RETURN
A0133	...	...	PROCEED RETURN
A0134	...	...	ENTER RETURN

R0135 GOPERF4 IS USED FOR A PLEASE PERFORM ON AN OPTION. THE DESIRED OPTION IS ENTERED IN A AND STORED IN OPTION1.
R0137 GOPERF4 DISPLAYS R1 AND R2 BY MEANS OF A V04N06 FOLLOWED BY A FLASHING V50N06 FOR A PLEASE PERFORM. NO
R0139 IMMEDIATE RETURN IS MADE TO THE USER (SEE NO. 7 ABOVE).

A0140	CAF	UCTXX	REQUEST PERFORM ON OPTION XX
A0141	TC	BANKCALL	
A0142	CADR	GOPERF4	
A0143	...	...	TERMINATE RETURN
A0144	...	...	PROCEED RETURN
A0145	ENTER RETURN

R0146 GOPERF4 BLANKS REGISTER R3

L-----DISPLAY-INTERFACE-ROUTINES-----

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R0147 GUDSPRET IS USED TO DISPLAY A VERB NOUN ARRIVING IN A WITH A RETURN TO THE USER AFTER THE DISPLAY HAS BEEN SENT
 R0149 OUT.

A0150 CAF VXXNYY
 A0151 TC BANKCALL
 A0152 CADR GUDSPRET

A0153 RETURN TO USER

R0154 REGODSP IS USED TO DISPLAY A VERB NOUN ARRIVING IN A. REGODSP IS THE SAME AS GUDSP ONLY REGODSP REPLACES ANY
 R0156 ACTIVE NORMAL DISPLAY IF ONE WAS ACTIVE.

A0157 CAF VXXNYY
 A0158 TC BANKCALL
 A0159 CADR REGODSP

R0160 REFLASH IS THE SAME AS GUDFLASH ONLY REFLASH REPLACES ANY ACTIVE NORMAL DISPLAY IF ONE WAS ACTIVE.

A0162 CAF VXXNYY VXX NYY WILL BE A FLASHING VERB NOUN
 A0163 TC BANKCALL
 A0164 CADR REFLASH
 A0165 TERMINATE RETURN
 A0166 PROCEED RETURN
 A0167 ENTER RETURN

R0168 GUDFLASHR IS SAME AS GUDFLASH ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +4.

A0170 CAF VXXNYY
 A0171 TC BANKCALL
 A0172 CADR GUDFLASHR
 A0173 TERMINATE RETURN
 A0174 PROCEED RETURN
 A0175 ENTER OR RECYCLE RETURN

A0176 IMMEDIATE RETURN FROM GUDFLASHR

R0177 GOPERF1R IS THE SAME AS GOPERF1 ONLY GOPERF1R HAS AN IMMEDIATE RETURN TOUSERS CALL CADR +4.

R0179 GOPERF1R-BLANKS-REGISTERS-R2-AND-R3

A0180 CAF OCTXX CODE FOR CHECKLIST-VALUE-XX.
 A0181 TC BANKCALL
 A0182 CADR GOPERF1R
 A0183 TERMINATE RETURN
 A0184 PROCEED RETURN
 A0185 ENTER RETURN

A0186 IMMEDIATE RETURN FROM GOPERF1R

R0187 GOPERF2R IS THE SAME AS GOPERF2 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL CADR +4.

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R0189 GUPERF2R DOES NOT BLANK ANY REGISTERS

A0190	CAF	VXXNYY	VARIABLE NOUN YY REQUESTED. XX=00 OR 01
A0191	TC	BANKCALL	
A0192	CADR	GUPERF2R	
A0193	...	...	TERMINATE RETURN
A0194	...	...	PROCEED RETURN
A0195	...	...	ENTER RETURN
A0196	...	...	IMMEDIATE RETURN HERE FROM GUPERF2R

R0197 GUPERF3R IS THE SAME AS GUPERF3 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL CADR +4.

R0199 GUPERF3R-BLANKS-REGISTERS-R2-AND-R3

A0200	CAF	PROGXX	PERFORM PROGRAM XX
A0201	TC	BANKCALL	
A0202	CADR	GUPERF3R	
A0203	...	...	TERMINATE RETURN
A0204	...	...	PROCEED RETURN
A0205	...	...	ENTER RETURN
A0206	...	...	GUPERF3R-IMMEDIATELY-RETURNS-HERE

R0207 GUPERF4R IS THE SAME AS GUPERF4 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL CADR +4.

A0209	CAF	OCTXX	REQUEST-PERFORM-ON-OPTIONXX
A0210	TC	BANKCALL	
A0211	CADR	GUPERF4R	
A0212	...	...	TERMINATE RETURN
A0213	...	...	PROCEED RETURN
A0214	...	...	ENTER RETURN
A0215	...	...	IMMEDIATE RETURN TO USER

R0216 GUPERF4R-BLANKS-REGISTER-R3

R0217 REFLASHR IS THE SAME AS REFLASH ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +4.

A0219	CAF	VXXNYY	VXX NYY WILL BE A FLASHING VERB NOUN
A0220	TC	BANKCALL	
A0221	CADR	REFLASHR	
A0222	...	...	TERMINATE RETURN
A0223	...	...	PROCEED RETURN
A0224	...	...	ENTER RETURN
A0225	...	...	IMMEDIATE RETURN TO USER

R0226 REGUDSPR IS THE SAME AS REGUDSP ONLY A RETURN (IMMEDIATE) IS MADE TO THE USER.

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A0228
A0229
A0230CAF VXXNYY
TC BANKCALL
CADR NEGODSPR

A0231

... ..

IMMEDIATE RETURN TO USER

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R0232 GOMARK IS USED TO DISPLAY A MARK VERB NOUN ARRIVING IN A. NO RETURN IS MADE TO THE USER.

R0234 GOXDSP = GOMARK

A0235	CAF	VXXNYY	VXXNYY CONTAINS VERB AND NOUN
A0236	TC	BANKCALL	
A0237	CADR	GOMARK	OTHER EXTENDED VERBS USE CADR GOXDSP

R0238 GOMARKR IS THE SAME AS GOMARK ONLY RETURN IS TO THE USER.

R0239 GOXDSPR = GOMARKR

A0240	CAF	VXXNYY	
A0241	TC	BANKCALL	
A0242	CADR	GOMARKR	OTHER EXTENDED VERBS USE CADR GOXDSPR

A0243 IMMEDIATE RETURN OF GOMARKR

R0244 GOMARKF DISPLAYS A FLASHING MARK VERB NOUN WITH NO IMMEDIATE RETURN TO THE USER. 3 RETURNS ARE POSSIBLE FROM
R0246 THE ASTRONAUT (SEE NO. 7 ABOVE).

R0247 GOXDSPF = GOMARKF

A0248	CAF	VXXNYY	VXXNYY WILL BE A FLASHING MARK VERB NOUN
A0249	TC	BANKCALL	
A0250	CADR	GOMARKF	OTHER EXTENDED VERBS USE CADR GOXDSPF
A0251	...	...	TERMINATE RETURN
A0252	...	...	PROCEED RETURN
A0253	...	...	ENTER OR RECYCLE RETURN

R0254 GOMARKFR IS THE SAME AS GOMARKF ONLY AN IMMEDIATE RETURN IS MADE TO THE USER CALL CADR +4.

R0256 GOXDSPFR = GOMARKFR

A0257	CAF	VXXNYY	FLASHING MARK VERB NOUN
A0258	TC	BANKCALL	
A0259	CADR	GOMARKFR	OTHER EXTENDED VERBS USE CADR GOXDSPFR
A0260	...	...	TERMINATE RETURN
A0261	...	...	PROCEED RETURN
A0262	...	...	ENTER OR RECYCLE RETURN

A0263 IMMEDIATE RETURN TO THE USER

R0264 GOMARK1 IS USED FOR A PLEASE PERFORM ON A MARK REQUEST WITH ONLY 1 ASTRONAUT RETURN TO THE USER. NO IMMEDIATE
R0266 RETURN IS MADE. THE DESIRED MARK PLEASE PERFORM VERB AND DESIRED NOUN IS ENTERED IN A. GOMARK1 DISPLAYS R1, R2, R
R0268 MEANS OF A V05NYY FOLLOWED BY A FLASHING V5XNYY FOR A PLEASE PERFORM. THE ASTRONAUT WILL RESPOND WITH A MARK
R0270 OR MARK REJECT OR AN ENTER. THE ENTER IS THE ONLY ASTRONAUT RESPONSE THAT WILL COME BACK TO THE USER.

A0272	CAF	V5XNYY	X=1,2,3,4 Y=NOUN
A0273	TC	BANKCALL	

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A0274	CADR	GOMARK1	
A0275	ENTER RETURN
R0276	*** IF BLANKING DESIRED ON NON R ROUTINES, NOTIFY DISPLAYER.		
R0277	GOMARK1R IS THE SAME AS A GOMARK1 ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +2.		
A0279	CAF	V5XNYY	X=1,2,3,4 YY = NOUN
A0280	TC	BANKCALL	
A0281	CADR	GOMARK1R	
A0282	...	...	ASTRONAUT ENTER RETURN
A0283	...	...	IMMEDIATE RETURN TO USER
R0284	GOMARK2 IS THE SAME AS GOMARK1 ONLY 3 RETURNS ARE MADE TO THE USER FROM THE ASTRONAUT.		
A0286	CAF	V5XNYY	X=1,2,3,4 YY=NOUN
A0287	TC	BANKCALL	
A0288	CADR	GOMARK2	
A0289	...	...	TERMINATE RETURN
A0290	...	...	PROCEED RETURN
A0291	...	...	ENTER RETURN
R0292	GOMARK2R IS THE SAME AS GOMARK1R ONLY 3 ASTRONAUT RETURNS ARE MADE TO THE USER.		
A0294	CAF	V5XNYY	X=0,1,2,3,4 YY=NOUN
A0295	TC	BANKCALL	
A0296	CADR	GOMARK2R	
A0297	...	...	TERMINATE RETURN
A0298	...	...	PROCEED RETURN
A0299	...	...	ENTER RETURN
A0300	...	...	IMMEDIATE RETURN TO THE USER
R0301	GOMARK3 IS USED FOR A PLEASE PERFORM ON A MARK REQUEST WITH A 3 COMP. DEC DISPLAY. THE DESIRED MARK PLEASE		
R0303	PERFORM VERB AND NOUN ARE ENTERED IN A. GOMARK3 DISPLAYS R1, R2, R3 BY MEANS OF A V06NYY FOLLOWED BY A FLASHING		
R0305	V5XNYY FOR A PLEASE PERFORM. GOMARK3 HAS 3 ASTRONAUT RETURNS TO THE USER WITH NO IMMEDIATE RETURN.		
A0307	CAF	V5XNYY	X=1, 2,3,4 YY=NOUN
A0308	TC	BANKCALL	
A0309	CADR	GOMARK3	
A0310	...	...	TERMINATE RETURN
A0311	...	...	PROCEED RETURN
A0312	...	...	ENTER RETURN
R0313	GOMARK4 IS THE SAME AS GOMARK3 ONLY R2 AND R3 ARE BLANKED AND R1 IS DISPLAYED IN OCTAL.		
A0315	CAF	V5XNYY	X=1,2,3,4 YY=NOUN
A0316	TC	BANKCALL	
A0317	CADR	GOMARK4	
A0318	TERMINATE RETURN
A0319	PROCEED RETURN

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A0320 ... ENTER RETURN

R0321 EXDSPRET IS USED TO DISPLAY A VERB NOUN ARRIVING IN A WITH A RETURN MADE TO THE USER AFTER THE DISPLAY HAS BEEN
R0323 SENT OUT.

A0324 CAF VXXNYY
A0325 TC BANKCALL
A0326 CADR EXDSPRET

A0327 ... RETURN TO USER

R0328 KLEENEX CLEANS OUT ALL MARK DISPLAYS (ACTIVE AND INACTIVE). A RETURN IS MADE TO THE USER AFTER THE MARK DISPLAYS
R0330 HAVE BEEN CLEANED OUT.

A0331 TC BANKCALL
A0332 CADR KLEENEX

A0333 ... RETURN TO USER

R0334 MARKBRAN IS A SPECIAL PURPOSE ROUTINE USED FOR SAVING JOB VAC AREAS (SEE DESCRIPTION OF MARKBRAN BELOW).

A0336 TC BANKCALL
A0337 CADR MARKBRAN

A0338 ... BAD RETURN IF MARK DISPLAY NOT ACTIVE

A0339 (GOOD RETURN TO IMMEDIATE RETURN LOC OF
A0340 LAST FLASHING MARK R ROUTINE)

R0341 PINBRNCH REESTABLISHES THE LAST ACTIVE FLASHING DISPLAY. IF THERE IS NO ACTIVE FLASHING DISPLAY, THE DSKY IS
R0343 BLANKED AND CONTROL IS SENT TO END OF JOB.

A0344 TC POSTJUMP
A0345 CADR PINBRNCH

R0346 PRIODSP IS USED AS A PRIORITY DISPLAY. IT WILL DISPLAY A GUFASH TYPE DISPLAY WITH THREE POSSIBLE RETURNS FROM
R0348 THE ASTRONAUT (SEE NO. 7 ABOVE).

R0349 THE MAIN PURPOSE OF PRIODSP IS TO REPLACE THE PRESENT DISPLAY WITH A DISPLAY OF HIGHER PRIORITY AND TO
R0351 PROVIDE A MEANS FOR RESTORING THE OLD DISPLAY WHEN THE PRIORITY DISPLAY
R0352 IS RESPONDED TO BY THE ASTRONAUT.

R0353 THE FORMER DISPLAY IS RESTORED BY AN AUTOMATIC BRANCH TO WAKE UP THE DISPLAY THAT WAS INTERRUPTED BY THE
R0355 PRIORITY DISPLAY.

A0356 CAF VXXNYY VXXNYY WILL BE A FLASHING VERB NOUN
A0357 TC BANKCALL
A0358 CADR PRIODSP
A0359 ... TERMINATE RETURN
A0360 ... PROCEED RETURN

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A0361 ENTER OR RECYCLE RETURN

R0362 PRIODSPR IS THE SAME AS PRIODSP ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +4.

A0364 CAF VXXNYY VXXNYY WILL BE A FLASHING VERB NOJN

A0365 TC BANKCALL

A0366 CADR PRIODSPR

A0367 TERMINATE RETURN

A0368 PROCEED RETURN

A0369 ENTER OR RECYCLE RETURN

A0370 IMMEDIATE RETURN

R0371 PRIOLARM DOES A V05N09 PRIODSPR.

R0372 CLEANDSP CLEANS OUT ALL NORMAL DISPLAYS (ACTIVE AND INACTIVE). A RETURN IS MADE TO THE USER AFTER NORMAL

R0374 DISPLAYS ARE CLEANED OUT.

A0375 TC BANKCALL

A0376 CADR CLEANDSP

A0377 RETURN TO USER

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P0378 GENERAL INFORMATION

R0379

R0380 ALARM OR ABORT EXIT MODES--

A0381

PRIORIT TC ABORT

A0382

OCT 1502

R0383 PRIORIT IS BRANDED TO WHEN (1) A NORMAL DISPLAY IS REQUESTED AND ANOTHER NORMAL DISPLAY IS ALREADY ACTIVE
 R0385 (REFLASH AND REGUDSP ARE EXCEPTIONS) OR (2) A PRIORITY DISPLAY IS REQUESTED WHEN ANOTHER PRIORITY DISPLAY IS
 R0387 ALREADY ACTIVE (A PRIORITY WITH LINUS BIT14 IS AN EXCEPTION).

R0388 ERASABLE INITIALIZATION REQUIRED--

R0389 ACCOMPLISHED BY FRESH START- 1. FLAGWRD4 (USED EXCLUSIVELY BY DISPLAY INTERFACE ROUTINES)
 R0391 2. NVSAVE = NORMAL VERB AND NOUN REGISTER.
 R0393 3. EBANKTEM = NORMAL INACTIVE FLAGWORD (ALSO CONTAINS NORMALS EBANK).

R0395

5. RISAVE = MARKBRAN CONTROL WORD

R0396

4. RESTREG = PRIORITY 30 AND SUPERBANK 3.

R0398 OUTPUT--

R0399 NVWORD = PRIOR VERB AND NOUN

R0400 NVWORD +1(MARKNV) = MARK VERB AND NOUN

R0401 NVWORD +2(NVSAVE) = NORMAL VERB AND NOUN

R0402 DSPFLG(EBANKSAV) = PRIOR FLAGWORD (INCLUDING EBANK)

R0403 DSPFLG +1(MARKEBAN) = MARK FLAGWORD (INCLUDING EBANK)

R0404 DSPFLG +2(EBANKTEM) = NORMAL FLAGWORD (INCLUDING EBANK)

R0405 CADRFLSH = PRIOR USERS CALL CADR +1 LOCATION

R0406 CADRFLSH +1(MARKFLSH) = MARK USERS CALL CADR +1 LOCATION

R0407 CADRFLSH +2(TEMPFLSH) = NORMAL USERS CALL CADR +1 LOCATION

R0408 PRIOTIME = TIME EACH PRIOR REQUEST FIRST SENT OUT

R0409 OPTION1 = DESIRED OPTION FROM GOPERF4

R0410 FLAGWRD4 = BIT INFO FOR CONTROL OF ALL DISPLAY ROUTINES

R0411 DSPTM1 = R1 INFO FOR ASTRONAUT FROM PERFORM DISPLAYS(NORMAL)

R0412 SUBROUTINES USED-- NVSUB, FLAGUP, FLAGDOWN, ENDOFJOB, BLANKSUB, ABORT, JOBWAKE, JOBSLEEP, FINDVAC, PRIUCHNG,

R0414 JAMTERM, NVSUBUSY, FLASHON, ENDIDLE, CHANG1, BANKJUMP, MAKECADR, NOVAC,

R0415 DEBRIS-- (STORED INTO)

R0416 TEMPORARY TEMPORARIES- A, Q, L, MPAC +2, MPAC +3, MPAC +4, MPAC +5, MPAC +6, RUPTREG2, RUPTREG3, CYL,

R0418 EBANK, RUPTREG4, LOC, BANKSET, MODE, MPAC, MPAC +1 4. FACEREG

R0420 ERASABLES (SHARED AND USED WITH OTHER PROGRAMS) CADRSTOR, DSPLIST, LOC, DSPTM1, OPTION1

R0422 ERASABLES (USED ONLY BY DISPLAY ROUTINES)- NVWORD, +1, +2, DSPFLG, +1, +2, CADRFLSH, +1, +2, PRIOTIME, FLAGWRD4.

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R0424 R1SAVE, MARK2PAC,

R0425 DEBRIS-- (USED BUT NOT STORED INTO)-- NOUNREG, VERBREG, LOCCTR, MONSAVE1

R0426 FLAGWORD DESCRIPTIONS--

R0427 FLAGWORD4- SEE DESCRIPTION UNDER LOG SECTION ERASABLE ASSIGNMENTS

R0428 DSPFLG, DSPFLG+1, DSPFLG +2-

R0429

R0430 BITS 1 BLANK R1

R0431 2-BLANK-R2

R0432 3-BLANK-R3

R0433 4 FLASHING DISPLAY REQUESTED

R0434 5 PERFORM-DISPLAY-REQUESTED

R0435 6 ----- EXDSPRET GODSPRET

R0436 7 PRIQ-DISPLAY -----

R0437 8 ----- DEC-MARK-PERFORM -----

R0438 9-EBANK

R0439 10-EBANK

R0440 11-EBANK

R0441 12 ----- V99PASTE

R0442 13-2ND-PART-OF-PERFORM

R0443 15-REFLASH-OR-REDO REFLASH OR REDO

R0444 15 MARK-REQUEST

R0445 RESTARTING-DISPLAYS--

R0446 RULES FOR THE DSKY-OPERATOR--

- R0447 1. PROCEED AND TERMINATE SERVE AS RESPONSES TO REQUESTS FOR OPERATOR RESPONSE (FLASHING V/I). AS LONG
R0449 AS THERE IS ANY REQUEST AWAITING OPERATOR RESPONSE, ANY USE OF PROCEED OR TERMINATE WILL SERVE AS
R0451 RESPONSES TO THAT REQUEST. CARE SHOULD BE EXERCISED IN ATTEMPTING TO KILL AN OPERATOR INITIATED MONITOR
R0453 WITH PROCEED AND TERMINATE FOR THIS REASON.
- R0454 2. THE ASTRONAUT MUST RESPOND TO A PRIORITY DISPLAY NO SOONER THAN 2 SECONDS FROM THE TIME THE
R0456 PROGRAM SENT OUT THE REQUEST FOR OPERATOR RESPONSE (THE ASTRONAUT WOULD SEE THIS DISPLAY FOR LESS TIME
R0458 DUE TO TIME IT TAKES TO GET DISPLAY SENT OUT.) IF THE ASTRONAUT RESPONDS TOO SOON, THE PRIORITY DISPLAY
R0460 IS SENT OUT AGAIN -- AND AGAIN UNTIL AN ACCUMULATED 2 SECS FROM THE TIME THE FIRST PRIORITY DISPLAY
R0462 OUT. THE SAME 2 SEC. DELAY WILL OCCUR AT 163.84 SECS OR IN ANY MULTIPLE OF THAT TIME DUE TO PROGRAM
R0464 CONSIDERATION.
- R0465 3. KEY-RELEASE-BUTTON-
- R0466 A) IF THE KEY RELEASE LIGHT IS ON, IT SIMPLY RELEASES THE KEYBOARD AND DISPLAY FOR INTERNAL USE.
R0468 B) IF THE KEY RELEASE LIGHT IS OFF, AND IF SOME REQUEST FOR OPERATOR RESPONSE (FLASHING V/I) IS STILL
R0470 AWAITING RESPONSE THEN IT RE-ESTABLISHES THE DISPLAYS THAT ORIGINALLY REQUESTED RESPONSE.
R0472 IF AN OPERATOR WANTS THEREFORE TO RE-ESTABLISH BUT CONDITION (A) IS ENCOUNTERED, A SECOND DEPRESSION OF
R0474 KEY RELEASE BUTTON MAY BE NECESSARY.
- R0475 4. IT IS IMPORTANT TO ANSWER ALL REQUESTS FOR OPERATOR RESPONSE.
- R0476 5. IT IS ALWAYS GOOD PRACTICE TO TERMINATE AN EXTENDED VERB BEFORE ASKING FOR ANOTHER ONE OR THE SAME ONE
R0478 OVER AGAIN.

R0479 SPECIAL CONSIDERATIONS--

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- R0480 1. MPAC +2 SAVED ONLY IN MARK DISPLAYS
- R0481 2. GODSP(R), REGODSP(R), GOMARK(R) ALWAYS TURN ON THE FLASH IF ENTERED WITH A PASTE VERB REQUEST.
- R0483 3. ALL NORMAL DISPLAYS ARE RESTARTABLE EXCEPT GODSP(R), REGODSP(R)
- R0484 4. ALL EXTENDED VERBS WITH DISPLAYS SHOULD START WITH A TC TESTXACT AND FINISH WITH A TC ENDEXT.
- R0486 5. GODSP(R) AND REGODSP(R) MUST BE IN THE SAME EBANK AND SUPERBANK AS THE LAST NORMAL DISPLAY RESTARTED
- R0488 BY A .1 RESTART PHASE CHANGE.
- R0489 6. IN ORDER TO SET UP A NON DISPLAY .1 RESTART POINT, THE USER MUST MAKE CERTAIN THAT RSTREG CONTAINS THE
- R0491 CORRECT PRIORITY AND SUPERBANK AND THAT EBANKTEM CONTAINS THE CO
- R04911 7. IF CLEANDSP IS RESTARTED VIA A .1 PHASE CHANGE, CWF ZERO SHOULD BE EXECUTED BEFORE THE TC BANKCALL.

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P0492 CALLING SEQUENCE FOR BLANKING

A0493

A0494

A0495

CAF BITX

X=1,2,3-BLANK R1,R2,R3-RESPECTIVELY

TC BLANKET

... ..

RETURN TO USER HERE

R0496 IN ORDER TO USE BLANKET CORRECTLY THE USER MUST USE A DISPLAY ROUTINE THAT ENDS IN R FIRST FOLLOWED BY THE CALL
 R0498 TO BLANKET AT THE IMMEDIATE RETURN LOC.

0499 5464 BLOCK 02
 0500 REF 1 4000 SETLOC FFTAG4
 0501 5464 BANK

0502 REF 1 COUNT* \$\$/DSPLA
 0503 REF 805 LAST 1338 5464 54 162 0 BLANKET TS MPAC +6
 0504 REF 1 5465 4 0160 1 CS PLAYTEM4
 0505 REF 806 LAST 1354 5466 7 0162 0 MASK MPAC +6
 0506 REF 807 LAST 1354 5467 50 161 1 INDEX MPAC +5
 0507 REF 2 LAST 1354 5470 26 160 1 ADS PLAYTEM4

0508 REF 354 LAST 1340 5471 0 0002 0 TC 0

0511 REF 57 LAST 1331 5472 0 4635 0 ENDMARK TC POSTJUMP
 0512 REF 1 5473 20326 1 CADR MARKEND

05121 REF 245 LAST 1339 5474 3 4755 1 CLEARMRK CAF ZERO
 05122 REF 16 LAST 718 5475 55 044 1 TS EXTVBACT

05123 5476 0 0004 0 +2 INHINT
 05124 REF 2 LAST 1340 5477 4 4755 0 CS XDSPBIT
 05125 REF 5 LAST 475 5500 7 0100 1 MASK FLAGWRD4
 05126 REF 6 LAST 1354 5501 54 100 1 TS FLAGWRD4

05127 5502 0 0003 1 RELINT

05128 REF 355 LAST 1354 5503 0 0002 0 TC 0

R0513 ***ALL EXTENDED VERB ROUTINES THAT HAVE AT LEAST ONE FLASHING DISPLAY MUST TCF ENDMARK OR TCF ENDEXT WHEN

R0515 FINISHED.

0516 10,2326 BANK 10
 0517 REF 1 10,2000 SETLOC DISPLAYS
 0518 10,2326 BANK

0519 REF 1 COUNT* \$\$/DSPLA

R0520 NTERONLY IS USED TO DIFFERENTIATE THE MARK ROUTINE WITH ONLY ONE RETURN TO THE USER FROM THE MARKING ROUTINE WITH
 R0522 3-RETURNS TO THE USER. THIS ROUTINE IS ONLY USED BY GOMARK1 AND GOMARK1R.

05291 REF 2 LAST 225 10,2326 0 5474 0 MARKEND TC CLEARMRK
 05297 REF 1 10,2327 1 3421 1 TCF MARKOVER

0530 REF 1 10,2330 54 155 1 GOMARK TS PLAYTEM1 ENTRANCE FOR MARK GODSP

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0531	REF	43	LAST 1317	10,2331	3 4735 1	GOMARS	CAF	BIT15	BIT15 SET FOR ALL MARK REQUESTS
0532	REF	1		10,2332	1 2500 1		TCF	GOFLASH2	
0533	REF	246	LAST 1354	10,2333	3 4755 1	KLEENEX	CAF	ZERO	CLEAN OUT EXTENDED VERBS
0534	REF	2	LAST 1354	10,2334	54 155 1	GOMARKF	TS	PLAYTEM1	ENTRANCE FOR MARK GOFLASH
0535	REF	1		10,2335	3 3031 0		CAF	MARKFMSK	MARK, FLASH
0536	REF	2	LAST 1355	10,2336	1 2500 1		TCF	GOFLASH2	
0539	REF	3	LAST 1355	10,2337	54 155 1	GOMARK2	TS	PLAYTEM1	MARK GOPERFS-3 AST. RETURNS
0540	REF	1		10,2340	3 3520 0	MARKFORM	CAF	MPEFFMSK	MARK, PERFORM, FLASH
0541	REF	3	LAST 1355	10,2341	1 2500 1		TCF	GOFLASH2	
0542	REF	4	LAST 1355	10,2342	54 155 1	GOMARK3	TS	PLAYTEM1	USED FOR 3COMP DECIMAL PERFORM
0543	REF	1		10,2343	3 3505 1		CAF	MARK3MSK	
0544	REF	4	LAST 1355	10,2344	1 2500 1		TCF	GOFLASH2	
0545	REF	5	LAST 1355	10,2345	54 155 1	GOMARK4	TS	PLAYTEM1	
0546	REF	1		10,2346	3 3506 1		CAF	MARK4MSK	MARK, PERFORM, FLASH, BLANK
0547	REF	5	LAST 1355	10,2347	1 2500 1		TCF	GOFLASH2	
0548	REF	6	LAST 1355	10,2350	54 155 1	GOMARKK	TS	PLAYTEM1	ENTRANCE FOR MARK GODSPP
0549	REF	44	LAST 1355	10,2351	3 4735 1		CAF	BIT15	
0550	REF	1		10,2352	1 2453 0		TCF	GODSPR2	
0551	REF	7	LAST 1355	10,2353	54 155 1	GOMARKFR	TS	PLAYTEM1	ENTRANCE FOR MARK GOFLASHR
0552	REF	2	LAST 1355	10,2354	3 3031 0		CAF	MARKFMSK	
0553	REF	1		10,2355	1 2637 0		TCF	GODSPRS	
0559	REF	8	LAST 1355	10,2356	54 155 1	GOMARK2R	TS	PLAYTEM1	MARK GOPERFS-3 AST. RETS+ IMMEDIATE RET.
0560	REF	2	LAST 1355	10,2357	3 3520 0		CAF	MPEFFMSK	MARK, PERFORM, FLASH
0561	REF	2	LAST 1355	10,2360	1 2637 0		TCF	GODSPRS	
05611	REF	9	LAST 1355	10,2361	54 155 1	GOMARK3R	TS	PLAYTEM1	
05612	REF	2	LAST 1355	10,2362	3 3505 1		CAF	MARK3MSK	
05613	REF	3	LAST 1355	10,2363	1 2637 0		TCF	GODSPRS	
0562	REF	134	LAST 1329	10,2364	3 4753 1	MAKEMARK	CAF	ONE	
0563	REF	1		10,2365	0 2735 1		TC	COPIES	
0564	REF	7	LAST 1354	10,2366	3 0100 0		CA	FLAGWRD4	IS NORM OR PRIO BUSY OR WAITING
0565	REF	1		10,2367	7 3521 0		MASK	OCT34300	
0566	REF	428	LAST 1340	10,2370	10 000 0		CCS	A	
0567	REF	1		10,2371	1 2427 0		TCF	CHKPRIO	
0568	REF	8	LAST 1355	10,2372	3 0100 0		CA	FLAGWRD4	IS MARK SLEEPING DUE TO ASTRO BUSY
0569	REF	1		10,2373	7 4743 1		MASK	MRKNVBIT	
0570				10,2374	0 0006 1		EXTEND		

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0571	REF 1		10,2375	1-2377-1	BZF	MARKPLAY	NO
0572	REF 146	LAST 1210	10,2376	1 5155 1	TCF	ENDOFJOB	
0594			10,2377	0 0004 0	MARKPLAY	INHINT	
0595	REF 22	LAST 1285	10,2400	4 4756 0	CS	FIVE	RESET MARK OVER NORM, SET MARK
0596	REF 9	LAST 1355	10,2401	7 0100 1	MASK	FLAGWRD4	
05965	REF 135	LAST 1355	10,2402	6 4753 1	AD	ONE	
0597	REF 10	LAST 1356	10,2403	54 100 1	TS	FLAGWRD4	
0598			10,2404	0 0003 1	RELINT		
0599	REF 1		10,2405	4 1071 1	GOGOMARK	CS	MARKFLAG
0600	REF 42	LAST 1336	10,2406	7 4747 0	MASK	BIT5	PERFORM
0601	REF 429	LAST 1355	10,2407	10 000 0	CCS	A	
0602	REF 1		10,2410	1 2413 1	TCF	MARKCOP	
0603	REF 1		10,2411	4 0370 1	CS	MARKNV	
0604	REF 2	LAST 1356	10,2412	54 370 1	TS	MARKNV	
0605	REF 136	LAST 1356	10,2413	3 4753 1	MARKCOP	CAF	ONE
0606	REF 1		10,2414	1 2616 0	TGF	PRIOPLAY	MARK INDEX
0607	REF 1		10,2415	3 0165 0	COPYTGGU	CA	MPAC2SAV
0608	REF 808	LAST 1354	10,2416	54 156 1	TS	MPAC +2	
0609	REF 1		10,2417	50 164 1	COPYPACS	INDEX	COPINDEX
0610	REF 1		10,2420	3 3531 0	CAF	PRIOOCT	
0611	REF 1		10,2421	54 162 0	TS	GENMASK	
0612	REF 2	LAST 1356	10,2422	50 164 1	INDEX	COPINDEX	
0613	REF 1		10,2423	3 1070 1	CAF	EBANKSAV	
0614	REF 1		10,2424	54 160 1	TS	TEMPOR2	ACTIVE EBANK AND FLAG
0615	REF 76	LAST 1331	10,2425	54 003 0	TS	EBANK	
0616	REF 356	LAST 1354	10,2426	0 0002 0	TC	Q	

R0617 PINCHER CHECKS TO SEE IF THE CURRENT MARK REQUEST IS MADE BY THE ASTRONAUT WHILE INTERRUPTING A GOPLAY DISPLAY
 R0619 (A NORMAL OR A PRIO). IF THE ASTRONAUT TRIES TO MARK DURING A PRIO, THE CHECK FAIL LIGHT GOES ON AND THE MARK
 R0621 REQUEST IS ENDED. IF HE TRIES TO MARK DURING A NORM, THE MARK IS ALLOWED. IN THIS CASE THE NORM IS PUT TO SLEEP
 R0623 UNTIL ALL MARKING IS FINISHED.

R0624 IF THE MARK REQUEST COMES FROM THE PROGRAM DURING A TIME THE ASTRONAUT IS NOT INTERRUPTING A NORMAL OR A
 R0626 PRIO, THE MARK REQUEST IS PUT TO SLEEP UNTIL THE +RESET ACTIVE DISPLAY IS RESPONDED TO BY THE ASTRONAUT.

0628	REF 11	LAST 1356	10,2427	3 0100 0	CHKPRIO	CA	FLAGWRD4	MARK ATTEMPT DURING PRIO
0629	REF 1		10,2430	7 3254 0	MASK	OCT24100		
0630	REF 430	LAST 1356	10,2431	10 000 0	CCS	A		
0631	REF 1		10,2432	1 3454 0	TCF	MARSLEEP		
0632	REF 12	LAST 1356	10,2433	4 0100 1	CS	FLAGWRD4		

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0633	REF	1		10,2434	7 4751 1		MASK	MKOVBIT	SET MARK OVER NORM
0634				10,2435	0 0004 0		INHINT		
0635	REF	13	LAST 1356	10,2436	26 100 1		ADS	FLAGWRD4	
0636	REF	1		10,2437	1 2534 0		TCF	SETNORM	
0637	REF	3	LAST 1356	10,2440	3 0370 0	MARKPERF	CA	MARKNV	
0638	REF	1		10,2441	7 4144 0		MASK	VERBMASK	
0639	REF	1		10,2442	1 3120 0		TCF	NV50DSP	
0640	REF	10	LAST 1355	10,2443	54 155 1	GODSP	TS	PLAYTEM1	
0641	REF	247	LAST 1355	10,2444	3 4755 1	GODSP2	CAF	ZERO	
0642	REF	6	LAST 1355	10,2445	1 2500 1		TCF	GOFLASH2	
0643	REF	11	LAST 1357	10,2446	54 155 1	GODSPRET	TS	PLAYTEM1	ENTRANCE FOR A GODSP WITH A PASTE
0644	REF	56	LAST 1327	10,2447	3 4746 0		CAF	BIT6	SET BIT6 TO GO BACK TO USER AFTER NVSUB
0645	REF	7	LAST 1357	10,2450	1 2500 1		TCF	GOFLASH2	
0646	REF	12	LAST 1357	10,2451	54 155 1	GODSPR	TS	PLAYTEM1	
0647	REF	248	LAST 1357	10,2452	3 4755 1	GODSPR1	CAF	ZERO	
0648	REF	3	LAST 1354	10,2453	54 160 1	GODSPR2	TS	PLAYTEM4	
0649	REF	249	LAST 1357	10,2454	3 4755 1		CAF	ZERO	* DONT MOVE
0650	REF	1		10,2455	1 2641 1		TCF	GODSPRS1	

R0651 CLEANDSP IS USED FOR CLEARING OUT A NORMAL DISPLAY THAT IS PRESENTLY ACTIVE OR A NORMAL DISPLAY THAT IS
 R0653 SET-UP TO BE STARTED OR RESTARTED.

R0654 NORMALLY THE USER WILL NOT NEED TO USE THIS ROUTINE SINCE A NEW NORMAL DISPLAY AUTOMATICALLY CLEARS OUT AN
 R0656 OLD DISPLAY.

R0657 CALLING SEQUENCE FOR CLEANDSP-

A0658						TC	BANKCALL
A0659						CADR	CLEANDSP

0660	REF	250	LAST 1357	10,2456	3 4755 1	CLEANDSP	CAF	ZERO
0661	REF	13	LAST 1357	10,2457	54 155 1	REFLASH	TS	PLAYTEM1

0662	REF	1		10,2460	3 3504 0		CAF	REDOMASK	FLASH AND PERMIT
0663	REF	8	LAST 1357	10,2461	1 2500 1		TCF	GOFLASH2	

0664	REF	14	LAST 1357	10,2462	54 155 1	REFLASHP	TS	PLAYTEM1
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0665	REF	2	LAST 1357	10,2463	3 3504 0		CAF	REDOMASK	FLASH AND PERMIT
0666	REF	4	LAST 1355	10,2464	1 2637 0		TCF	GODSPRS	

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0667	REF 15	LAST 1357	10,2465	54 155 1	REGODSP	TS	PLAYTEM1	
0668	REF 76	LAST 1325	10,2466	3 4736 1	CAF	BIT14		
0669	REF 9	LAST 1357	10,2467	1 2500 1	TCF	GOFLASH2		
0670	REF 16	LAST 1358	10,2470	54 155 1	REGODSPR	TS	PLAYTEM1	
0671	REF 77	LAST 1358	10,2471	3 4736 1	CAF	BIT14		
0672	REF 2	LAST 1355	10,2472	1 2453 0	TCF	GODSPR2		
06721	REF 17	LAST 1358	10,2473	54 155 1	CLOCPLAY	TS	PLAYTEM1	
06722	REF 1		10,2474	3 3543 0	CAF	CLOCKCON		
06723	REF 10	LAST 1358	10,2475	1 2500 1	TCF	GOFLASH2		
0673	REF 18	LAST 1358	10,2476	54 155 1	GOFLASH	TS	PLAYTEM1	
0674	REF 50	LAST 1332	10,2477	3 4750 1	CAF	BIT4	LEAVE ONLY FLASH BIT SET	
0675	REF 4	LAST 1357	10,2500	54 160 1	GOFLASH2	TS	PLAYTEM4	
0676	REF 1		10,2501	0 2722 1	TC	SAVELOGS		
0677			10,2502	0 0003 1		RELINT		
0678	REF 1		10,2503	1 2546 0	TCF	MAKEPLAY	BRANCH DIRECT WITH NO SEPARATE JOB CALL	
0679	REF 19	LAST 1358	10,2504	54 155 1	PRIODSPR	TS	PLAYTEM1	
0680	REF 1		10,2505	3 3523 0	CAF	BITS7+4		
0681	REF 5	LAST 1357	10,2506	1 2637 0	TCF	GODSPRS		
0682	REF 20	LAST 1358	10,2507	54 155 1	PRIODSP	TS	PLAYTEM1	
0683	REF 2	LAST 1358	10,2510	3 3523 0	SETPRIO	CAF	BITS7+4	
0684	REF 11	LAST 1358	10,2511	1 2500 1	TCF	GOFLASH2		
0685	REF 251	LAST 1357	10,2512	3 4755 1	MAKEPRIO	CAF	ZERO	
0686	REF 3	LAST 1356	10,2513	54 164 0		TS	COPINDEX	
0687	REF 1		10,2514	0 3374 1	TC	LINUSCHR		
0688	REF 1		10,2515	1 2522 1	TCF	HIPRIO	LINUS RETURN	
0689	REF 14	LAST 1357	10,2516	3 0100 0	CA	FLAGWRD4		
0690	REF 1		10,2517	7 3542 0	MASK	OCT20100	IS PRIO IN ENDIDLE OR BUSY	
0691	REF 431	LAST 1356	10,2520	10 000 0	CCS	A		
0692	REF 1		10,2521	1 2575 0	TCF	PRIOBORT	YES, ABORT	
0693	REF 15	LAST 1358	10,2522	3 0100 0	HIPRIO	CA	FLAGWRD4	MARK ACTIVE
0694	REF 1		10,2523	7 5642 0	MASK	OCT40400		
0695			10,2524	0 0006 1		EXTEND		
0696	REF 1		10,2525	1 2530 1	BZF	ASKIFNRM	NO	

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0697	REF 252	LAST 1358	10,2526	3 4755 1	SETMARK	CAF	ZERO	
0698	REF 1		10,2527	1 2774 0	TCF	JOBXCHS		
0699	REF 16	LAST 1358	10,2530	3 0100 0	ASKIFNRM	CA	FLAGWRD4	NORMAL ACTIVE
0700	REF 1		10,2531	7 3540 1	MASK	OCT10200		BITS 13+8
0701			10,2532	0 0006 1	EXTEND			
0702	REF 1		10,2533	1 2536 1	BZF	OKTOCOPY		NO
0703	REF 137	LAST 1356	10,2534	3 4753 1	SETNORM	CAF	ONE	
0704	REF 2	LAST 1359	10,2535	1 2774 0	TCF	JOBXCHS		
0705	REF 1		10,2536	0 2734 0	OKTOCOPY	TC	COPYNORM	
0706	REF 1		10,2537	0 3205 0	TC	WITCHONE		
0707	REF 8	LAST 1328	10,2540	0 5137 1	TC	JOBWAKE		
0708	REF 1		10,2541	0 3222 0	TC	XCHTOEND		
0709	REF 20	LAST 1304	10,2542	3 0025 0	REDOPRIO	CA	TIME1	SAVE TIME PRIODSP SENT OUT
0710	REF 1		10,2543	55 165 0	TS	PRIOTIME		
0711	REF 253	LAST 1359	10,2544	3 4755 1	KEEPPRIO	CAF	ZERO	START UP PRIOD DISPLAY
0712	REF 2	LAST 1356	10,2545	1 2616 0	TCF	PRIODPLAY		
0713	REF 33	LAST 1331	10,2546	3 0167 1	MAKEPLAY	CA	PRIORITY	SAVE USERS PRIORITY
07131	REF 3	LAST 1331	10,2547	7 7725 1	MASK	PRI037		
07132	REF 1		10,2550	54 163 1	TS	USERPRIO		
07133	REF 1		10,2551	3 7721 1	CAF	PRI033		RAISE PRIORITY FOR FAST JOBS AFTER WAKE
07134	REF 14	LAST 895	10,2552	0 5146 1	TC	PRI0CHNG		
07135	REF 5	LAST 1358	10,2553	3 0160 0	CA	PLAYTEM4		IS IT MARK OR PRIOD OR NORM
0714	REF 1		10,2554	7 3522 0	MASK	BIT515+7		
0715	REF 432	LAST 1358	10,2555	10 000 0	CCS	A		
0716	REF 1		10,2556	1 2512 1	TCF	MAKEPRIO		ITS PRIOD
0717	REF 1		10,2557	1 2561 0	TCF	IFLEGAL		
0718	REF 1		10,2560	1 2364 0	TCF	MAKEMARK		ITS MARK
0719	REF 85	LAST 1329	10,2561	3 4752 0	IFLEGAL	CAF	TWO	
0720	REF 4	LAST 1358	10,2562	54 164 0	TS	COPINDEX		
0721	REF 2	LAST 1358	10,2563	0 3374 1	TC	LINUSCHR		
0722	REF 1		10,2564	1 2577 1	TCF	UKTOPLAY		LINUS RETURN
0723	REF 3	LAST 230	10,2565	4 1072 1	CS	EBANKTEM		
0724	REF 51	LAST 1358	10,2566	7 4750 0	MASK	BIT4		
0725	REF 433	LAST 1359	10,2567	10 000 0	CCS	A		
0726	REF 2	LAST 1359	10,2570	1 2577 1	TCF	OKTOPLAY		NO
0727	REF 17	LAST 1359	10,2571	3 0100 0	CA	FLAGWRD4		WAS NORM ASLEEP

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0728	REF	1		10,2572	7 3513 1		MASK	NBUSHMASK	ARE ANY NORMS ASLEEP
0729				10,2573	0-0006-1		EXTEND		
0730	REF	3	LAST-1359	10,2574	1-2577-1		BZF	OKTOPLAY	NO
0731	REF	8	LAST-1331	10,2575	0-5652-0	PRIOBORT	TC	POOD00	
0732				10,2576	01502-1		OCT	1502	
0733	REF	1		10,2577	0 2736 1	OKTOPLAY	TC	COPILS2	
07331	REF	2	LAST-1359	10,2600	3-0163-0		CA	USERPRIO	
07332				10,2601	0-0006-1		EXTEND		
07333	REF	25	LAST-1299	10,2602	04-007-1		ROR	SUPERBNK	
07334	REF	3	LAST-227	10,2603	54-366-0		TS	RESTREG	
0737	REF	18	LAST-1359	10,2604	3-0100-0		CA	FLAGWRD4	PRIO OR MARK GOING
0738	REF	1		10,2605	7 3514 0		MASK	P4MASK	
0739	REF	434	LAST-1359	10,2606	10-000-0		CCS	A	
0740	REF	1		10,2607	1-2754-1		TCF	GOSLEEPS	YES
0741				10,2610	1-2612-1		TCF	+2	
0742	REF	2	LAST-1360	10,2611	1-2754-1		TCF	GOSLEEPS	MARK GOING
0743	COULD PUT NORM BUSY CHECK HERE TO SAVE TIME								
0744	REF	2	LAST-1359	10,2612	0-3205-0		TC	WITCHONE	IS IT NVSUB BUSY. ENDIDLE OR NOONE
0745	REF	9	LAST-1359	10,2613	0-5137-1		TC	JOBWAKE	
0746	REF	2	LAST-1359	10,2614	0-3222-0		TC	XCHTOEND	
0747	REF	86	LAST-1359	10,2615	3-4752-0	PLAYJUM1	CAF	TWO	
0748	REF	5	LAST-1359	10,2616	54-164-0	PRIOPLAY	TS	COPINDEX	
0749	REF	1		10,2617	1-3070-1		TCF	GOPLAY	
0750	REF	21	LAST-1358	10,2620	54-155-1	EXDSPRET	TS	PLAYTEM1	
0751	REF	1		10,2621	3-7734-0		CAF	BIT15+6	
0752	REF	12	LAST-1358	10,2622	1-2500-1		TCF	GOFLASH2	
0753	REF	2	LAST-946	10,2623	55-045-0	GOPERF1	TS	NORMTEM1	STORE DESIRED CHECKLIST VALUE
0754	REF	1		10,2624	3-3476-1		CAF	VO1N25	USED TO DISPLAY CHECKLIST VALUE IN R1
0755	REF	22	LAST-1360	10,2625	54-155-1	GOPERFS	TS	PLAYTEM1	
0756	REF	1		10,2626	3-3475-1		CAF	PERF2MSK	LEAVE ONLY FLASH. PERFORM. BLANKING
0757	REF	13	LAST-1360	10,2627	1-2500-1		TCF	GOFLASH2	
0758	REF	23	LAST-1360	10,2630	54-155-1	GOPERF2	TS	PLAYTEM1	DESIRED VERB-NOUN TO DISPLAY R1,R2,R3
0759	REF	1		10,2631	3-3501-0		CAF	PERF2MSK	
0760	REF	14	LAST-1360	10,2632	1-2500-1		TCF	GOFLASH2	

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0764	REF 1		10,2633	0 2715 0	GOPERF4	TC	PURRS4	
0765	REF 15	LAST 1360	10,2634	1 2500 1		TCF	GOFLASH2	
0766	REF 24	LAST 1360	10,2635	54 155 1	GOFLASHR	TS	PLAYTEM1	
0767	REF 52	LAST 1359	10,2636	3 4750 1		CAF	HIT4	LEAVE ONLY FLASH BIT SET
0768	REF 6	LAST 1359	10,2637	54 160 1	GODSPRS	TS	PLAYTEM4	
0769	REF 38	LAST 1324	10,2640	3 6245 1		CAF	THREE	
0770			10,2641	0 0004 0	GODSPRS1	INHINT		IMMEDIATE RETURN IS CALL CADR +4
0771	REF 16	LAST 1328	10,2642	54 072 0		TS	RUPTREG3	
0772	REF 34	LAST 1359	10,2643	3 0167 1		CA	PRIORITY	MAKE DISPLAY ONE HIGHER THAN USER
0773	REF 4	LAST 1359	10,2644	7 7725 1		MASK	PRI037	
0774	REF 11	LAST 1112	10,2645	54 063 0		TS	NEWPRIO	
07741	REF 7	LAST 1361	10,2646	3 0160 0		CA	PLAYTEM4	IS THIS A FLASHING R DISPLAY
07742	REF 53	LAST 1361	10,2647	7 4750 0		MASK	BIT4	
07743	REF 435	LAST 1360	10,2650	10 000 0		CCS	A	
07744	REF 1		10,2651	1 2657 0		TCF	VACDSP	YES, MAKE DSPLAY JOB A VAC
07745	REF 12	LAST 1361	10,2652	3 0063 1		CA	NEWPRIO	NO, MAKE DSPLAY JOB A NOVAC
07746	REF 29	LAST 1338	10,2653	0 5072 1		TC	NOVAC	
07747	REF 4	LAST 781	E7,1471			EBANK=	WHOCARES	
07748	REF 2	LAST 1358	10,2654	02546 1		2CADR	MAKEPLAY	
07748			10,2655	20067 1				
07749	REF 1		10,2656	1 2665 1		TCF	BOTHJOBS	
0775	REF 44	LAST 1331	10,2657	3 0006 1	VACDSP	CA	BBANK	
0776			10,2660	0 0006 1		EXTEND		
0777	REF 26	LAST 1360	10,2661	04 007 1		ROR	SUPERBNK	
0778	REF 235	LAST 1336	10,2662	54 001 1		TS	L	
0779	REF 1		10,2663	3 3537 0		CAF	MAKEGEN	
0780	REF 3	LAST 369	10,2664	0 5116 1		TC	SPVAC	
0781	REF 2	LAST 1358	10,2665	0 2722 1	BOTHJOBS	TC	SAVELOCS	COPY TEMPS INTO PERMANENT REGISTERS
0782			10,2666	0 0006 1		EXTEND		SAVE NVWORD AND USERS MPAC +2
0783	REF 809	LAST 1356	10,2667	3 0156 0		DCA	MPAC +1	
0784	REF 25	LAST 1338	10,2670	50 064 0		INDEX	LOCCTR	
0785	REF 810	LAST 1361	10,2671	52 156 1		DXCH	MPAC +1	
0786			10,2672	0 0006 1		EXTEND		SAVE USERS CADR, FLAGS AND EBANK
0787	REF 811	LAST 1361	10,2673	3 0160 0		DCA	MPAC +3	
0788	REF 26	LAST 1361	10,2674	50 064 0		INDEX	LOCCTR	
0789	REF 812	LAST 1361	10,2675	52 160 1		DXCH	MPAC +3	
0790	REF 27	LAST 1361	10,2676	3 0064 0		CA	LOCCTR	
0791	REF 813	LAST 1361	10,2677	54 161 0		TS	MPAC +5	

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0792	REF	1		10,2700	0 2727 1	TC	SAVELOGR	
0793				10,2701	0 0003 1	RELINT		
0794	REF	18	LAST 1294	10,2702	1 4640 0	TCF	BANKJUMP	CALL CADR +4
0795	REF	3	LAST 1360	10,2703	55 045 0	GOPERF1R TS	NORMTEM1	DESIRED CHECKLIST VALUE
0796	REF	2	LAST 1360	10,2704	3 3476 1	CAF	VO1N25	DISPLAYS CHECKLIST VALUE IN R1
0797	REF	25	LAST 1361	10,2705	54 155 1	GOPERFRS TS	PLAYTEM1	
0798	REF	2	LAST 1360	10,2706	3 3475 1	CAF	PERFMASK	LEAVE ONLY FLASH, PERFORM, BLANKING
0799	REF	6	LAST 1358	10,2707	1 2637 0	TCF	GODSPRS	
0800	REF	26	LAST 1362	10,2710	54 155 1	GOPERF2R TS	PLAYTEM1	DESIRED VERB-NOUN TO DISPLAY R1,R2,R3
0801	REF	2	LAST 1360	10,2711	3 3501 0	CAF	PERF2MSK	
0802	REF	7	LAST 1362	10,2712	1 2637 0	TCF	GODSPRS	
0806	REF	2	LAST 1361	10,2713	0 2715 0	GOPERF4R TC	PURRS4	
0807	REF	8	LAST 1362	10,2714	1 2637 0	TCF	GODSPRS	
0808	REF	8	LAST 976	10,2715	55 144 0	PURRS4 TS	OPTION1	DESIRED OPTION CODE
0809	REF	1		10,2716	3 3502 0	CAF	VO4N06	
0810	REF	27	LAST 1362	10,2717	54 155 1	TS	PLAYTEM1	
0811	REF	1		10,2720	3 3503 1	CAF	PERF4MSK	FLASH, PERFORM AND BLANK R3
0812	REF	357	LAST 1356	10,2721	0 0002 0	TC	Q	
0813				10,2722	0 0004 0	SAVELOGS	INHINT	
0815	REF	1		10,2723	4 3512 0	CS	GCT400	EBANK BITS
0816	REF	8	LAST 1361	10,2724	7 0160 1	MASK	PLAYTEM4	
0817	REF	77	LAST 1356	10,2725	6 0003 1	AD	EBANK	
0818	REF	9	LAST 1362	10,2726	54 160 1	TS	PLAYTEM4	
0819	REF	358	LAST 1362	10,2727	22 002 0	SAVELOGR LXCH	Q	
0820	REF	14	LAST 1330	10,2730	0 4645 1	TC	MAKECADR	
0821	REF	1		10,2731	54 157 0	TS	PLAYTEM3	
0822	REF	17	LAST 1361	10,2732	6 0072 1	AD	RUPTREG3	NOT USED FOR NON-R ROUTINES
0823	REF	236	LAST 1361	10,2733	0 0001 0	TC	L	
0824	REF	254	LAST 1359	10,2734	3 4755 1	COPYNORM CAF	ZERO	
0825	REF	6	LAST 1360	10,2735	54 164 0	COPIES TS	COPINDEX	
0826				10,2736	0 0004 0	COPIES2	INHINT	
0827	REF	10	LAST 1362	10,2737	3 0160 0	CA	PLAYTEM4	FLAGWORD

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0828	REF	7	LAST 1362	10,2740	50 164 1	INDEX	COPINDEX	
0829	REF	2	LAST 1356	10,2741	55 070 0	TS	EBANKSAV	EQUIV TO DSPFLG
0830	REF	1		10,2742	7 3530 0	MASK	CADRMASK	FLASH AND GODSPRET
0831				10,2743	0 0006 1	EXTEND		
0832	REF	1		10,2744	1 2750 0	BZF	SKIPADD	
0833	REF	2	LAST 1362	10,2745	3 0157 1	CA	PLAYTEM3	
0834	REF	8	LAST 1363	10,2746	50 164 1	INDEX	COPINDEX	
0835	REF	2	LAST 195	10,2747	54 372 0	TS	CADRFLSH	
0836	REF	28	LAST 1362	10,2750	3 0155 0	SKIPADD	CA	PLAYTEM1
0837	REF	9	LAST 1363	10,2751	50 164 1	INDEX	COPINDEX	VERB NOUN
0838	REF	2	LAST 745	10,2752	54 367 1	TS	NVWORD	
0842	REF	1		10,2753	1 3231 0	TCF	RELINTQ	
0843	REF	10	LAST 1363	10,2754	50 164 1	GOSLEEPS	INDEX	COPINDEX
0844	REF	2	LAST 1356	10,2755	3 3531 0	CA	PRI00CT	
0845	REF	1		10,2756	7 2760 0	MASK	WAITMASK	
0846	REF	1		10,2757	0 3544 1	TC	UPENT2	
0847				10,2760	03004 0	WAITMASK	GCT	3004
0848	REF	138	LAST 1359	10,2761	4 4753 0	CS	ONE	
0849	REF	11	LAST 1363	10,2762	6 0164 1	AD	COPINDEX	
0850	REF	1		10,2763	54 154 0	TS	FACEREG	
0851	REF	2	LAST 1363	10,2764	50 154 1	XCHSLEEP	INDEX	FACEREG
0852	REF	1		10,2765	3 3510 0	CAF	WAKECADR	
0853				10,2766	0 0004 0	INHINT		
0854	REF	10	LAST 1360	10,2767	0 5137 1	TC	JOBWAKE	FIND CADR IN JOB AREA
0855	REF	3	LAST 1360	10,2770	0 3222 0	TC	XCHTUEND	CAUSES AWAKENED JOB TO GO TO ENDOFJOB
0858	REF	3	LAST 1363	10,2771	50 154 1	INDEX	FACEREG	REPLACE SAME CADR BUT NEW JOB AREA
0859	REF	2	LAST 1363	10,2772	3 3510 0	CAF	WAKECADR	
0860	REF	7	LAST 1330	10,2773	1 5133 1	TCF	JUBSLEEP	
0861	REF	4	LAST 1363	10,2774	54 154 0	JOBXCHS	TS	FACEREG
0862	REF	3	LAST 1360	10,2775	0 3205 0	TC	WITCHONE	
0863	REF	11	LAST 1363	10,2776	0 5137 1	TC	JOBWAKE	
0864	REF	5	LAST 1363	10,2777	3 0154 1	CA	FACEREG	
0865	REF	28	LAST 1361	10,3000	50 064 0	INDEX	LOCCTR	
0866	REF	6	LAST 1363	10,3001	54 154 0	TS	FACEREG	
0867	REF	1		10,3002	3 3015 0	CAF	XCHQADD	
0868	REF	1		10,3003	0 3223 1	TC	XCHNYLOC	
0869	REF	7	LAST 1363	10,3004	50 154 1	INDEX	FACEREG	
0870	REF	1		10,3005	3 3532 0	CA	MARKOCT	
0871	REF	1		10,3006	7 3534 1	MASK	IDLESLEP	

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0872	REF	1		10,3007	0 3554 0	TC	DOWNENT2	
0873				10,3010	74004 0	IDLEMASK OCT	74004	* DONT MOVE
0874	REF	8	LAST 1363	10,3011	50 154 1	INDEX	FACEREG	BIT SHOWS PRIO INTERRUPTED NORM OR MARK
0875	REF	43	LAST 1356	10,3012	3 4747 1	CA	BIT5	BIT5 FOR MARK, BIT4 FOR NORMAL
0876	REF	29	LAST 1322	10,3013	6 4751 0	AD	FOUR	
0877	REF	2	LAST 1363	10,3014	0 3544 1	TC	UPENT2	FLAG ROUTINE DOES RELINT
0878	REF	1		10,3015	02764 0	XCHQADD GENADR	XCHSLEEP	* DONT MOVE
0879	REF	19	LAST 1360	10,3016	3 0100 0	CA	FLAGWRD4	
0880	REF	2	LAST 1357	10,3017	7 4751 1	MASK	MKOVBIT	MARK OVER NORM ?
0881	REF	436	LAST 1361	10,3020	10 000 0	CCS	A	
0882	REF	2	LAST 1356	10,3021	0 2377 0	GENMARK TC	MARKPLAY	USED AS GENADR FOR JOBWAKE
0883	REF	2	LAST 1359	10,3022	1 2536 1	TCF	OKTOCOPY	
0884	REF	255	LAST 1362	10,3023	3 4755 1	MARKWAKE CAF	ZERO	
0885	REF	2	LAST 1356	10,3024	54 160 1	WAKEPLAY TS	TEMPOR2	
0886	REF	3	LAST 1364	10,3025	50 160 0	INDEX	TEMPOR2	
0887	REF	1		10,3026	3 3524 1	CA	BITS5+11	
0888	REF	30	LAST 1364	10,3027	6 4751 0	AD	FOUR	
0889	REF	2	LAST 1364	10,3030	0 3554 0	TC	DOWNENT2	
0890				10,3031	40010 1	MARKFMSK OCT	40010	***DONT MOVE
0891	REF	4	LAST 1364	10,3032	50 160 0	INDEX	TEMPOR2	
0892	REF	3	LAST 1363	10,3033	3 3510 0	CAF	WAKECADR	
0893				10,3034	0 0004 0	INHINT		
0894	REF	12	LAST 1363	10,3035	0 5137 1	TC	JOBWAKE	
0895	REF	1		10,3036	1 3335 0	TCF	ENDRET	
0896	ALL .1 RESTARTS BRANCH DIRECTLY TO INITDSP. NORMAL DISPLAYS ARE THE ONLY DISPLAYS ALLOWED TO USE .1 RESTARTS							
0898	INITDSP FIRST RESTORES THE EBANK AND THE SUPERBANK TO THE MOST RECENT NORMAL EBANK AND SUPERBANK.							
0900	IF THE MOST RECENT NORMAL DISPLAY REQUEST WAS NOT FINISHED, CONTROL IS SENT BACK TO THE LAST NORMAL USER.							
0902	OTHERWISE THE NORMAL DISPLAY SET UP IN THE NORMAL DISPLAY REGS IS STARTED UP IMMEDIATELY.							
0904	REF	4	LAST 1359	10,3037	3 1072 0	INITDSP CA	EBANKTEM	RESTORE MOST RECENT NORMAL EBANK
0905	REF	78	LAST 1362	10,3040	54 003 0	TS	EBANK	
0906	REF	4	LAST 1360	10,3041	3 0366 1	CA	RESTREG	SUPERBANK AND JOB PRIORITY
0907	REF	1		10,3042	0 4727 1	TC	SUPERSW	RESTORE SUPERBANK
0908	REF	5	LAST 1361	10,3043	7 7725 1	MASK	PRIO37	
0909	REF	15	LAST 1359	10,3044	0 5146 1	TC	PRIOCHNG	
0910	REF	39	LAST 1361	10,3045	4 6245 0	CS	THREE	
0911	REF	3	LAST 231	10,3046	6 0374 1	AD	TEMPFLSH	
0912	REF	19	LAST 1362	10,3047	1 4640 0	TCF	BANKJUMP	
0913				10,3050	0 0003 1	PINBRNCH	RELINT	FOR GOPIN USERS
09135	REF	1		10,3051	3 1073 1	CA	MARK2PAC	NEEDED TO SAVE MPAC +2 FOR MARK USERS

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0914	REF 814	LAST 1361	10,3052	54 156 1	TS	MPAC +2	ONLY
0915	REF 20	LAST 1364	10,3053	3 0100 0	CA	FLAGWRD4	PINBRANCH CONDITION
0916	REF 1		10,3054	7 7740 1	MASK	PINMASK	
0917	REF 437	LAST 1364	10,3055	10 000 0	CCS	A	
0918			10,3056	1 3061 1	TCF	+3	
0919	REF 1		10,3057	1 3471 1	TCF	ERASER	** NOTHING IN ENDIDLE
0920	REF 3	LAST 1364	10,3060	1 2377 1	TCF	MARKPLAY	
0921	REF 72	LAST 1335	10,3061	0 5504 0	NORMBNCH TC	UPFLAG	SET PINBRANCH BIT
0922	REF 1		10,3062	00105 0	ADRES	PINBRFLG	
0923	REF 1		10,3063	3 4736 1	CAF	PRIODBIT	PPIO INTERRUPTED
0924	REF 21	LAST 1365	10,3064	7 0100 1	MASK	FLAGWRD4	
0925	REF 438	LAST 1365	10,3065	10 000 0	CCS	A	
0926	REF 1		10,3066	1 2544 1	TCF	KEEPPRIO	
0927	REF 1		10,3067	1 2615 0	TCF	PLAYJUM1	
0928	REF 1		10,3070	0 2417 1	NVDSP TC	COPYPACS	
09281	REF 5	LAST 1364	10,3071	3 0160 0	CA	TEMPOR2	SET UP BLANK BITS FOR NVMONOPT IN CASE
09282	REF 22	LAST 1331	10,3072	7 4757 1	MASK	SEVEN	USER REQUESTS BLANKING MONITOR
09283	REF 237	LAST 1362	10,3073	54 001 1	TS	L	
0929	REF 46	LAST 1322	10,3074	4 4737 1	CS	BIT13	
0930	REF 12	LAST 1363	10,3075	50 164 1	INDEX	COPINDEX	
0931	REF 1		10,3076	7 1070 0	MASK	DSPFLG	
0932	REF 13	LAST 1365	10,3077	50 164 1	INDEX	COPINDEX	
0933	REF 2	LAST 1365	10,3100	55 070 0	TS	DSPFLG	
0934	REF 41	LAST 1331	10,3101	7 4744 0	MASK	BIT8	BIT8 SET IF DEC MARK PERFORM DISPLAY
0935	REF 33	LAST 1267	10,3102	54 141 1	TS	TEM1	
0936	REF 815	LAST 1365	10,3103	3 0156 0	CA	MPAC +2	
0937	REF 2	LAST 1356	10,3104	54 165 1	TS	MPAC2SAV	
0938	REF 2	LAST 1364	10,3105	55 073 0	TS	MARK2PAC	* FOR DISK ONLY *
0939	REF 14	LAST 1365	10,3106	50 164 1	INDEX	COPINDEX	
0940	REF 3	LAST 1363	10,3107	10 367 1	CCS	NVWORD	
0941	REF 1		10,3110	1 3117 1	TCF	NVDSP1	
0942	REF 1		10,3111	1 3233 1	TCF	CLEANEND	
0943	REF 4	LAST 1357	10,3112	4 0370 1	CS	MARKNV	
0944	REF 5	LAST 1365	10,3113	54 370 1	TS	MARKNV	IN CASE MARKPLAY AWAKENED AFTER SLEEPING
0945	REF 12	LAST 1326	10,3114	7 6074 0	MASK	LOW7	
0946	REF 1		10,3115	6 3515 0	AD	V05NOOM1	
0947	REF 34	LAST 1365	10,3116	6 0141 0	AD	TEM1	
0948	REF 139	LAST 1363	10,3117	6 4753 1	NVDSP1 AD	ONE	
0949	REF 1		10,3120	0 4155 1	NV50DSP TC	NVMONOPT	
0950	REF 1		10,3121	1 3245 0	TCF	REST	IF BUSY

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0951	REF	6	LAST	468	10,3122	0 4433 1	TC	FLASHOFF	IN CASE OF EXTENDED VERB NON FLASH
0952	REF	1			10,3123	0 2415 0	TC	COPYTOGO	MPACS DESTROYED BY NVSUB
0953	REF	94	LAST	1357	10,3124	0 5516 0	TC	DOWNFLAG	UNSET SLEEPING BITS
0954	REF	1			10,3125	00102 1	ADRES	MRKNVFLG	
09541	REF	95	LAST	1366	10,3126	0 5516 0	TC	DOWNFLAG	
09542	REF	1			10,3127	00103 0	ADRES	NRMNVFLG	
09543	REF	96	LAST	1366	10,3130	0 5516 0	TC	DOWNFLAG	
09544	REF	1			10,3131	00104 1	ADRES	PRUNVFLG	
0955	REF	6	LAST	1365	10,3132	3 0160 0	BLANKCHK CA	TEMPOR2	BLANK BITS 1,2,3 IF SET
0956	REF	2	LAST	439	10,3133	0 4255 1	TC	BLANKSUB	
0957	REF	1			10,3134	1 3070 1	TCF	NVDSP	
0958	REF	44	LAST	1364	10,3135	3 4747 1	PERFCHK CAF	BIT5	BIT 5 FOR PERFORM
0959	REF	7	LAST	1366	10,3136	7 0160 1	MASK	TEMPOR2	
0960	REF	439	LAST	1365	10,3137	10 000 0	CCS	A	IS THIS A GOPERF DISPLAY
0961	REF	1			10,3140	1 3163 1	TCF	1STOR2ND	YES
0962	REF	54	LAST	1361	10,3141	3 4750 1	GOANIDLE CAF	BIT4	
0963	REF	8	LAST	1366	10,3142	7 0160 1	MASK	TEMPOR2	
0964	REF	440	LAST	1366	10,3143	10 000 0	CCS	A	
0965	REF	1			10,3144	1 3260 1	TCF	FLASHSUB	IT IS
0966	REF	9	LAST	1366	10,3145	4 0160 1	CS	TEMPOR2	IS THIS A GODSPRET
0967	REF	57	LAST	1357	10,3146	7 4746 1	MASK	BIT6	
0968	REF	441	LAST	1366	10,3147	10 000 0	CCS	A	
0969	REF	1			10,3150	1 3155 1	TCF	ISITN00	
09691	REF	15	LAST	1365	10,3151	50 164 1	INDEX	COPINDEX	
09692	REF	3	LAST	1363	10,3152	3 0372 1	CA	CADRFLSH	
09693	REF	816	LAST	1365	10,3153	54 157 0	TS	MPAC +3	
09694	REF	1			10,3154	1 3353 0	TCF	ENDIT	
0972	REF	16	LAST	1366	10,3155	50 164 1	ISITN00 INDEX	COPINDEX	IS THIS A PASTE
0973	REF	4	LAST	1365	10,3156	3 0367 0	CA	NVWORD	
0974	REF	13	LAST	1365	10,3157	7 6074 0	MASK	LOW7	CHECK MADE FOR PINBRNCH AND PRIO ON MARK
0975					10,3160	0 0006 1	EXTEND		
0976	REF	2	LAST	1366	10,3161	1 3260 1	BZF	FLASHSUB	YES, ASSUME PASTE ALWAYS ON FLASH
0977	REF	147	LAST	1356	10,3162	1 5155 1	TCF	ENDOFJOB	NOT FLASH, NOT GOPERF, THEREFORE EXIT
0978	REF	10	LAST	1366	10,3163	3 0160 0	1STOR2ND CA	TEMPOR2	
0979	REF	47	LAST	1365	10,3164	7 4737 1	MASK	BIT13	
0980	REF	442	LAST	1366	10,3165	10 000 0	CCS	A	
0981	REF	1			10,3166	1 3141 1	TCF	GOANIDLE	SECOND
0982	REF	48	LAST	1366	10,3167	3 4737 0	CA	BIT13	
0983	REF	17	LAST	1366	10,3170	50 164 1	INDEX	COPINDEX	
0984	REF	3	LAST	1365	10,3171	27 070 0	ADS	DSPFLG	
09845					10,3172	22 007 0	ZL		

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0985			10,3173	0 0006 1	EXTEND		IS IT MARK
0986	REF 1		10,3174	6 2440 0	BZMF	MARKPERF	YES
0987	REF 36	LAST 1302	10,3175	7 4740 1	MASK	BIT12	
09871			10,3176	0 0006 1	EXTEND		
09872	REF 1		10,3177	1 3203 1	BZF	V50PASTE	
09874	REF 3	LAST 745	10,3200	4 1067 0	CS	NVWORD1	NVWORD1= -0 IS V97. NVWORD1= -400 IS V99
098741	REF 1		10,3201	6 3541 1	AD	V97N00	
09875	REF 2	LAST 1357	10,3202	1 3120 0	TCF	NV50DSP	
0988	REF 1		10,3203	3 3500 1	CAF	V50N00	
0989	REF 3	LAST 1367	10,3204	1 3120 0	TCF	NV50DSP	DISPLAY SECOND PART OF GUPERF
0990	REF 45	LAST 1366	10,3205	4 4747 0	WITCHONE CS	BIT5	TURN OFF KEY RELEASE LIGHT
0991			10,3206	0 0006 1	EXTEND		
0992	REF 35	LAST 1339	10,3207	03 011 1	WAND	DSALMOUT	
0993	REF 22	LAST 1365	10,3210	3 0100 0	CA	FLAGWRD4	
0994	REF 1		10,3211	7 3516 1	MASK	NVBUSMSK	IS IT NVSUB ASLEEP
0995	REF 443	LAST 1366	10,3212	10 000 0	CCS	A	
0996	REF 140	LAST 1365	10,3213	3 4753 1	CAF	ONE	
0997	REF 238	LAST 1365	10,3214	54 001 1	TS	L	
0998	REF 256	LAST 1364	10,3215	3 4755 1	CAF	ZERO	
0999	REF 239	LAST 1367	10,3216	50 001 0	INDEX	L	
1000	REF 11	LAST 458	10,3217	57 042 0	XCH	CADRSTOR	
1001			10,3220	0 0004 0	INHINT		
1002	REF 359	LAST 1362	10,3221	0 0002 0	TC	Q	
1003	REF 6	LAST 448	10,3222	3 4217 1	XCHTOEND CAF	ENDINST	TC ENDOFJOB REPLACES GENADR IN LOC FOR
1004	REF 29	LAST 1363	10,3223	56 064 0	XCHNYLOC XCH	LOCCTR	WAS THIS ADDRESS SLEEPING
1005			10,3224	0 0006 1	EXTEND		
1006	REF 2	LAST 1363	10,3225	6 3231 1	BZMF	RELINTQ	NO
1007	REF 30	LAST 1367	10,3226	56 064 0	XCH	LOCCTR	YES
1008	REF 31	LAST 1367	10,3227	50 064 0	INDEX	LOCCTR	
1009	REF 45	LAST 1328	10,3230	54 164 0	TS	LUC	
1010			10,3231	0 0003 1	RELINTQ	RELINT	
1011	REF 360	LAST 1367	10,3232	0 0002 0	TC	Q	BACK TO USER
1012	REF 4	LAST 889	10,3233	3 7720 0	CLEANEND CAF	PRIG32	ONE LOWER THAN DISPLAYS SLEEPING
1014	REF 44	LAST 1308	10,3234	0 5105 0	TC	FINDVAC	
1015	REF 2	LAST 211	0371		EBANK=	NVSAVE	
1016	REF 1		10,3235	04231 0	2CADR	JAMTERM	
1016	REF 1		10,3236	04060 0			
1017	REF 3	LAST 1366	10,3237	1 3261 0	TCF	FLASHSUB +1	
1018	REF 23	LAST 1367	10,3240	3 0100 0	ISITPRIO CA	FLAGWRD4	
1019	REF 1		10,3241	7 3266 1	MASK	ITISMASK	IS PINBRFLG. MARKIDFLG SET
1020			10,3242	0 0006 1	EXTEND		

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1021	REF 2	LAST 1358	10,3243	1 2575 0	BZF	PRIOBORT	
1022	REF 148	LAST 1366	10,3244	1 5155 1	TCF	ENDOFJOB	
1023	REF 12	LAST 1367	10,3245	11 042 1	REST	CCS	CADRSTOR IS SOMEONE IN ENDIDLE
1024	REF 149	LAST 1368	10,3246	1 5155 1	TCF	ENDOFJOB	YES
1025	REF 1		10,3247	1 3251 0	TCF	RESTSLEP	
1026	REF 150	LAST 1368	10,3250	1 5155 1	TCF	ENDOFJOB	
1027	REF 2	LAST 1356	10,3251	3 0162 1	RESTSLEP	CA	GENMASK SET NVSLEEP BITS
1028	REF 1		10,3252	7 3517 0	MASK	ASTROMSK	
1029	REF 3	LAST 1364	10,3253	0 3544 1	TC	UPENT2	
1030			10,3254	24100 0	OCT24100	OCT	24100 *** DONT MOVE
1031	REF 18	LAST 1366	10,3255	50 164 1	INDEX	COPINDEX	
1032	REF 1		10,3256	3 3507 0	CAF	NVCADR	
1033	REF 2	LAST 464	10,3257	0 4442 1	TC	NVSUBUSY	BUSY OR ABORT IF ILLEGAL
1034	REF 4	LAST 447	10,3260	0 4427 1	FLASHSUB	TC	FLASHON
1035	REF 19	LAST 1368	10,3261	3 0164 1	CA	COPINDEX	COPINDEX DESTROYED BY ENDIDLE
1036	REF 1		10,3262	54 157 0	TS	COPMPAC	
1037	REF 3	LAST 1368	10,3263	3 0162 1	CA	GENMASK	
1038	REF 1		10,3264	7 3010 1	MASK	IDLEMASK	
1039	REF 4	LAST 1368	10,3265	0 3544 1	TC	UPENT2	
1040			10,3266	40040 1	ITISMASK	OCT	40040 *** ENDIDLE ALLOW *** DONT MOVE
1041	REF 2	LAST 222	10,3267	3 1074 0	CA	RISAVE	IS THIS A REPEAT AND RETURN DISPLAY
1042	REF 20	LAST 1368	10,3270	50 164 1	INDEX	COPINDEX	
1043	REF 36	LAST 1339	10,3271	7 4751 1	MASK	BIT3	
1044	REF 444	LAST 1367	10,3272	10 000 0	CCS	A	
1045	REF 1		10,3273	1 3360 0	TCF	UNSEAR1	YES
1046	REF 13	LAST 1368	10,3274	11 042 1	CCS	CADRSTOR	SEE IF SOMEONE ALREADY IN ENDIDLE
1047	REF 1		10,3275	1 3240 0	TCF	ISITPRIO	
1048			10,3276	1 3300 0	TCF	+2	
1049	REF 2	LAST 1368	10,3277	1 3240 0	TCF	ISITPRIO	
1050	REF 1		10,3300	0 4207 0	TC	ENDIDLE	
1051	REF 1		10,3301	1 3372 0	IDLERET1	TCF	TERMATE
1052	REF 1		10,3302	1 3411 1	TCF	PROCEED	ENDIDLE RETURNS HERE ON PROCEED
1053	REF 1		10,3303	4 3526 1	CS	LOWLOAD	
1054	REF 817	LAST 1366	10,3304	6 0154 1	AD	MPAC	VERBREG
1055			10,3305	0 0006 1	EXTEND		
1056	REF 445	LAST 1368	10,3306	26 000 0	DIM	A	
1057			10,3307	0 0006 1	EXTEND		
1058	REF 1		10,3310	1 3461 0	BZF	LOADITIS	V21 OR V22 OR V23 ON DSKY

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1059	REF 87	LAST 1360	10,3311	3 4752 0	OKTOENT	CAF	TWO	
1060	REF 1		10,3312	54 161 0	ENDOUT	TS	OUTHERE	
1061	REF 24	LAST 1367	10,3313	3 0100 0		CA	FLAGWRD4	CHECK NATURE OF ENDIDLE RETURN
1062	REF 2	LAST 1300	10,3314	7 4101 1		MASK	OCT60000	
1063	REF 446	LAST 1368	10,3315	10 000 0		CCS	A	
1064	REF 1		10,3316	1 3321 0		TCF	TIMECHEK	PRI0 ENDIDLE RETURN
1065	REF 1		10,3317	1 3427 1		TCF	NORMRET	NORMAL ENDIDLE RETURN
1066	REF 1		10,3320	1 3413 0		TCF	MARKRET	MARK ENDIDLE RETURN
1067	REF 21	LAST 1359	10,3321	4 0025 1	TIMECHEK	CS	TIME1	
1068	REF 2	LAST 1359	10,3322	6 1165 1		AD	PRI0TIME	
1069	REF 447	LAST 1369	10,3323	10 000 0		CCS	A	
1070			10,3324	4 0000 0		COM		
1071	REF 3	LAST 1305	10,3325	6 7731 0		AD	OCT37776	
1072	REF 141	LAST 1367	10,3326	6 4753 1		AD	ONE	
1073	REF 1		10,3327	6 3570 0		AD	-2SEC	
1074			10,3330	0 0006 1		EXTEND		
1075	REF 2	LAST 1365	10,3331	6 2544 0		BZMF	KEEPPRI0	
1076	REF 2	LAST 1369	10,3332	1 3427 1		TCF	NORMRET	
1084	REF 142	LAST 1369	10,3333	3 4753 1	NORMWAKE	CAF	ONE	
1085	REF 1		10,3334	1 3024 0		TCF	WAKEPLAY	
1086	REF 2	LAST 1369	10,3335	10 161 0	ENDRET	CCS	OUTHERE	
1087	REF 143	LAST 1369	10,3336	6 4753 1		AD	ONE	
1088			10,3337	1 3341 0		TCF	+2	NORMAL ENDIDLE EXIT
1089	REF 151	LAST 1368	10,3340	1 5155 1		TCF	ENDOFJOB	
1090	REF 2	LAST 1368	10,3341	50 157 1		INDEX	COPMPAC	
1091	REF 4	LAST 1366	10,3342	6 0372 1		AD	CADRFLSH	
1092	REF 818	LAST 1368	10,3343	54 157 0		TS	MPAC +3	
1093	REF 4	LAST 1368	10,3344	3 0162 1		CA	GENMASK	REMOVE ENDIDLE AND PINBRANCH BITS
1094	REF 1		10,3345	7 3347 0		MASK	PINIDMSK	
1095	REF 3	LAST 1364	10,3346	0 3554 0		TC	DOWNENT2	
1096			10,3347	74044 1	PINIDMSK	OCT	74044	*** DONT MOVE
1097	REF 40	LAST 1364	10,3350	4 6245 0		CS	THREE	BLANK EVERYTHING EXCEPT MM
1098	REF 2	LAST 263	10,3351	0 4154 0		TC	NVSUB	
1099			10,3352	1 3353 0		TCF	+1	
1100	REF 3	LAST 1360	10,3353	3 0162 0	ENDIT	CA	USERPRI0	RETURN TO USERS PRIORITY
1101	REF 6	LAST 1364	10,3354	7 7725 1		MASK	PRI037	
1102	REF 16	LAST 1364	10,3355	0 5146 1		TC	PRI0CHNG	
1103	REF 819	LAST 1369	10,3356	3 0157 1		CA	MPAC +3	
1104	REF 20	LAST 1364	10,3357	1 4640 0		TCF	BANKJUMP	
1105	REF 21	LAST 1368	10,3360	50 164 1	UNSETR1	INDEX	COPINDEX	RESET REPEAT AND RETURN REQUEST
1106	REF 37	LAST 1368	10,3361	4 4751 1		CS	BIT3	

L-----DISPLAY INTERFACE ROUTINES-----

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1107	REF	3	LAST 1368	10,3362	7 1074 1		MASK	R1SAVE	
1108	REF	4	LAST 1370	10,3363	55 074 1		TS	R1SAVE	
1109	REF	257	LAST 1367	10,3364	3 4755 1		CAF	ZERO	*** 205 ONLY MARKBRAN USERS IN
1110	REF	2	LAST 1364	10,3365	0 4727 1		TC	SUPER SW	SUPERBANK 0
1111	REF	41	LAST 1369	10,3366	3 6245 1	-1	CAF	THREE	RETURN TO USERS IMMEDIATE RETURN LOC
1112	REF	22	LAST 1369	10,3367	50 164 1	IMMEDRET	INDEX	COPINDEX	
1113	REF	5	LAST 1369	10,3370	6 0372 1		AD	CADRFLSH	
1114	REF	21	LAST 1369	10,3371	1 4640 0		TCF	BANKJUMP	
1115	REF	258	LAST 1370	10,3372	3 4755 1	TERMATE	CAF	ZERO	ASTRONAUT TERMINATE (V34) RETURNS TO
1116	REF	1		10,3373	1 3312 0		TCF	ENDOUT	
1117	REF	11	LAST 1362	10,3374	4 0160 1	LINUSCHR	CS	PLAYTEM4	IS THIS A LINUS
1118	REF	78	LAST 1358	10,3375	7 4736 0		MASK	BIT14	
1119	REF	448	LAST 1369	10,3376	10 000 0		CCS	A	
1120	REF	5	LAST 1294	10,3377	1 6737 0		TCF	Q+1	NO
1121	REF	3	LAST 1363	10,3400	4 0157 0		CS	PLAYTEM3	YES, IS IT ALREADY IN ENDIDLE
1122	REF	23	LAST 1370	10,3401	50 164 1		INDEX	COPINDEX	
1123	REF	6	LAST 1370	10,3402	6 0372 1		AD	CADRFLSH	
1124				10,3403	0 0006 1		EXTEND		
1125				10,3404	1 3406 1		BZF	+2	YES
1126	REF	361	LAST 1367	10,3405	0 0002 0		TC	Q	NO
1127	REF	12	LAST 470	10,3406	11 012 1		CCS	DSPLOCK	IS THE ASTRONAUT BUSY
1128	REF	152	LAST 1369	10,3407	0 5155 0		TC	ENDOFJOB	END THE NEW DISPLAY, ITS ALREADY ACTIVE
1129	REF	362	LAST 1370	10,3410	0 0002 0		TC	Q	
R1130	MORE LOGIC COULD BE INCORPORATED HERE TO MAKE SURE A RECYCLE IS A RECYCLE AND CONVERSLY THAT A LOAD IS A LOAD.								
1132	REF	144	LAST 1369	10,3411	3 4753 1	PROCEED	CAF	ONE	ASTRONAUT PROCEED (V33) RETURNS
1133	REF	2	LAST 1370	10,3412	1 3312 0		TCF	ENDOUT	
R1138	LASTPLAY CHECKS TO SEE IF (1) THE LAST NORMAL DISPLAY WAS EITHER INTERRUPTED BY A PRIO OR A MARK (MARK								
R1140	COULD ONLY HAPPEN DURING PINBRANCH) OR IF (2) THE LAST NORMAL DISPLAY WAS REQUESTED WHILE A HIGHER PRIORITY								
R1142	DISPLAY WAS GOING RESULTING IN THE NORMAL BEING PUT TO SLEEP.								
R1143	IF EITHER OF THE ABOVE 2 CONDITIONS EXISTS, THE NORMAL DISPLAY IS AWAKENED TO GO TO PLAYJUM1 WHICH STARTS								
R1145	UP THE MOST RECENT VALID NORMAL DISPLAY. IF THESE 2 CONDITIONS DO NOT EXIST, CONTROL GOES TO PLAYJUM1 WHICH IS								
R1147	STARTED IMMEDIATELY WITH THE ASSUMPTION THAT THE MOST RECENT NORMAL DISPLAY IS ALREADY IN ENDIDLE (DURING A								
R1149	PINBRANCH) OR THAT A RESTART HAS OCCURRED AND THE DISPLAY CAN BE STARTED AS A .1 RESTART.								
1163	REF	26	LAST 1312	10,3413	4 6242 1	MARKRET	CS	SIX	
1164	REF	25	LAST 1369	10,3414	7 0100 1		MASK	FLAGWRD4	
1165				10,3415	0 0004 0		INHINT		*** MAY MOVE DISPLAY FLAGWORD OUT OF
1166	REF	26	LAST 1370	10,3416	54 100 1		TS	FLAGWRD4	
1167				10,3417	0 0003 1		RELINT		INHINT-REALM
1168	REF	2	LAST 1364	10,3420	1 3335 0		TCF	ENDRET	

L DISPLAY INTERFACE ROUTINES

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1169	REF	2	LAST 1323	10,3421	3 7747 1	MARKOVER	CAF	MINUS1	RUPTREG2 IS - MEANS ENDOFJOB TO ENDRET
1170	REF	3	LAST 1369	10,3422	54 161 0		TS	OUTHERE	
1171	REF	27	LAST 1370	10,3423	3 0100 0		CA	FLAGWRD4	IS ENDIDFLG SET
1172	REF	12	LAST 1294	10,3424	7 4355 1		MASK	PRI030	IS NORMAL OR PRI0 IN ENDIDLE
1173	REF	449	LAST 1370	10,3425	10 000 0		CCS	A	
1174	REF	1		10,3426	1 3061 1		TCF	NORMBNCH	
1175	REF	28	LAST 1371	10,3427	3 0100 0	NORMRET	CA	FLAGWRD4	IS MARK SLEEPING
1176	REF	2	LAST 1364	10,3430	7 3524 0		MASK	BITS5+11	OR WAITING
1177	REF	450	LAST 1371	10,3431	10 000 0		CCS	A	
1178	REF	1		10,3432	1 3023 1		TCF	MARKWAKE	
1179	REF	29	LAST 1371	10,3433	3 0100 0		CA	FLAGWRD4	NO
1180	REF	1		10,3434	7 3525 1		MASK	BITS4+10	IS NORMAL INTERRUPTED OR WAITING
1181	REF	451	LAST 1371	10,3435	10 000 0		CCS	A	
1182	REF	1		10,3436	1 3333 0		TCF	NORMWAKE	YES
1183	REF	5	LAST 1364	10,3437	3 1072 0		CA	EBANKTEM	NO, WAS IT A FLASH REQUEST
1184	REF	4	LAST 1331	10,3440	7 4771 0		MASK	OCT50	OR A GODSPRET
1185	REF	452	LAST 1371	10,3441	10 000 0		CCS	A	
1186	REF	3	LAST 1370	10,3442	1 3335 0		TCF	ENDRET	YES
1187	REF	3	LAST 1367	10,3443	3 0371 1		CA	NVSAVE	
1188				10,3444	0 0006 1		EXTEND		
1189	REF	4	LAST 1371	10,3445	1 3335 0		BZF	ENDRET	
1190	REF	5	LAST 468	10,3446	3 5025 0		CAF	PRI015	
1191				10,3447	0 0004 0		INHINT		
1192	REF	30	LAST 1361	10,3450	0 5072 1		TC	NOVAC	
1193	REF	5	LAST 1366	0367			EBANK=	NVWORD	
1194	REF	2	LAST 1365	10,3451	02615 1		2CADR	PLAYJUM1	
1194				10,3452	20060 0				
1195	REF	5	LAST 1371	10,3453	1 3335 0		TCF	ENDRET	
1196	REF	30	LAST 1371	10,3454	3 0100 0	MARSLEEP	CA	FLAGWRD4	IS MARK ALREADY IN
1197	REF	3	LAST 1371	10,3455	7 3524 0		MASK	BITS5+11	
1198	REF	453	LAST 1371	10,3456	10 000 0		CCS	A	
1199	REF	153	LAST 1370	10,3457	1 5155 1		TCF	ENDOFJOB	YES
11991	REF	3	LAST 1360	10,3460	1 2754 1		TCF	GUSLEEPS	
1200	REF	3	LAST 1369	10,3461	50 157 1	LOADITIS	INDEX	COPMPAC	
1201	REF	6	LAST 1371	10,3462	3 0367 0		CA	NVWORD	
1202	REF	14	LAST 1366	10,3463	7 6074 0		MASK	LOW7	
1203				10,3464	4 0000 0		COM		
1204	REF	820	LAST 1369	10,3465	6 0155 0		AD	MPAC +1	NOUNREG
1205				10,3466	0 0006 1		EXTEND		
1206	REF	1		10,3467	1 3311 0		BZF	OKTOENT	NO, THEN LOAD IS VALID
1207	REF	6	LAST 836	10,3470	1 3050 0		TCF	PINBRNCH	YES, ACCEPT LOAD BUT ASK FOR LAST AGAIN

L DISPLAY-INTERFACE ROUTINES

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1208	REF 42	LAST 1370	10,3471	4 6245 0	ERASER	CS	THREE	BLANK EVERYTHING EXCEPT MM
1209	REF 3	LAST 1369	10,3472	0 4154 0		TC	NVSUB	
1210	REF 154	LAST 1371	10,3473	1 5155 1		TCF	ENDOFJOB	
1211	REF 155	LAST 1372	10,3474	1 5155 1		TCF	ENDOFJOB	
1212			10,3475	00036 1	PERFMASK	OCT	0036	FLASH, PERFORM, BLANK R2 AND R3
1213			10,3476	00231 1	V01N25	VN	00125	
1214			10,3477	01407 0	V06N07	VN	00607	GOPERF3 VN DISPLAY BEFORE V50
1215			10,3500	14400 0	V50N00	VN	5000	
1216			10,3501	00030 1	PERF2MSK	OCT	00030	FLASH, PERFORM
1217			10,3502	01006 0	V04N06	VN	00406	
1218			10,3503	00014 1	PERF4MSK	OCT	14	FLASH, BLANK R3
1219	REF 7	LAST 1371	10,3050		GOAGIN	EQUALS	PINBRNCH	
1220			10,3504	20010 1	REDOMASK	OCT	20010	BITS 4 AND 14
1221			10,3505	40230 1	MARK3MSK	OCT	40230	MARK, DECIMAL NOUN, PERFORM, FLASH
1222			10,3506	40036 0	MARK4MSK	OCT	40036	MARK, PERFORM, FLASH, BLANK 2 AND 3
1223	REF 1		10,3507	20542 0	NVCADR	CADR	REDOPRIO	
1224	REF 4	LAST 1365	10,3510	20377 0	WAKECADR	CADR	MARKPLAY	
1225	REF 3	LAST 1371	10,3511	20615 1		CADR	PLAYJUMI	
1226			10,3512	03400 0	OCT3400	OCT	3400	EBANK MASK
1227			10,3513	11210 1	NBUSMASK	OCT	11210	
1228			10,3514	66521 1	PMMASK	OCT	66521	
1229	REF 4	LAST 446	4144		VERBMASK	=	MID7	(OCT 37600)
1230			10,3515	01177 1	V05N00M1	OCT	1177	V05 MINUS ONE
1231	REF 1		10,2330		GOXDSP	EQUALS	GOMARK	
1232	REF 1		10,2350		GOXDSPR	EQUALS	GOMARKR	
1233	REF 12	LAST 703	10,2334		GOXDSPF	EQUALS	GOMARKF	
1234	REF 5	LAST 489	10,2353		GOXDSPFR	EQUALS	GOMARKFR	
1235	REF 2	LAST 253	5472		ENDEXT	EQUALS	ENDMARK	
1236	REF 14	LAST 1111	0165		MPAC2SAV	EQUALS	BANKSET	
1238			10,3516	00700 0	NVBUSMSK	OCT	700	
12385			10,3517	00704 1	ASTROMSK	OCT	704	
1239			10,3520	40030 0	MPERFMSK	OCT	40030	BIT 15,5,4 FOR MARK, PERFORM, FLASH
1240			10,3521	34300 0	OCT34300	OCT	34300	
1241			10,3522	40100 1	BITS15+7	OCT	40100	
1242			10,3523	00110 1	BITS7+4	OCT	110	
1243	REF 3	LAST 1363	1070		DSPFLG	EQUALS	EBANKSAV	
1244	REF 1		1071		MARKFLAG	EQUALS	MARKEBAN	
1245	REF 6	LAST 1371	1072		SAVEFLAG	EQUALS	EBANKTEM	
1246			10,3524	02020 1	BITS5+11	OCT	2020	* DONT MOVE
1247			10,3525	01010 1	BITS4+10	OCT	1010	* DONT MOVE
1249			10,3526	00026 0	LOWLOAD	DEC	27	
1250			10,3527	77730 0	BUSYMASK	OCT	77730	
1252			10,3530	00050 1	CADRMASK	OCT	50	
1253	REF 4	LAST 1314	7740		PINMASK	EQUALS	13,14,15	
1254	REF 2	LAST 1366	10,3070		GOPLAY	EQUALS	NVDSP	
A1255					PRIOSAVE	EQUALS	RISAVE	
1256	REF 821	LAST 1371	0157		COPMPAC	EQUALS	MPAC +3	
1257	REF 822	LAST 1372	0160		TEMPOR2	EQUALS	MPAC +4	

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1258	REF 823	LAST 1372	0161	OUTHERE	EQUALS	MPAC +5	
1259	REF 46	LAST 1367	0164	COPINDEX	EQUALS	LOC	
1260	REF 37	LAST 1077	0163	USERPRIO	EQUALS	MODE	
1261	REF 824	LAST 1373	0162	GENMASK	EQUALS	MPAC +6	
1262			10,3531	20144 1	PRIOCT	OCT 20144	PRIO
1263			10,3532	42424 0	MARKOCT	OCT 42424	MARK
1264			10,3533	11254 1		OCT 11254	NORM
1265			10,3534	74704 1	IDLESLEP	OCT 74704	
1266			10,3535	67777 1	OCT67777	OCT 67777	
1267	REF 12	LAST 725	5464	LINUS	EQUALS	BLANKET	
1268	REF 825	LAST 1373	0154	FACEREG	EQUALS	MPAC	
1269	REF 826	LAST 1373	0155	PLAYTEM1	EQUALS	MPAC +1	
1270	REF 827	LAST 1373	0157	PLAYTEM3	EQUALS	MPAC +3	
1271	REF 828	LAST 1373	0160	PLAYTEM4	EQUALS	MPAC +4	
1273			10,3536	40420 0	OCT40420	OCT 40420	
1274	REF 3	LAST 1361	10,3537	02546 1	MAKEGEN	GENADR MAKEPLAY	
1275			10,3540	10200 1	OCT10200	OCT 10200	
1276			10,3541	30200 0	V97N00	VN 09700	PASTE FOR V97 OR V99
12761			10,3542	20100 1	OCT20100	OCT 20100	
12762			10,3543	24030 1	CLOCKCON	OCT 24030	FLASH, PERFORM, V99 OR V97 PASTE, REFLASH

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0001				10,3544			BANK 10
0002	REF	2	LAST 1354	10,2000			SETLOC DISPLAYS
0003				10,3544			BANK
0004	REF	2	LAST 1354 TO 1374:	654	654*		COUNT* 11/DSPLA

0005				10,3544	0 0004 0	UPENT2	INHINT
0006	REF	3	LAST 1286	10,3545	7 5660 0		MASK OCT77770
0007	REF	240	LAST 1367	10,3546	54 001 1		TS L
0008	REF	31	LAST 1371	10,3547	4 0100 1		CS FLAGWRD4
0009	REF	241	LAST 1374	10,3550	7 0001 1		MASK L
0010	REF	32	LAST 1374	10,3551	26 100 1		ADS FLAGWRD4
0011				10,3552	0 0003 1	JOIN	RELINT
0012	REF	6	LAST 1370	10,3553	1 6737 0		TCF Q+1

0013				10,3554	0 0004 0	DOWNENT2	INHINT
0014	REF	4	LAST 1374	10,3555	7 5660 0		MASK OCT77770
0015				10,3556	4 0000 0		COM
0016	REF	33	LAST 1374	10,3557	7 0100 1		MASK FLAGWRD4
0017	REF	34	LAST 1374	10,3560	54 100 1		TS FLAGWRD4
0018	REF	1		10,3561	1 3552 1		TCF JOIN

0032	REF	23	LAST 1365	4757		OCT7	EQUALS SEVEN
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L SERVICE ROUTINES

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R0033
 R0034 UPFLAG AND DOWNFLAG ARE ENTIRELY GENERAL FLAG SETTING AND CLEARING SUBROUTINES. USING THEM, WHETHER OR
 R0036 NOT IN INTERRUPT, ONE MAY SET OR CLEAR ANY SINGLE, NAMED BIT IN ANY ERASABLE REGISTER, SUBJECT OF COURSE TO
 R0038 EBANK SETTING. A "NAMED" BIT, AS THE WORD IS USED HERE, IS ANY BIT WITH A NAME FORMALLY ASSIGNED BY THE YUL
 R0040 ASSEMBLER.

R0041 AT PRESENT THE ONLY NAMED BITS ARE THOSE IN THE FLAGWORDS. ASSEMBLER CHANGES WILL MAKE IT POSSIBLE TO
 R0043 NAME ANY BIT IN ERASABLE MEMORY.

R0044 CALLING SEQUENCES ARE AS FOLLOWS:

	TC	UPFLAG	TC	DOWNFLAG
R0045				
R0046	ADRES	NAME OF FLAG	ADRES	NAME OF FLAG

R0047 RETURN IS TO THE LOCATION FOLLOWING THE "ADRES" ABOUT .58 MS AFTER THE "TC".

R0049 UPON RETURN A CONTAINS THE CURRENT FLAGWRD SETTING.

0050			5504		BLOCK	02	
0051	REF	3	LAST 1294	4000	SETLOC	FFTAG1	
0052			5504		BANK		
0053	REF	1			COUNT#	\$/FLAG	
0054	REF	363	LAST 1370	5504 3 0002 0	UPFLAG	CA	0
0055	REF	2	LAST 743	5505 0 5522 1	TC	DEBIT	
0056				5506 4 0000 0	COM		+(15 - BIT)
0057				5507 0 0006 1	EXTEND		
0058	REF	16	LAST 1026	5510 04 001 1	ROR	LCHAN	SET BIT
0059	REF	57	LAST 1325	5511 50 061 0	COMFLAG	INDEX	ITEMP1
0060	REF	31	LAST 965	5512 54 074 0	TS	FLAGWRDO	
0061	REF	27	LAST 1300	5513 22 063 1	LXCH	ITEMP3	
0062				5514 0 0003 1	RELINT		
0063	REF	242	LAST 1374	5515 0 0001 0	TC	L	
0064	REF	364	LAST 1375	5516 3 0002 0	DOWNFLAG	CA	0
0065	REF	3	LAST 1375	5517 0 5522 1	TC	DEBIT	
0066	REF	243	LAST 1375	5520 7 0001 1	MASK	L	RESET BIT
0067	REF	2	LAST 743	5521 1 5511 0	TCF	COMFLAG	
0068	REF	145	LAST 1370	5522 6 4753 1	DEBIT	AD	ONE
0069				5523 0 0004 0	INHINT		GET DE BITS
0070	REF	28	LAST 1375	5524 54 063 0	TS	ITEMP3	
0071	REF	3	LAST 1092	5525 3 4762 0	CA	LOW4	DEC15
0072	REF	58	LAST 1375	5526 54 061 1	TS	ITEMP1	
0073	REF	29	LAST 1375	5527 50 063 1	INDEX	ITEMP3	
0074				5530 2 7777 0	CA	0-1	ADRES
0075	REF	244	LAST 1375	5531 54 001 1	TS	L	
0076	REF	259	LAST 1370	5532 3 4755 1	CA	ZERO	

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0077				5533	0 0006 1	EXTEND	
0078	REF	59	LAST 1375	5534	10 061 1	DV	ITEMP1 A = FLAGWRD, L = (15 - BIT)
0079	REF	60	LAST 1376	5535	52 062 1	DXCH	ITEMP1
0080	REF	61	LAST 1376	5536	50 061 0	INDEX	ITEMP1
0081	REF	32	LAST 1375	5537	3 0074 1	CA	FLAGWRD0
0082	REF	245	LAST 1375	5540	54 001 1	TS	L CURRENT STATE
0083	REF	26	LAST 1324	5541	50 062 0	INDEX	ITEMP2
0084	REF	45	LAST 1355	5542	4 4735 0	CS	BIT15 --(15 - BIT)
0085	REF	365	LAST 1375	5543	0 0002 0	TC	0

L SERVICE ROUTINES

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P0085 DELAYJOB- A GENERAL ROUTINE TO DELAY A JOB A SPECIFIC AMOUNT OF TIME BEFORE PICKING UP AGAIN.

R0088 ENTRANCE REQUIREMENTS...

A0089	CAF	DT	DELAY JOB FOR DT CENTISECS
A0090	TC	BANKCALL	
A0091	CADR	DELAYJOB	

0092		06,3764	BANK	06
0093	REF 1	00,2000	SETLOC	DLAYJOB
0094		00,3735	BANK	

R0095 THIS MUST REMAIN IN BANK 0 *****

0096	REF 1		COUNT*	\$/DELAY
0097		00,3735	0 0004 0	DELAYJOB INHINT
0098	REF 366	LAST 1376	00,3736	54 002 1 TS
				STORE DELAY DT IN Q FOR DLY -1 IN
0099	REF 1		00,3737	3 4752 0 CAF DELAYNUM WAITLIST
0100	REF 56	LAST 1326	00,3740	54 070 1 DELLOOP TS RUPTREG1
0101	REF 454	LAST 1371	00,3741	50 000 1 INDEX A
0102	REF 4	LAST 222	00,3742	3 1326 1 CA DELAYLOC IS THIS DELAYLOC AVAILABLE
0103			00,3743	0 0006 1 EXTEND
0104	REF 1		00,3744	1 3752 0 BZF OK2DELAY YES
0105	REF 57	LAST 1377	00,3745	10 070 1 CCS RUPTREG1 NO, TRY NEXT DELAYLOC
0106	REF 1		00,3746	1 3740 0 TCF DELLOOP
0107	REF 28	LAST 1331	00,3747	52 134 0 DXCH BUF2
0108	REF 7	LAST 1330	00,3750	0 5716 1 TC BAILOUT1 NO AVAILABLE LOCS.
0109			00,3751	01104 0 OCT 1104
0110	REF 1		00,3752	3 3772 0 OK2DELAY CA TCSLEEP SET WAITLIST IMMEDIATE RETURN
0111	REF 7	LAST 1132	00,3753	54 061 1 TS WAITEXIT
0112	REF 30	LAST 1105	00,3754	3 0004 0 CA FBANK
0113	REF 58	LAST 1377	00,3755	6 0070 0 AD RUPTREG1 STORE BBANK FOR TASK CALL
0114	REF 246	LAST 1376	00,3756	54 001 1 TS L
0115	REF 1		00,3757	3 3773 1 CAF MAKECAD STORE CADR FOR TASK CALL
0116	REF 2	LAST 1119	00,3760	1 5211 1 TCF DLY2 -1 DLY IS IN WAITLIST ROUTINE
0117	REF 15	LAST 1362	00,3761	0 4645 1 TCGETCAD TC MAKECADR GET CALLERS FCADR
0118	REF 59	LAST 1377	00,3762	50 070 0 INDEX RUPTREG1
0119	REF 5	LAST 1377	00,3763	55 326 0 TS DELAYLOC SAVE DELAY CADRS
0120	REF 8	LAST 1363	00,3764	0 5133 0 TC JOBSLEEP
0121	REF 260	LAST 1375	00,3765	3 4755 1 WAKER CAF ZERO
0122	REF 45	LAST 1361	00,3766	50 006 1 INDEX BBANK
0123	REF 6	LAST 1377	00,3767	57 326 1 XCH DELAYLOC MAKE DELAYLOC AVAILABLE

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0124	REF	13	LAST 1364	00,3770	0 5137 1	TC	JOBWAKE
0125	REF	81	LAST 1328	00,3771	0 5261 1	TC	TASKOVER
0126	REF	1		00,3772	03757 1	TCSLEEP	GENADR TCGETCAD -2
0127	REF	1		00,3773	03765 0	WAKECAD	GENADR WAKER

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P0128 GENTRAN, A BLOCK TRANSFER ROUTINE.

R0129 WRITTEN BY D. EYLES

R0130 MOD 1 BY KERNAN

UTILITYM REV 17 11/18/67

R0132 MOD 2 BY SCHULENBERG (REMOVE RELINT) SKIPPER REV 4 2/28/68

R0133 THIS ROUTINE IS USEFULL FOR TRANSFERING N CONSECUTIVE ERASABLE OR FIXED QUANTITIES TO SOME OTHER N
 R0135 CONSECUTIVE ERASABLE LOCATIONS. IF BOTH BLOCKS OF DATA ARE IN SWITCHABLE EBANKS, THEY MUST BE IN THE SAME ONE.

R0137 GENTRAN IS CALLABLE IN A JOB AS WELL AS A RUPT. THE CALLING SEQUENCE IS:

A0139	I	CA	N-1	# OF QUANTITIES-MINUS-ONE.
A0140	I +1	TC	GENTRAN	IN FIXED-FIXED.
A0141	I +2	ADRES	L	STARTING ADRES OF DATA TO BE MOVED.
A0142	I +3	ADRES	#	STARTING ADRES OF DUPLICATION BLOCK.
A0143	I +4			RETURNS HERE.

R0144 GENTRAN TAKES 25 MCT'S (300 MICROSECONDS) PER ITEM + 5 MCT'S (60 MICS) FOR ENTERING AND EXITING.

R0146 A. L AND ITEMPI ARE NOT PRESERVED.

0147			5544	BLOCK 02
0148	REF 2	LAST 1354	4000	SETLOC FFTAG4
0149			5544	BANK
0150	REF 62	LAST 1376	0061	EBANK= ITEMPI
0151	REF 1			COUNT* \$\$/TRAN
0152			5544 0 0004 0	GENTRAN INHINT
0153	REF 63	LAST 1379	5545 54 061 1	TS ITEMPI
0154	REF 367	LAST 1377	5546 50 002 0	INDEX Q
0155			5547 6 0000 1	AD 0
0156	REF 455	LAST 1377	5550 50 000 1	INDEX A
0157			5551 3 0000 1	CA 0
0158	REF 247	LAST 1377	5552 54 001 1	TS L
0159	REF 64	LAST 1379	5553 3 0061 0	CA ITEMPI
0160	REF 368	LAST 1379	5554 50 002 0	INDEX Q
0161			5555 6 0001 0	AD 1
0162	REF 456	LAST 1379	5556 50 000 1	INDEX A
0163			5557 22 000 1	LXCH 0
0164	REF 65	LAST 1379	5560 10 061 1	CCS ITEMPI
0165	REF 2	LAST 297	5561 1 5545 1	TCF GENTRAN +1
0166	REF 5	LAST 1294	5562 1 6741 1	TCF Q+2

SAVE N-1.
 C(Q) = ADRES L.
 ADRES (L + N - 1).
 C(ABOVE).
 SAVE DATA.
 ADRES (M + N - 1).
 STUFF IT.
 LOOP UNTIL N-1 = 0.
 RETURN TO CALLER.

L SERVICE ROUTINES

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P0167 B5OFF ZERO BIT 5 OF EXTVBACT, WHICH IS SET BY TESTXACT.

R0168 MAY BE USED AS NEEDED BY ANY EXTENDED VERB WHICH HAS DONE TESTXACT

0170	REF	1					COUNT*	\$/EXTVB
0171	REF	46	LAST 1367	5563	4 4747 0	B5OFF	CS	BIT5
0172	REF	17	LAST 1354	5564	7 1044 1		MASK	EXTVBACT
0173	REF	18	LAST 1380	5565	55 044 1		TS	EXTVBACT
0174	REF	156	LAST 1372	5566	0 5155 0		TC	ENDJOB

L ALARM AND ABORT

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R0001 THE FOLLOWING SUBROUTINE MAY BE CALLED TO DISPLAY A NON-ABORTIVE ALARM CONDITION. IT MAY BE CALLED
 R0003 EITHER IN INTERRUPT OR UNDER EXECUTIVE CONTROL.

R0004 CALLING SEQUENCE IS AS FOLLOWS:

R0005 TC ALARM
 R0006 OCT AAANN ALARM NO. NN IN GENERAL AREA AAA.
 R0007 (RETURNS HERE)

0008			5567		BLOCK 02		
0009	REF 1		4000		SETLOC FFTAG7		
0010			5567		BANK		
0011	REF 8	LAST 471	0375		EBANK= FAILREG		
0012	REF 1				COUNT* \$\$/ALARM		
R0013	ALARM TURNS ON THE PROGRAM ALARM LIGHT, BUT DOES NOT DISPLAY.						
0014			5567	0 0004 0	ALARM	INHINT	
0015	REF 369	LAST 1379	5570	3 0002 0	CA	Q	
0016	REF 4	LAST 1286	5571	55 363 1	ALARM2	TS	ALMCADR
0017	REF 370	LAST 1381	5572	50 002 0		INDEX	Q
0018			5573	3 0000 1	CA	0	
0019	REF 248	LAST 1379	5574	54 001 1	BORTENT	TS	L
0020	REF 46	LAST 1377	5575	3 0006 1	PRIDENT	CA	BBANK
0021			5576	0 0006 1	+1	EXTEND	
0022	REF 27	LAST 1361	5577	04 007 1	ROR	SUPERBNK	ADD SUPER BITS.
0023	REF 5	LAST 1381	5600	55 364 0	TS	ALMCADR +1	
0024	REF 371	LAST 1381	5601	3 0002 0	LARMENT	CA	Q
0025	REF 66	LAST 1379	5602	54 061 1	TS	ITEMP1	STORE RETURN FOR ALARM
0026	REF 9	LAST 1381	5603	10 375 1	CHKFAIL1	CCS	FAILREG
0027	REF 1		5604	1 5607 1	TCF	CHKFAIL2	IS ANYTHING IN FAILREG
0028	REF 10	LAST 1381	5605	22 375 0	LXCH	FAILREG	YES TRY NEXT REG
0029	REF 1		5606	1 5621 0	TCF	PROGLARM	TURN ALARM LIGHT ON FOR FIRST ALARM
0030	REF 11	LAST 1381	5607	10 376 1	CHKFAIL2	CCS	FAILREG +1
0031	REF 1		5610	1 5613 1	TCF	FAIL3	
0032	REF 12	LAST 1381	5611	22 376 0	LXCH	FAILREG +1	
0033	REF 1		5612	1 5624 0	TCF	MULTEXIT	
0034	REF 13	LAST 1381	5613	3 0377 1	FAIL3	CA	FAILREG +2
0035	REF 32	LAST 1128	5614	7 4733 0	MASK	PUSHMAX	
0036	REF 457	LAST 1379	5615	10 000 0	CCS	A	
0037	REF 1		5616	1 5630 0	TCF	MULTFAIL	
0038	REF 14	LAST 1381	5617	22 377 1	LXCH	FAILREG +2	
0039	REF 2	LAST 1381	5620	1 5624 0	TCF	MULTEXIT	

L ALARM AND ABORT

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0040 REF 47 LAST 1317 5621 4 1036 1 PROGLARM CS DSPTAB +11D
 0041 REF 2 LAST 1358 5622 7 5642 0 MASK OCT40400
 0042 REF 48 LAST 1382 5623 27 036 1 ADS DSPTAB +11D

0043 REF 67 LAST 1381 5624 56 061 0 MULTEXIT XCH ITEMP1 OBTAIN RETURN ADDRESS IN A
 0044 5625 0 0003 1 RELINT
 0045 REF 458 LAST 1381 5626 50 000 1 INDEX A
 0046 5627 0 0001 0 TC 1

0047 REF 249 LAST 1381 5630 3 0001 0 MULTFAIL CA 1
 0048 REF 46 LAST 1376 5631 6 4735 1 AD BIT15
 0049 REF 15 LAST 1381 5632 54 377 0 TS FAILKEG +2

0050 REF 3 LAST 1381 5633 1 5624 0 TCF MULTEXIT

R0051 PRIOLARM DISPLAYS VO5N09 VIA PRIODSPR WITH 3 RETURNS TO THE USER FROM THE ASTRONAUT AT CALL LOC +1,+2,+3 AND
 R0053 AN IMMEDIATE RETURN TO THE USER AT CALL LOC +4. EXAMPLE FOLLOWS.

A0054 CAF OCTXX ALARM CODE
 A0055 TC BANKCALL
 A0056 CADR PRIOLARM

A0057 ...

A0058 ...

A0059 ...

A0060 TC PHASCHNG

A0061 OCT X.1

ASTRONAUT RETURN
 IMMEDIATE RETURN TO USER. RESTART
 PHASE CHANGE FOR PRIO DISPLAY

0062 10,3562 BANK 10
 0063 REF 3 LAST 1374 10,2000 SETLOC DISPLAYS
 0064 10,3562 BANK

0065 REF 3 LAST 1374 TO 1375: 14 668* COUNT* \$\$/DSPLA

0066 10,3562 0 0004 0 PRIOLARM INHINT

0067 REF 250 LAST 1382 10,3563 54 001 1 TS L

* * * KEEP IN DISPLAY ROUTINES BANK
 SAVE ALARM CODE

0068 REF 29 LAST 1377 10,3564 3 0133 0 CA BUF2

0069 REF 6 LAST 1381 10,3565 55 363 1 TS ALMCADR

0070 REF 30 LAST 1382 10,3566 3 0134 1 CA BUF2 +1

0071 REF 1 10,3567 0 5576 0 TC PRIORNT +1

0072 10,3570 77467 1 -2SEC DEC -200

0073 REF 6 LAST 930 10,3571 3 5006 1 CAF VO5N09

0074 REF 2 LAST 515 10,3572 1 2504 0 TCF PRIODSPR

* LEAVE L ALONE
 *** DONT MOVE

0075 5634 BLOCK 02

0076 REF 2 LAST 1381 4000 SETLOC FFTAG7

0077 5634 BANK

0078 REF 2 LAST 1381 TO 1382: 37 37* COUNT* \$\$/ALARM

0079 5634 0 0004 0 BAILOUT INHINT

0080 REF 372 LAST 1381 5635 3 0002 0 CA Q

L ALARM AND ABORT

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0081	REF 7	LAST 1382	5636	55'363 1	TS	ALMCADR	
0082	REF 373	LAST 1382	5637	50 002 0	INDEX	Q	
0083			5640	3 0000 1	CAF	0	
0084	REF 1		5641	0 5574 1	TC	BORTENT	
0085			5642	40400 1	OCT40400	OCT	40400
0086			5643	0 0004 0	INHINT		
0087	REF 88	LAST 1369	5644	3 4752 0	WHIMPER	CA	TWO
0088	REF 24	LAST 1294	5645	6 0005 1	AD	Z	
0089	REF 2	LAST 830	5646	54 017 0	TS	BRUPT	
0090			5647	5 0017 1	RESUME		
0091	REF 58	LAST 1354	5650	0 4635 0	TC	POSTJUMP	RESUME SENDS CONTROL HERE
0092	REF 2	LAST 832	5651	12765 0	CADR	ENEMA	
0093			5652	0 0004 0	POODOO	INHINT	
0094	REF 374	LAST 1383	5653	3 0002 0	CA	Q	
0095	REF 8	LAST 1383	5654	55'363 1	ABORT2	TS	ALMCADR
0096	REF 375	LAST 1383	5655	50 002 0	INDEX	Q	
0097			5656	3 0000 1	CAF	0	
0098	REF 2	LAST 1383	5657	0 5574 1	TC	BORTENT	
0099			5660	77770 1	OCT77770	OCT	77770
							DON'T MOVE
0100	REF 3	LAST 1096	5661	3 4765 1	CAF	OCT55	4.35SPOT FOR GPOODOO
0101	REF 251	LAST 1382	5662	54 001 1	TS	L	
0102			5663	4 0000 0	COM		
0103	REF 9	LAST 865	5664	52 761 0	DXCH	-PHASE4	
0104			5665	0 0004 0	GPOODOO	INHINT	
01042	REF 313	LAST 1335	5666	0 4616 1	TC	BANKCALL	RESET STATEFLG, REINTFLG, AND NODEFLAG.
01044	REF 1		5667	27755 0	CADR	FLAGS	
0105	REF 31	LAST 1339	5670	3 0103 0	CA	FLAGWRD7	IS SERVICER CURRENTLY IN OPERATION?
0106	REF 3	LAST 280	5671	7 4746 1	MASK	V37FLBIT	
0107	REF 459	LAST 1382	5672	10 000 0	CCS	A	
0108	REF 1		5673	1 5701 0	TCF	STRTIDLE	
0109	REF 314	LAST 1383	5674	0 4616 1	TC	BANKCALL	TERMINATE GRPS 1, 3, 5, AND 6
0110	REF 2	LAST 230	5675	12652 0	CADR	V37KLEAN	
01102	REF 315	LAST 1383	5676	0 4616 1	TC	BANKCALL	TERMINATE GRPS 2, 4, 1, 3, 5, AND 6
01104	REF 2	LAST 212	5677	12643 0	CADR	MR.KLEAN	(I.E., GRP 4 LAST)
0111	REF 2	LAST 865	5700	1 5644 0	TCF	WHIMPER	
0112	REF 1		5701	3 5743 1	STRTIDLE	CAF	BBSERVDL
01122	REF 3	LAST 1370	5702	0 4727 1	TC	SUPPFSW	
01124	REF 316	LAST 1383	5703	0 4616 1	TC	BANKCALL	PUT SERVICER INTO ITS "GROUND" STATE
01125	REF 1		5704	57321 0	CADR	SERVIDLE	AND PROCEED TO GOTOPOOH.
0114			5705	0 0004 0	CCSHOLE	INHINT	
0115	REF 376	LAST 1383	5706	3 0002 0	CA	Q	
0116	REF 1		5707	0 5654 0	TC	ABORT2	
0117			5710	01103 1	OCT1103	OCT	1103
0118			5711	0 0004 0	CURTAINS	INHINT	
0119	REF 377	LAST 1383	5712	3 0002 0	CA	Q	
0120	REF 2	LAST 1286	5713	0 5571 1	TC	ALAR42	
0121			5714	00217 0	OCT217	OCT	00217

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Line	Ref	Last	Line	Code	Alarm/Abort	TC	ALMCADR	Return to User
0122	REF 9	LAST 1383	5715	0 1363 0		TC	ALMCADR	RETURN TO USER
0123			5716	0 0004 0	BAILOUT1	INHINT		
0124	REF 10	LAST 1384	5717	53 364 0		DXCH	ALMCADR	
0125	REF 1		5720	3 5742 0		CAF	ADR40400	
0126	REF 68	LAST 1382	5721	54 061 1	BOTHABRT	TS	ITEMP1	
0127	REF 378	LAST 1383	5722	50 002 0		INDEX	Q	
0128			5723	3 0000 1		CAF	0	
0129	REF 252	LAST 1383	5724	54 001 1		TS	L	
0130	REF 1		5725	1 5603 0		TCF	CHKFAIL1	
0131			5726	0 0004 0	POOD001	INHINT		
0132	REF 11	LAST 1384	5727	53 364 0		DXCH	ALMCADR	
0133	REF 1		5730	3 5741 0		CAF	ADR77770	
0134	REF 1		5731	1 5721 1		TCF	BOTHABRT	
0135			5732	0 0004 0	ALARM1	INHINT		
0136	REF 12	LAST 1384	5733	53 364 0		DXCH	ALMCADR	
0137			5734	0 0004 0	ALMNCADR	INHINT		
0138	REF 379	LAST 1384	5735	50 002 0		INDEX	Q	
0139			5736	3 0000 1		CA	0	
0140	REF 253	LAST 1384	5737	54 001 1		TS	L	
0141	REF 1		5740	1 5601 1		TCF	LARMENT	
0142	REF 5	LAST 1374	5741	1 5660 0	ADR77770	TCF	OCT77770	
0143	REF 3	LAST 1382	5742	1 5642 0	ADR40400	TCF	OCT40400	
0144	REF 157	LAST 1380	5155		DOALARM	EQUALS	ENDOFJOB	
01444	REF 54	LAST 894	E7.1515			EBANK	DVCNTR	
01445	REF 2	LAST 1383	5743	56067 0	BBSERVOL	BBCON	SERVIDLE	
0145	CALLING SEQUENCE FOR VARALARM							
A0146					CAF	(ALARM)		
A0147					TC	VARALARM		
0148	VARALARM TURNS ON PROGRAM ALARM LIGHT BUT DOES NOT DISPLAY							
0149			5744	0 0004 0	VARALARM	INHINT		
0150	REF 254	LAST 1384	5745	54 001 1		TS	L	SAVE USERS ALARM CODE
0151	REF 380	LAST 1384	5746	3 0002 0		CA	Q	SAVE USERS Q
0152	REF 13	LAST 1384	5747	55 363 1		TS	ALMCADR	
0153	REF 2	LAST 1382	5750	0 5575 0		TC	PRI0ENT	
0154			5751	00014 1	OCT14	OCT	14	DONT MOVE
0155	REF 14	LAST 1384	5752	0 1363 0		TC	ALMCADR	RETURN TO USER
0156	REF 3	LAST 1383	5644		ABORT	EQUALS	WHIMPER	
0157			13,3755			BANK	13	
0158	REF 1		13,2000			SETLOC	ABTFLGS	
0159			13,3755			BANK		

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						COUNT#	\$/ALARM
0160	REF	1					
0161	REF	1		13,3755	4 4747 0	FLAGS	CS STATEBIT
0162	REF	21	LAST 1332	13,3756	7 0077 0		MASK FLAGWRD3
0163	REF	22	LAST 1385	13,3757	54 077 0		TS FLAGWRD3
0164	REF	3	LAST 1220	13,3760	4 4745 1		CS REINT8IT
0165	REF	20	LAST 862	13,3761	7 0106 1		MASK FLGWRD10
0166	REF	21	LAST 1385	13,3762	54 106 1		TS FLGWRD10
0167	REF	3	LAST 229	13,3763	4 4753 0		CS NODOBIT
0168	REF	31	LAST 1315	13,3764	7 0076 1		MASK FLAGWRD2
0169	REF	32	LAST 1385	13,3765	54 076 1		TS FLAGWRD2
0170	REF	381	LAST 1384	13,3766	0 0002 0		TC Q

L UPDATE PROGRAM

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R0001 PROGRAM NAME: P27

R0002 WRITTEN BY: KILROY/ DE WOLF

R0003 MOD NO: 6

R0004 MOD BY: KILROY

R0005 DATE: 01DEC67

R0006 LOG SECTION: UPDATE PROGRAM.

R0007 FUNCT. DESCR: P27 (THE UPDATE PROGRAM) PROCESSES COMMANDS AND DATA

R0008 INSERTIONS REQUESTED BY THE GROUND VIA UPLINK.

R0009 THE P27 PROGRAM WILL ACCEPT UPDATES

R0010 ONLY DURING P00 FOR THE LM, AND ONLY DURING P00,

R0011 P02, AND FRESH START FOR THE CSM

R0012 CALLING SEQ: PROGRAM IS INITIATED BY UPLINK ENTRY OF VERBS 70, 71, 72 AND 73.

R0014 SUBROUTINES: TESTXACT, NEWMODEX, NEWMODEX +3, GOXDSPF, BANKCALL, FINDVAC, INTPRET, INTSTALL, TPAGREE,

R0016 INTWAKEU, ENDEXT, POSTJUMP, FALTON, NEWPHASE, PHASCHNG

R0017 NORMAL EXIT: TC ENDEXT

R0018 ALARM/ABORT: TC FALTON FOLLOWED BY TC ENDEXT

R0019 RESTARTS: P27 IS RESTART PROTECTED IN TWO WAYS...

R0020 1. PRIOR TO VERIFLAG INVERSION (WHICH IS CAUSED BY THE GROUND/ASTRONAUT'S VERIFICATION OF UPDATE

R0022 DATA BY SENDING A V33E WHEN V21N02 IS FLASHING)---

R0023 NO PROTECTION EXCEPT PRE-P27 MODE IS RESTORED, COAST + ALIGN DOWNLIST IS SELECTED AND UPLINK

R0025 ACTIVITY LIGHT IS TURNED OFF. (JUST AS IF A V34E WAS SENT DURING P27 DATA LOADS).

R0027 V70, V71, V72 OR V73 WILL HAVE TO BE COMPLETELY RESENT BY USER.

R0029 2. AFTER VERIFLAG INVERSION (WHEN UPDATE OF THE SPECIFIED ERASABLES IS BEING PERFORMED)---

R0031 PROTECTED AGAINST RESTARTS.

R0032 DEBKIS: UPBUFF (20D) TEMP STORAGE FOR ADDRESSES AND CONTENTS.

R0033 UPVERB (1) VERB NUMBER MINUS 70D (E.G. FOR V72, UPVERB = 72D - 70D = 2)

R0035 UPOLDMOD (1) FOR MAJOR MODE INTERRUPTED BY P27.

R0036 COMPNUMB (1) TOTAL NUMBER OF COMPONENTS TO BE TRANSMITTED.

R0038 UPCOUNT (1) ACTUAL NUMBER OF COMPONENTS RECEIVED.

R0039 UPTEMP (1) SCRATCH, BUT USUALLY CONTAINS COMPONENT NUMBER TO BE CHANGED DURING VERIFY CYCLE

R0041 INPUT:

R0042 ENTRY: DESCRIPTION

R0043 V70EXXXXXXEXXXXXE (LIFTOFF TIME INCREMENT) DOUBLE PRECISION OCTAL TIME INCREMENT, XXXXX XXXXX,

R0045 IS ADDED TO TEPHEM, SUBTRACTED FROM AGC CLOCK (TIME2, TIME1), SUBTRACTED FROM CSM STATE

R0047 VECTOR TIME (TETCSM) AND SUBTRACTED FROM LEM STATE VECTOR TIME (TETLEM).

R0049 THE DP OCTAL TIME INCREMENT IS SCALED AT 2(28).

L UPDATE PROGRAM

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R0050 V71E1IEAAAAE (CONTIGUOUS BLOCK UPDATE) 11-2 OCTAL COMPONENTS,XXXXX,
 R0051 XXXXXE ARE LOADED INTO ERASABLE STARTING AT ECADR, AAAA.
 R0052 XXXXXE IT IS .GE. 3 .AND. .LE. 200..
 R0053 AND (AAAA + 11 - 3) DOES NOT PRODUCE AN ADDRESS IN THE
 R0054 9 NEXT BANK
 R0055 . SCALING IS SAME AS INTERNAL REGISTERS.

R0056 V72E1IE (SCATTER UPDATE) (11-1)/2 OCTAL COMPONENTS,XXXXX, ARE
 R0057 AAAAEXXXXXE LOADED INTO ERASABLE LOCATIONS, AAAA.
 R0058 AAAAEXXXXXE 11 IS .GE. 3 .AND. .LE. 190, AND MUST BE ODD.
 R0060 . SCALING IS SAME AS INTERNAL REGISTERS.

R0061 V73EXXXXXEXXXXXE (OCTAL CLOCK INCREMENT) DOUBLE PRECISION OCTAL TIME
 R0062 INCREMENT XXXXX XXXXX, IS ADDED TO THE AGC CLOCK, IN
 R0063 CENTISECONDS SCALED AT (2)28.
 R0064 THIS LOAD IS THE OCTAL EQUIVALENT OF V55.

R0065 OUTPUT: IN ADDITION TO THE ABOVE REGISTER LOADS, ALL UPDATES
 R0066 COMPLEMENT BIT3 OF FLAGWORD7.

R0067 ADDITIONAL NOTES: VERB 71, JUST DEFINED ABOVE WILL BE USED TO PERFORM BUT NOT LIMITED TO THE FOLLOWING UPDATES--

R0069 1. CSM/LM STATE VECTOR UPDATE
 R0072 2. REFSMMAT UPDATE

R0073 THE FOLLOWING COMMENTS DELINEATE EACH SPECIAL UPDATE----

R0074 1. CSM/LM STATE VECTOR UPDATE (ALL DATA ENTRIES IN OCTAL)

ENTRIES:	DATA DEFINITION:	SCALE FACTORS:
R0075 V71E	CONTIGUOUS BLOCK UPDATE VERB	
R0078 21E	NUMBER OF COMPONENTS FOR STATE VECTOR UPDATE	
R0080 AAAAE	ECADR OF 'UPSVFLAG'	
R0082 XXXXXE	STATE VECTOR IDENTIFIER: 00001 FOR CSM, 77776 FOR LEM - EARTH SPHERE OF INFLUENCE SCALING	
R0083	00002 FOR CSM, 77775 FOR LEM - LUNAR SPHERE OF INFLUENCE SCALING	
R0084 XXXXXEXXXXXE	X POSITION	
R0086 XXXXXEXXXXXE	Y POSITION	
R0088 XXXXXEXXXXXE	Z POSITION	
R0090 XXXXXEXXXXXE	X VELOCITY	
R0092 XXXXXEXXXXXE	Y VELOCITY	
R0094 XXXXXEXXXXXE	Z VELOCITY	
R0096 XXXXXEXXXXXE	TIME FROM AGC CLOCK ZERO	
R0098 V33E	VERB 33 TO SIGNAL THAT THE STATE VECTOR IS READY TO BE STORED.	

R0144 2. REFSMMAT (ALL DATA ENTRIES IN OCTAL)
 R0145 ENTRIES: DATA DEFINITIONS:

SCALE FACTORS:

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R0147 V71E CONTIGUOUS BLOCK UPDATE VERB
 R0148 24E NUMBER OF COMPONENTS FOR REFSMMAT UPDATE
 R0150 AAAAE ECADR OF 'REFSMMAT'
 R0152 XXXXXE XXXXE ROW 1 COLUMN 1 2(-1)
 R0154 XXXXXE XXXXE ROW 1 COLUMN 2 2(-1)
 R0156 XXXXXE XXXXE ROW 1 COLUMN 3 2(-1)
 R0158 XXXXXE XXXXE ROW 2 COLUMN 1 2(-1)
 R0160 XXXXXE XXXXE ROW 2 COLUMN 2 2(-1)
 R0162 XXXXXE XXXXE ROW 2 COLUMN 3 2(-1)
 R0164 XXXXXE XXXXE ROW 3 COLUMN 1 2(-1)
 R0166 XXXXXE XXXXE ROW 3 COLUMN 2 2(-1)
 R0168 XXXXXE XXXXE ROW 3 COLUMN 3 2(-1)
 R0170 V33E VERB 33 TO SIGNAL THAT REFSMMAT IS READY TO BE STORED.

0171 07,3773 BANK 07
 0172 REF 7 LAST 297 43,2000 SETLOC EXTVERBS
 0173 43,3724 BANK

0174 REF 4 LAST 985 E3,1706 EBANK= TEPHEM

0175 REF 1 COUNT* \$\$/P27
 0176 REF 1 43,3724 3 4755 1 V70UPDAT CAF UP70 COMES HERE ON V70E
 0177 REF 2 LAST 262 43,3725 1 3733 1 TCF V73UPDAT +1

0178 REF 1 43,3726 3 4753 1 V71UPDAT CAF UP71 COMES HERE ON V71E
 0179 REF 3 LAST 1388 43,3727 1 3733 1 TCF V73UPDAT +1

0180 REF 1 43,3730 3 4752 0 V72UPDAT CAF UP72 COMES HERE ON V72E
 0181 REF 4 LAST 1388 43,3731 1 3733 1 TCF V73UPDAT +1

0182 REF 1 43,3732 3 6245 1 V73UPDAT CAF UP73 COMES HERE ON V73E

0183 REF 1 43,3733 55'166 0 +1 TS UPVERBSV SAVE UPVERB UNTIL IT'S OK TO ENTER P27

0184 REF 19 LAST 298 43,3734 0 2076 1 TC TESTXACT GRAB DISPLAY IF AVAILABLE, OTHERWISE
 A0185 TURN*OPERATOR ERROR* ON AND TERMINATEJOB

0186 REF 24 LAST 1294 43,3735 3 1011 0 CA MODREG CHECK IF UPDATE ALLOWED
 0187 43,3736 0 0006 1 EXTEND FIRST CHECK FOR MODREG = +0, -0
 0188 43,3737 1 3742 1 BZF +3 (+0 = P00, -0 = FRESHSTART)
 0189 REF 59 LAST 1383 43,3740 0 4635 0 UPERROR TC POSTJUMP TURN ON 'OPERATOR ERROR' LIGHT
 0190 REF 1 43,3741 11762 1 CADR UPERREUT +2 GO TO COMMON UPDATE PROGRAM EXIT

0191 REF 25 LAST 1388 43,3742 31'011 0 CAE MODREG UPDATE ALLOWED.
 01915 REF 1 43,3740 CKMDMORE UPERROR
 0192 REF 2 LAST 104 43,3743 55'171 0 TS UPOLDMOD SAVE CURRENT MAJOR MODE

L UPDATE PROGRAM

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0193	REF	2	LAST	1388	43,3744	31'166 1	CAE	UPVERBSV	SET UPVERB TO INDICATE TO P27
0194	REF	2	LAST	104	43,3745	55'172 0	TS	UPVERB	WHICH EXTENDED VERB CALLED IT.
0195	REF	146	LAST	1375	43,3746	3 4753 1	CAF	ONE	
0196	REF	2	LAST	104	43,3747	55'173 1	TS	UPCOUNT	INITIALIZE UPCOUNT TO 1
0197	REF	60	LAST	1388	43,3750	0 4635 0	TC	POSTJUMP	LEAVE EXTENDED VERB BANK AND
0198	REF	1			43,3751	11401 1	CADR	UPPART2	GO TO UPDATE PROGRAM(P27) BANK.
0211	REF	261	LAST	1377	4755		UP70	EQUALS ZERO	
0212	REF	147	LAST	1389	4753		UP71	EQUALS ONE	
0213	REF	89	LAST	1383	4752		UP72	EQUALS TWO	
0214	REF	43	LAST	1372	6245		UP73	EQUALS THREE	
0215					04,3401		BANK	04	
0216	REF	2	LAST	1225	04,2000		SETLOC	UPDATE2	
0217					04,3401		BANK		
0218	REF	1					COUNT*	\$/P27	
0219					04,3401		UPPART2	EQUALS	UPDATE PROGRAM - PART 2
0220	REF	114	LAST	1335	04,3401	0 5353 1	TC	PHASCHNG	SET RESTART GROUP 6 TO RESTORE OLD MODE
0221					04,3402	07026 1	OCT	07026	AND DOWNLIST AND EXIT IF RESTART OCCURS.
0222					04,3403	30000 1	OCT	30000	PRIORITY SAME AS CHRPRIO
0223	REF	4	LAST	204	1174		EBANK	UPBUFF	
0224	REF	1			04,3404	03712 0	2CADR	UPOUT +1	
0224	REF	1			04,3405	10102 0			
0225	REF	148	LAST	1389	04,3406	3 4753 1	CAF	ONE	
0226	REF	9	LAST	992	04,3407	54 332 1	TS	DNLSTCOD	DOWNLIST
0227	REF	6	LAST	802	04,3410	0 5311 1	TC	NEWMODEX	SET MAJOR MODE = 27
0228					04,3411	00033 1	DEC	27	
0229	REF	3	LAST	1389	04,3412	51'172 1	INDEX	UPVERB	BRANCH DEPENDING ON WHETHER THE UPDATE
0230					04,3413	1 3414 1	TCF	+1	VERB REQUIRES A FIXED OR VARIABLE NUMBER
0231					04,3414	1 3417 1	TCF	+3	V70 FIXED. (OF COMPONENTS.
0232	REF	1			04,3415	1 3422 1	TCF	OHWELL1	V71 VARIABLE -- GO GET NO. OF COMPONENTS
0233	REF	2	LAST	1389	04,3416	1 3422 1	TCF	OHWELL1	V72 VARIABLE -- GO GET NO. OF COMPONENTS
0234	REF	90	LAST	1389	04,3417	3 4752 0	CA	TWO	V73 (AND V70) FIXED
0235	REF	3	LAST	204	04,3420	55'170 1	TS	COMPNUMB	SET NUMBER OF COMPONENTS TO 2.
0236	REF	1			04,3421	1 3445 0	TCF	OHWELL2	GO GET THE TWO UPDATE COMPONENTS
0237	REF	1			04,3422	3 3515 0	OHWELL1	CAF	* REQUEST USER TO SEND NUMBER *
0238	REF	829	LAST	1373	04,3423	54 156 1	TS	MPAC +2	* OF COMPONENTS PARAMETER(II). *
0239	REF	1			04,3424	3 3516 0	CAF	UPLOADNV	(CK4V32 RETURNS HERE IF V32 ENCOUNTERED)
0240	REF	317	LAST	1383	04,3425	0 4616 1	TC	BANKCALL	DISPLAY A FLASHING V21N01

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0241	REF	11	LAST	717	04,3426	20334 1	CADR	GUXDSPF	TO REQUEST II.
0242	REF	1			04,3427	1 3712 1	TCF	UPOUT4	V34 TERMINATE UPDATE(P27) RETURN
0243	REF	3	LAST	1389	04,3430	1 3424 1	TCF	OHWELL1 +2	
0244	REF	1			04,3431	0 3506 1	TC	CK4V32	DATA OR V32 RETURN
0245	REF	50	LAST	1285	04,3432	4 4752 1	CS	BIT2	
0246	REF	5	LAST	1389	04,3433	6 1174 1	AD	UPBUFF	IS II (NUMBER OF COMPONENTS PARAMETER)
0247					04,3434	0 0006 1	EXTEND		.GE. 3 AND .LE. 20D.
0248	REF	4	LAST	1390	04,3435	6 3424 0	BZMF	OHWELL1 +2	
0249	REF	6	LAST	1390	04,3436	4 1174 0	CS	UPBUFF	
0250	REF	1			04,3437	6 4362 1	AD	UP21	
0251					04,3440	0 0006 1	EXTEND		
0252	REF	5	LAST	1390	04,3441	6 3424 0	BZMF	OHWELL1 +2	
0253	REF	7	LAST	1390	04,3442	31 1174 1	CAE	UPBUFF	
0254	REF	4	LAST	1389	04,3443	55 1170 1	TS	COMPNUMB	SAVE II IN COMPNUMB

R0257-----UPBUFF LOADING SEQUENCE-----

02571	REF	3	LAST	1389	04,3444	25 1173 0	INCR	UPCOUNT	INCREMENT COUNT OF COMPONENTS RECEIVED.
0258	REF	1			04,3445	3 3662 0	CAF	ADUPBFM1	CALCULATE LOCATION(ECADR) IN UPBUFF
0259	REF	4	LAST	1390	04,3446	6 1173 0	AD	UPCOUNT	WHERE NEXT COMPONENT SHOULD BE STORED.
0260	REF	830	LAST	1389	04,3447	54 156 1	TS	MPAC +2	PLACE ECADR INTO R3.
0261	REF	2	LAST	1389	04,3450	3 3516 0	CAF	UPLOADNV	(CK4V32 RETURNS HERE IF V32 ENCOUNTERED)
0262	REF	318	LAST	1389	04,3451	0 4616 1	TC	BANKCALL	DISPLAY A FLASHING V21N01
0263	REF	12	LAST	1390	04,3452	20334 1	CADR	GUXDSPF	TO REQUEST DATA.
0264	REF	2	LAST	1390	04,3453	1 3712 1	TCF	UPOUT4	V34 TERMINATE UPDATE(P27) RETURN.
0265	REF	2	LAST	1389	04,3454	1 3450 1	TCF	OHWELL2 +3	V33 PROCEED RETURN
0266	REF	2	LAST	1390	04,3455	0 3506 1	TC	CK4V32	DATA OR V32 RETURN
0267	REF	5	LAST	1390	04,3456	4 1173 1	CS	UPCOUNT	HAVE WE FINISHED RECEIVING ALL
0268	REF	5	LAST	1390	04,3457	6 1170 0	AD	COMPNUMB	THE DATA WE EXPECTED.
0269					04,3460	0 0006 1	EXTEND		
0270	REF	1			04,3461	6 3463 0	BZMF	UPVERIFY	YES- GO TO VERIFICATION SEQUENCE
0272	REF	3	LAST	1390	04,3462	1 3444 1	TCF	OHWELL2 -1	NO- REQUEST ADDITIONAL DATA.

R0273-----VERIFY SEQUENCE-----

0274	REF	1			04,3463	3 3514 1	UPVERIFY	CAF	ADUPTMP	PLACE ECADR WHERE COMPONENT NO. INDEX
0275	REF	831	LAST	1390	04,3464	54 156 1	TS	MPAC +2	IS TO BE STORED INTO R3.	
0276	REF	1			04,3465	3 3517 1	CAF	UPVRFYNV	(CK4V32 RETURNS HERE IF V32 ENCOUNTERED)	
0277	REF	319	LAST	1390	04,3466	0 4616 1	TC	BANKCALL	DISPLAY A FLASHING V21N02 TO REQUEST	
0278	REF	13	LAST	1390	04,3467	20334 1	CADR	GUXDSPF	DATA CORRECTION OR VERIFICATION.	
0279	REF	3	LAST	1390	04,3470	1 3712 1	TCF	UPOUT4	V34 TERMINATE UPDATE(P27) RETURN	
0280	REF	1			04,3471	1 3520 1	TCF	UPSTORE	V33 DATA SENT IS GOOD. GO STORE IT.	
0281	REF	3	LAST	1390	04,3472	0 3506 1	TC	CK4V32	COMPONENT NO. INDEX OR V32 RETURN	
0282	REF	4	LAST	104	04,3473	3 1167 0	CA	UPIFHP	DOES THE COMPONENT NO. INDEX JUST SENT	
0283					04,3474	0 0006 1	EXTEND		SPECIFY A LEGAL COMPONENT NUMBER?	
0284	REF	2	LAST	1390	04,3475	6 3463 0	BZMF	UPVERIFY	NO. IT IS NOT POSITIVE NONZERO	
0285	REF	5	LAST	1390	04,3476	4 1167 1	CS	UPTMP		
0288	REF	6	LAST	1390	04,3477	6 1170 0	AD	COMPNUMB		

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0289	REF 56	LAST 1327	04,3500	6 4753 1	AD	BIT1	
0290			04,3501	0 0006 1	EXTEND		
0291	REF 3	LAST 1390	04,3502	6 3463 0	BZMF	UPVERIFY	NO
0292	REF 2	LAST 1390	04,3503	3 5662 0	CAF	ADUPBFM1	YES- BASED ON THE COMPONENT NO. INDEX
0293	REF 6	LAST 1390	04,3504	6 1167 0	AD	UPTMP	CALCULATE THE ECADR OF LOCATION IN
0294	REF 4	LAST 1390	04,3505	1 3447 1	TCF	QHWELL2 +2	UPBUFF WHICH USER WANTS TO CHANGE.
0295	REF 2	LAST 1389	04,3712		UPOUT4	EQUALS UPGUT +1	COMES HERE ON V34 TO TERMINATE UPDATE

R0296-----CHECK FOR VERB 32 SEQUENCE-----

0297	REF 832	LAST 1390	04,3506	4 0154 0	CK4V32	CS	MPAC	ON DATA RETURN FROM 'GOXDSPF'
0298	REF 58	LAST 1366	04,3507	7 4746 1		MASK	BIT6	ON DATA RETURN FROM "GOXDSP" & THE CON-
0299	REF 460	LAST 1383	04,3510	10 000 0		CCS	A	TENTS OF MPAC = VERB. SO TEST FOR V32.
0300	REF 382	LAST 1385	04,3511	0 0002 0		TC	Q	IT'S NOT A V32, IT'S DATA. PROCEED.
0301	REF 383	LAST 1391	04,3512	50 002 0		INDEX	Q	
0302			04,3513	7 7771 0		TC	Q -6	V32 ENCOUNTERED - GO BACK AND GET DATA
0305	REF 7	LAST 1391	04,3514	01167 0	ADUPTMP	ADRES	UPTMP	ADDRESS OF TEMP STORAGE FOR CORRECTIONS
0306	REF 8	LAST 1390	04,3515	01174 1	ADUPBUFF	ADRES	UPBUFF	ADDRESS OF UPDATE DATA STORAGE BUFFER
0307			04,3516	05201 1	UPLOADNV	VN	2101	VERB 21 NOUN 01
0308			04,3517	05202 1	UPVRFYNV	VN	2102	VERB 21 NOUN 02
0309	REF 4	LAST 1099	4362		UP21	=	MD1	DEC 21 = MAX NO OF COMPONENTS +1
03121	REF 23	LAST 1356	4756		UPDTPHAS	EQUALS	FIVE	

R0313-----PRE-STORE AND FAN TO APPROPRIATE BRANCH SEQUENCE-----

0314			04,3520		UPSTORE	EQUALS		GROUND HAS VERIFIED UPDATE. STORE DATA.
0315			04,3520	0 0004 0		INHINT		
0316	REF 32	LAST 1383	04,3521	30 103 0	CAE	FLAGWRD7		INVERT VERIFLAG(BIT3 OF FLAGWRD7) TO
0317	REF 255	LAST 1384	04,3522	56 001 0	XCH	L		INDICATE TO THE GROUND(VIA DOWNLINK)
0318	REF 1		04,3523	3 4751 0	CAF	VERIFBIT		THAT THE V33 (WHICH THE GROUND SENT TO
0319			04,3524	0 0006 1	EXTEND			VERIFY THE UPDATE) HAS BEEN SUCCESSFULLY
0320	REF 17	LAST 1375	04,3525	06 001 0	RXOR	LCHAN		RECEIVED BY THE UPDATE PROGRAM
0321	REF 33	LAST 1391	04,3526	54 103 1	TS	FLAGWRD7		
0322	REF 115	LAST 1389	04,3527	0 5353 1	TC	PHASCHNG		SET RESTART GROUP 6 TO REDO THE UPDATE
0323			04,3530	04026 1	OCT	04026		DATA STORE IF A RESTART OCCURS.
0324			04,3531	0 0004 0		INHINT		(BECAUSE PHASCHNG DID A RELINT)
0325	REF 91	LAST 1389	04,3532	4 4752 1	CS	TWJ		GO TO UPENDVAC IF INSTALL IS REQUIRED.
0326	REF 4	LAST 1389	04,3533	6 1172 1	AD	UPVERB		THAT IS, IF IT'S A V70 - V72.
0327			04,3534	0 0006 1	EXTEND			GO TO UPEND73 IF IT'S A V73.
0328	REF 1		04,3535	6 3544 1	BZMF	UPENDVAC		

R0330-----VERB 73 BRANCH-----

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0331				04,3536	0 0006 1	UPEND73	EXTEND	V73-PERFORM DP OCTAL AGC CLOCK INCREMENT
0332	REF	9	LAST 1391	04,3537	3 1175 0		DCA UPBUFF	
0333	REF	10	LAST 1392	04,3540	53 205 0		DXCH UPBUFF +8D	
0334	REF	1		04,3541	0 3567 0		TC TIMEDIDL	
0335	REF	9	LAST 836	04,3542	0 4364 1		TC FALTON	ERROR- TURN ON *OPERATOR ERROR* LIGHT
0336	REF	3	LAST 1391	04,3543	0 3712 0		TC UPOUT +1	GO TO COMMON-UPDATE-PROGRAM-EXIT
0337	REF	7	LAST 1388	04,3544	3 4355 0	UPFNDVAC	CAF CHRPRIO	(USE EXTENDED VERB PRIORITY)
0338	REF	45	LAST 1367	04,3545	0 5105 0		TC FINDVAC	GET VAC AREA FOR 'CALL-INTSTALL'
0339	REF	5	LAST 1388	E3,1706			EBANK= TEPHEN	
0340	REF	1		04,3546	03551 0		2CADR UPJOB	(NOTE: THIS WILL ALSO SET EBANK FOR
0340	REF	1		04,3547	10103 1			
0341	REF	158	LAST 1384	04,3550	0 5155 0		TC ENDUFJOB	'TEPHEN' UPDATE BY V70)
0342	REF	242	LAST 1265	04,3551	0 6047 0	UPJOB	TC INTERPRET	THIS COULD BE A STATE VECTOR UPDATE--SO
0343				04,3552	77624 1		CALL	WAIT(PUT JOB TO SLEEP) IF ORBIT INT(OI)
0344	REF	38	LAST 1223	04,3553	27414 0		INTSTALL	IS IN PROGRESS--OR--GRAB OI AND RETURN
A0345								TO UPWAKE IF OI IS NOT IN PROGRESS.
0346				04,3554	77776 1	UPWAKE	EXIT	
0347	REF	116	LAST 1391	04,3555	0 5553 1		TC PHASCHNG	RESTART PROTECT(GROUP 6)
0348				04,3556	04026 1		OCT 04026	
0350	REF	73	LAST 1365	04,3557	0 5504 0		TC UPFLAG	SET INTEGRATION RESTART BIT
0351	REF	5	LAST 1242	04,3560	00236 0		ADRES REINTFLG	
0352				04,3561	0 0004 0		INHINT	
0355				04,3562		UPPART3	EQUALS	
0356	REF	5	LAST 1391	04,3562	51 172 1		INDEX UPVERB	BRANCH TO THE APPROPRIATE UPDATE VERB
0357				04,3563	1 3564 1		TCF +1	ROUTINE TO ACTUALLY PERFORM THE UPDATE
0358	REF	1		04,3564	1 3723 0		TCF UPEND70	V70
0359	REF	1		04,3565	1 3632 1		TCF UPEND71	V71
0360	REF	1		04,3566	1 3664 1		TCF UPEND72	V72

R0361 ROUTINE TO INCREMENT CLOCK(TIME2,TIME1) WITH CONTENTS OF DP WORD AT UPBUFF.

0363				04,3567	0 0006 1	TIMEDIDL	EXTEND	
0364	REF	8	LAST 1391	04,3570	23 167 0		QXCH UPTMP	SAVE Q FOR RETURN
0365	REF	262	LAST 1389	04,3571	3 4755 1		CAF ZERO	ZERO AND SAVE TIME2,TIME1
0366				04,3572	22 007 0		ZL	
0367	REF	36	LAST 1337	04,3573	52 025 1		DXCH TIME2	
0368	REF	11	LAST 1392	04,3574	53 217 0		DXCH UPBUFF +18D	STORE IN CASE OF OVERFLOW
0369	REF	1		04,3575	3 4756 1		CAF UPDTPHAS	DO
0370	REF	256	LAST 1391	04,3576	54 001 1		TS L	A
0371				04,3577	4 0000 0		COM	QUICK
03711	REF	5	LAST 865	04,3600	52 765 1		DXCH -PHASE6	PHASCHNG

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0372			04,3601	0 0004 0	TIMEDIDK	INHINT		
0373	REF 263	LAST 1392	04,3602	3 4755 1	CAF	ZERO		
0374			04,3603	22 007 0	ZL		PICK UP INCREMENTER(AND ZERO	
0375	REF 833	LAST 1391	04,3604	54 156 1	TS	MPAC +2	IT IN CASE OF RESTARTS) AND	
0376	REF 12	LAST 1392	04,3605	53 205 0	DXCH	UPBUFF +8D	STORE IT	
0377	REF 834	LAST 1393	04,3606	52 155 1	DXCH	MPAC	INTO MPAC FOR TPAGREE.	
0378			04,3607	0 0006 1	EXTEND			
0379	REF 13	LAST 1393	04,3610	3 1217 1	DCA	UPBUFF +18D		
0380	REF 835	LAST 1393	04,3611	20 155 1	DAS	MPAC	FORM SUM IN MPAC	
0381			04,3612	0 0006 1	EXTEND			
0382	REF 1		04,3613	1 3622 0	BZF	DELTATOK	TEST FOR OVERFLOW	
0383	REF 264	LAST 1393	04,3614	3 4755 1	CAF	ZERO		
0384	REF 14	LAST 1393	04,3615	53 217 0	DXCH	UPBUFF +18D	OVERFLOW, RESTORE OLD VALUE OF CLOCK	
0385	REF 37	LAST 1392	04,3616	20 025 1	DAS	TIME2	AND TURN ON OPERATOR ERROR	
0386	REF 117	LAST 1392	04,3617	0 5353 1	TC	PHASCHNG	RESTART PROTECT(GROUP 6)	
0387			04,3620	04026 1	OCT	04026		
0388	REF 9	LAST 1392	04,3621	0 1167 0	TC	UPTMP	GO TO ERROR EXIT	
0389	REF 18	LAST 1337	04,3622	0 7257 0	DELTATOK	TC	TPAGREE	FORCE SIGN AGREEMENT
0390	REF 836	LAST 1393	04,3623	52 155 1	DXCH	MPAC		
0391	REF 38	LAST 1393	04,3624	20 025 1	DAS	TIME2	INCREMENT TIME2, TIME1	
0392	REF 118	LAST 1393	04,3625	0 5353 1	TC	PHASCHNG	RESTART PROTECT(GROUP 6)	
0393			04,3626	04026 1	OCT	04026		
0394			04,3627	0 0004 0	INHINT			
0395	REF 10	LAST 1393	04,3630	51 167 0	INDEX	UPTMP	(CODED THIS WAY FOR RESTART PROTECTION)	
0396			04,3631	0 0001 0	TC	1	NORMAL RETURN	
0397	VERB 71 BRANCH							
0402	REF 15	LAST 1393	04,3632	31 175 0	UPEND71	CAE	UPBUFF +1	SET EBANK
0403	REF 79	LAST 1364	04,3633	54 003 0	TS	EBANK	AND	
0404	REF 20	LAST 1324	04,3634	7 4357 0	MASK	LOW8	CALCULATE	
0405	REF 11	LAST 1393	04,3635	55 167 1	TS	UPTMP	S-REG VALUE OF RECEIVING AREA	
0406	REF 5	LAST 1324	04,3636	6 7745 0	AD	NEG3	IN THE PROCESS OF	
0407	REF 7	LAST 1390	04,3637	6 1170 0	AD	COMPNUMB	PERFORMING	
0408			04,3640	0 0006 1	EXTEND		THIS UPDATE	
0409	REF 1		04,3641	1 3647 0	BZF	STORLP71	WILL WE	
0410	REF 32	LAST 1332	04,3642	7 4743 1	MASK	BIT9	OVERFLOW	
0411	REF 461	LAST 1391	04,3643	10 000 0	CCS	A	INTO THE NEXT EBANK....	
0412	REF 2	LAST 1388	04,3644	1 3760 1	TCF	UPERROUT	YES	
0413	REF 6	LAST 1393	04,3645	3 7745 0	CA	NEG	NO- CALCULATE NUMBER OF	
0414	REF 8	LAST 1393	04,3646	6 1170 0	AD	COMPNUMB	WORDS TO BE STORED MINUS ONE	
0415	REF 837	LAST 1393	04,3647	54 154 0	STORLP71	TS	MPAC	SAVE NO. OF WORDS REMAINING MINUS ONE

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0416	REF 462	LAST 1393	04,3650	50 000 1	INDEX	A	TAKE NEXT UPDATE WORD FROM
0417	REF 16	LAST 1393	04,3651	3 1176 0	CA	UPBUFF +2	UPBUFF AND
0418	REF 257	LAST 1392	04,3652	54 001 1	TS	L	SAVE IT IN L
0419	REF 838	LAST 1393	04,3653	3 0154 1	CA	MPAC	CALCULATE NEXT
0420	REF 12	LAST 1393	04,3654	6 1167 0	AD	UPTMP	RECEIVING ADDRESS
0421	REF 463	LAST 1394	04,3655	50 000 1	INDEX	A	
0422			E3,1400		EBANK=	1400	
0423			04,3656	23 1400 1	LXCH	1400	UPDATE THE REGISTER BY CONTENTS OF L
0424	REF 6	LAST 1392	E3,1706		EBANK=	TEPHM	
0425	REF 839	LAST 1394	04,3657	10 154 0	CCS	MPAC	ARE THERE ANY WORDS LEFT TO BE STORED
0426	REF 2	LAST 1393	04,3660	1 3647 0	TCF	STURLP71	YES
0427	REF 4	LAST 1392	04,3661	1 3711 1	TCF	UPOUT	NO- THEN EXIT UPDATE PROGRAM
0428	REF 17	LAST 1394	04,3662	0 1173 0	ADUPBFM1	ADRES UPBUFF -1	SAME AS ADUPBUFF BUT LESS 1 (DON'T MOVE)
0429	REF 5	LAST 1394	04,3663	1 3711 1	TCF	UPOUT	NO- EXIT UPDATE(HERE WHEN COMPNUMB = 3)

R0430 VERB 72 BRANCH

0431	REF 57	LAST 1391	04,3664	3 4753 1	UPEND72	CAF	BIT2	HAVE AN ODD NO. OF COMPONENTS
0432	REF 9	LAST 1393	04,3665	7 1170 1		MASK	COMPNUMB	BEEN SENT FOR A V72 UPDATE...
0433	REF 464	LAST 1394	04,3666	10 000 0		CCS	A	
0434			04,3667	1 3671 0		TCF	+2	YES
0435	REF 3	LAST 1393	04,3670	1 3760 1		TCF	UPERROUT	ERROR- SHOULD BE ODD NO. OF COMPONENTS
0451	REF 51	LAST 1390	04,3671	4 4752 1		CS	BIT2	
0452	REF 10	LAST 1394	04,3672	6 1170 0		AD	COMPNUMB	
0453	REF 840	LAST 1394	04,3673	54 154 0	LDLOOP72	TS	MPAC	NOW PERFORM THE UPDATE
0454	REF 465	LAST 1394	04,3674	50 000 1		INDEX	A	
0455	REF 19	LAST 1394	04,3675	31 1175 0		CAE	UPBUFF +1	PICK UP NEXT UPDATE WORD
0456	REF 466	LAST 1394	04,3676	22 000 1		LXCH	A	
0457	REF 841	LAST 1394	04,3677	10 154 0		CCS	MPAC	SET POINTER TO ECADR(MUST BE CCS)
0458	REF 842	LAST 1394	04,3700	54 154 0		TS	MPAC	
0459	REF 467	LAST 1394	04,3701	50 000 1		INDEX	A	
0460	REF 19	LAST 1394	04,3702	31 1175 0		CAE	UPBUFF +1	PICK UP NEXT ECADR OF REG TO BE UPDATED
0461	REF 80	LAST 1393	04,3703	54 003 0		TS	EBANK	SET EBANK
0462	REF 21	LAST 1393	04,3704	7 4357 0		MASK	LOW8	ISOLATE RELATIVE ADDRESS
0463	REF 468	LAST 1394	04,3705	50 000 1		INDEX	A	
0464			E3,1400			EBANK=	1400	
0465			04,3706	23 1400 1		LXCH	1400	UPDATE THE REGISTER BY CONTENTS OF L
0466	REF 7	LAST 1394	E3,1706			EBANK=	TEPHM	
0467	REF 843	LAST 1394	04,3707	10 154 0		CCS	MPAC	ARE WE THROUGH THE V72 UPDATE...
0468	REF 1		04,3710	1 3673 1		TCF	LDLOOP72	NO

R0469 NORMAL FINISH OF P27

0470			04,3711		UPOUT	EQUALS		
0471	REF 1		04,3711	0 3165 0		TC	INTWAKEU	RELEASE GRAB OF ORBITAL INTEGRATION
0472	REF 3	LAST 1388	04,3712	31 1171 1	+1	CAE	UPOLDMOD	RESTORE PRIOR P27 MODE
0473	REF 7	LAST 1389	04,3713	0 5314 1		TC	NEWMODEX +3	
0474	REF 265	LAST 1393	04,3714	3 4755 1		CAF	ZERO	

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0475	REF	10	LAST	1389	04,3715	54 332 1	TS	DNLSSTCOD	
0476	REF	1			04,3716	0 3765 0	TC	UPACTOFF	TURN OFF 'UPLINK ACTIVITY' LIGHT
0477					04,3717	0 0006 1	EXTEND		KILL-GROUP 6.
0478	REF	29	LAST	1313	04,3720	3 4755 1	DCA	NEGO	
0479	REF	6	LAST	1392	04,3721	52 765 1	DXCH	PHASE6	
0480	REF	43	LAST	718	04,3722	0 5472 0	TC	ENDEXT	EXTENDED VERB EXIT

R0481 VERB 70 BRANCH

0482					04,3723	0 0006 1	UPEND70	EXTEND	V70 DOES THE FOLLOWING WITH DP DELTA
0483	REF	20	LAST	1394	04,3724	4 1175 1	DCS	UPBUFF	TIME IN-UPBUFF
0484	REF	21	LAST	1395	04,3725	53 205 0	DXCH	UPBUFF +8D	
0485	REF	2	LAST	1392	04,3726	0 3567 0	TC	TIMEDIDL	DECREMENT AGC CLOCK
0486	REF	4	LAST	1394	04,3727	0 3760 0	TC	UPERROUT	ERROR WHILE DECREMENTING CLOCK -- EXIT
0487	REF	8	LAST	1394	E3,1706		EBANK=	TEPHEM	
0488					04,3730	0 0006 1	EXTEND		
0489	REF	22	LAST	1395	04,3731	4 1175 1	DCS	UPBUFF	COPY DECREMENTERS FOR
0490	REF	23	LAST	1395	04,3732	53 207 1	DXCH	UPBUFF +10D	RESTART PROTECTION
0491					04,3733	0 0006 1	EXTEND		
0492	REF	24	LAST	1395	04,3734	4 1175 1	DCS	UPBUFF	
0493	REF	25	LAST	1395	04,3735	53 211 0	DXCH	UPBUFF +12D	
0494	REF	119	LAST	1393	04,3736	0 5353 1	TC	PHASCHNG	RESTART PROTECT(GROUP 6)
0495					04,3737	04026 1	OCT	04026	
0496	REF	266	LAST	1394	04,3740	3 4755 1	CAF	ZERO	
0497					04,3741	22 007 0	ZL		
0498	REF	26	LAST	1395	04,3742	53 207 1	DXCH	UPBUFF +10D	DECREMENT CSM STATE VECTOR TIME
0499	REF	5	LAST	500	04,3743	21 571 1	DAS	TETGSM	
0500	REF	267	LAST	1395	04,3744	3 4755 1	CAF	ZERO	
0501					04,3745	22 007 0	ZL		
0502	REF	27	LAST	1395	04,3746	53 211 0	DXCH	UPBUFF +12D	DECREMENT LEM STATE VECTOR TIME
0503	REF	4	LAST	622	04,3747	21 643 0	DAS	TETLEM	
0504	REF	268	LAST	1395	04,3750	3 4755 1	CAF	ZERO	
0505					04,3751	22 007 0	ZL		
0506	REF	28	LAST	1395	04,3752	53 175 1	DXCH	UPBUFF	
0507	REF	9	LAST	1395	04,3753	21 710 1	DAS	TEPHEM +1	INCREMENT TP TEPHEM
0508	REF	10	LAST	1395	04,3754	27 706 0	ADS	TEPHEM	
0509	REF	120	LAST	1395	04,3755	0 5353 1	TC	PHASCHNG	RESTART PROTECT(GROUP 6)
0510					04,3756	04026 1	OCT	04026	
0511	REF	29	LAST	1395	1174		EBANK=	UPBUFF	

L UPDATE PROGRAM

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0512 REF 6 LAST 1394 04,3757 0 3711 0 TC UPLUT GO TO STANDARD UPDATE PROGRAM EXIT

R0513 ERROR SEQUENCE

0514 REF 10 LAST 1392 04,3760 0 4364 1 UPERROUT TC FALTON TURN ON *OPERATOR ERROR* LIGHT
0515 REF 7 LAST 1396 04,3761 1 3711 1 TCF UPLUT GO TO COMMON UPDATE PROGRAM EXIT

0516 REF 11 LAST 1396 04,3762 0 4364 1 +2 TC FALTON TURN ON 'OPERATOR ERROR' LIGHT
0517 REF 2 LAST 1395 04,3763 0 3765 0 TC UPACTOFF TURN OFF 'UPLINK ACTIVITY' LIGHT
0518 REF 44 LAST 1395 04,3764 0 5472 0 TC ENDEXT EXTENDED-VERB-EXIT
A0519 (THE PURPOSE OF UPERROUT +2 EXIT IS
A0520 TO PROVIDE AN ERROR EXIT WHICH DOES NOT
A0521 RESET ANY RESTART GROUPS)
A0522

R0523 :UPACTOFF: IS A ROUTINE TO TURN OFF UPLINK ACTIVITY LIGHT ON ALL EXITS FROM UPDATE PROGRAM(P27).

0525 REF 38 LAST 1369 04,3765 4 4751 1 UPACTOFF CS BIT3
0527 04,3766 0 0006 1 EXTEND TURN OFF UPLINK ACTIVITY LIGHT
0528 REF 36 LAST 1367 04,3767 03 011 1 WAND DSALMOUT (BIT 3 OF CHANNEL 11)
0530 REF 384 LAST 1391 04,3770 0 0002 0 TC Q

L RTB OP CODES

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0001 22.3773 BANK 22
 0002 REF 1 10.2000 SETLOC RTBCODES
 0003 10.3573 BANK

0004 REF 12 LAST 1265 E5.1664 EBANK= XNB
 0005 REF 1 COUNT* \$\$/RTB

R0006 LOAD TIME2, TIME1 INTO MPAC:

0007 10.3573 0 0006 1 LOADTIME EXTEND
 0008 REF 39 LAST 1393 10.3574 3 0025 0 DCA TIME2
 0009 REF 2 LAST 1019 10.3575 1 6055 0 TCF SLOAD2

R0010 CONVERT THE SINGLE PRECISION 2'S COMPLEMENT NUMBER ARRIVING IN MPAC (SCALED IN HALF-REVOLUTIONS) TO A
 R0012 DP 1'S COMPLEMENT NUMBER SCALED IN REVOLUTIONS.

0016 REF 844 LAST 1394 10.3576 10 154 0 CDULOGIC CCS MPAC
 0017 REF 269 LAST 1395 10.3577 3 4755 1 CAF ZERO
 0018 10.3600 1 3603 0 TCF +3
 0019 10.3601 13 602 1 NOOP
 0020 REF 26 LAST 1102 10.3602 4 4736 0 CS HALF
 0021 REF 845 LAST 1397 10.3603 54 155 1 TS MPAC +1
 0022 REF 270 LAST 1397 10.3604 3 4755 1 CAF ZERO
 0023 REF 846 LAST 1397 10.3605 56 154 1 XCH MPAC
 0024 10.3606 0 0006 1 EXTEND
 0025 REF 27 LAST 1397 10.3607 7 4736 0 MP HALF
 0026 REF 847 LAST 1397 10.3610 20 155 1 DAS MPAC
 0027 REF 61 LAST 1282 10.3611 1 6061 1 TCF DANZIG MODE IS ALREADY AT DOUBLE-PRECISION

R0054 FORCE TP SIGN AGREEMENT IN MPAC:

0055 REF 19 LAST 1393 10.3612 0 7257 0 SGNAGREE TC TPAGREE
 0056 REF 62 LAST 1397 10.3613 1 6061 1 TCF DANZIG

R0057 CONVERT THE DP 1'S COMPLEMENT ANGLE SCALED IN REVOLUTIONS TO A SINGLE PRECISION 2'S COMPLEMENT ANGLE
 R0059 SCALED IN HALF-REVOLUTIONS.

0060 REF 1 10.3614 0 3644 1 1ST02S TC 1T02SUB
 0061 REF 271 LAST 1397 10.3615 3 4755 1 CAF ZERO
 0062 REF 848 LAST 1397 10.3616 54 155 1 TS MPAC +1
 0063 REF 5 LAST 1047 10.3617 1 6060 0 TCF NEWMODE

R0064 DO 1ST02S ON A VECTOR OF ANGLES:

0065 REF 2 LAST 1397 10.3620 0 3644 1 V1ST02S TC 1T02SUB ANSWER ARRIVES IN A AND MPAC.
 0066 REF 849 LAST 1397 10.3621 52 162 0 DXCH MPAC +5
 0067 REF 850 LAST 1397 10.3622 52 155 1 DXCH MPAC
 0068 REF 3 LAST 1397 10.3623 0 3644 1 TC 1T02SUB

L-----RTB-OP-CODES-----

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0069	REF 851	LAST 1397	10,3624	54 156 1	TS	MPAC +2	
0070	REF 852	LAST 1398	10,3625	52 160 1	DXCH	MPAC +3	
0071	REF 853	LAST 1398	10,3626	52 155 1	DXCH	MPAC	
0072	REF 4	LAST 1397	10,3627	0 3644 1	TC	1T02SUB	
0073	REF 854	LAST 1398	10,3630	54 155 1	TS	MPAC +1	
0074	REF 855	LAST 1398	10,3631	3 0161 1	CA	MPAC +5	
0075	REF 856	LAST 1398	10,3632	54 154 0	TS	MPAC	
0076	REF 149	LAST 1389	10,3633	3 4753 1	TPMODE	CAF	ONE
0077	REF 6	LAST 1397	10,3634	1 6060 0	TCF	NEWMODE	MODE IS TP.

R0078-----V1ST02S FOR 2 COMPONENT VECTOR. USED BY RR.

0079	REF 5	LAST 1398	10,3635	0 3644 1	2V1ST02S	TC	1T02SUB
0080	REF 857	LAST 1398	10,3636	52 160 1	DXCH	MPAC +3	
0081	REF 858	LAST 1398	10,3637	52 155 1	DXCH	MPAC	
0082	REF 6	LAST 1398	10,3640	0 3644 1	TC	1T02SUB	
0083	REF 258	LAST 1394	10,3641	54 001 1	TS	L	
0084	REF 859	LAST 1398	10,3642	3 0157 1	CA	MPAC +3	
0085	REF 3	LAST 1397	10,3643	1 6055 0	TCF	SLOAD2	

R0086-----SUBROUTINE TO DO DOUBLING AND 1'S TO 2'S CONVERSION:

0087	REF 860	LAST 1398	10,3644	52 155 1	1T02SUB	DXCH	MPAC	FINAL MPAC +1 UNSPECIFIED.
0088			10,3645	20 001 1	DDOUBL			
0089	REF 469	LAST 1394	10,3646	10 000 0	CCS	A		
0090	REF 150	LAST 1398	10,3647	6 4753 1	AD	ONE		
0091			10,3650	1 3652 1	TCF	+2		
0092			10,3651	4 0000 0	COM			THIS WAS REVERSE OF MSU.

0093	REF 861	LAST 1398	10,3652	54 154 0	TS	MPAC	AND SKIP ON OVERFLOW.
0094	REF 385	LAST 1396	10,3653	0 0002 0	TC	Q	

0095	REF 470	LAST 1398	10,3654	50 000 1	INDEX	A	OVERFLOW UNCORRECT AND IN MSU.
0096	REF 5	LAST 1102	10,3655	3 4734 0	CAF	LIMITS	
0097	REF 862	LAST 1398	10,3656	26 154 0	ADS	MPAC	
0098	REF 386	LAST 1398	10,3657	0 0002 0	TC	Q	

R0114 THE FOLLOWING ROUTINE INCREMENTS IN 2S COMPLEMENT THE REGISTER WHOSE ADDRESS IS IN BUF BY THE 1S COMPL.
 R0115 QUANTITY FOUND IN TEM2. THIS MAY BE USED TO INCREMENT DESIRED IMU AND OPTICS CDU ANGLES OR ANY OTHER 2S COMPL.
 R0118 (+0 UNEQUAL TO -0) QUANTITY. MAY BE CALLED BY BANKCALL/SWCALL.

0119	REF 31	LAST 1267	10,3660	54 142 1	CDUINC	TS	TL4	1S COMPL. QUANT. ARRIVES IN ACC. STORE IT
0120	REF 168	LAST 1267	10,3661	50 130 0	INDEX	BUF		
0121			10,3662	10 000 0	CCS	0		CHANGE 2S COMPL. ANGLE (IN BUF) INTO 1S
0122	REF 151	LAST 1398	10,3663	6 4753 1	AD	ONE		
0123			10,3664	1 3670 1	TCF	+4		
0124	REF 152	LAST 1398	10,3665	6 4753 1	AD	ONE		

L RTB OP-CODES

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0125	REF 153	LAST 1398	10,3666	6 4753 1	AD	ONE	OVERFLOW HERE IF 2S COMPL. IS 180 DEG.
0126			10,3667	4 0000 0	COM		
0127	REF 32	LAST 1398	10,3670	6 0142 0	AD	TEM2	SULT MOVES FROM 2ND TO 3D QUAD. (OR BACK)
0129	REF 471	LAST 1398	10,3671	10 000 0	CCS	A	BACK TO 2S COMPL.
0130	REF 154	LAST 1399	10,3672	6 4753 1	AD	ONE	
0131			10,3673	1 3675 1	TCF	+2	
0132			10,3674	4 0000 0	COM		
0133	REF 33	LAST 1399	10,3675	54 142 1	TS	TEM2	STORE 14BIT QUANTITY WITH PRESENT SIGN
0134			10,3676	1 3702 0	TCF	+4	
0135	REF 472	LAST 1399	10,3677	50 000 1	INDEX	A	SIGN.
0137	REF 6	LAST 1398	10,3700	3 4734 0	CAF	LIMITS	FIX IT BY ADDING IN 37777 OR 40000
0138	REF 34	LAST 1399	10,3701	6 0142 0	AD	TEM2	
0139	REF 169	LAST 1398	10,3702	50 130 0	INDEX	BUF	
0140			10,3703	54 000 0	TS	C	STORE NEW ANGLE IN 2S COMPLEMENT.
0141	REF 387	LAST 1398	10,3704	0 0002 0	TC	Q	

L RTB OP CODES

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PO142 RTB TO TORQUE GYROS, EXCEPT FOR THE CALL TO IMUSTALL. ECADR OF COMMANDS ARRIVES IN X1.

	REF		LAST				PULSEIMU	INDEX	FIXLOC	ADDRESS OF GYRO COMMANDS SHOULD BE IN X1
0144	REF	61	LAST	1220	10,3705	50 120 1				
0145	PEF	70	LAST	1271	10,3706	3 0046 0		CA	X1	
0146	REF	320	LAST	1390	10,3707	0 4616 1		TC	BANKCALL	
0147	REF	7	LAST	969	10,3710	17323 0		CADR	IMUPULSE	
0148	REF	63	LAST	1397	10,3711	1 6061 1		TCF	DANZIG	

L RTB OP CODES

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R0192 THE SUBROUTINE SIGNMPAC SETS C(MPAC, MPAC +1) TO SIGN(MPAC).

R0193 FOR THIS, ONLY THE CONTENTS OF MPAC ARE EXAMINED. ALSO +0 YIELDS POSMAX AND -0 YIELDS NEGMAX.

R0195 ENTRY MAY BE BY EITHER OF THE FOLLOWING:

R0196 1. LIMIT THE SIZE OF MPAC ON INTERPRETIVE OVERFLOW:

R0197 ENTRY: BOVB

R0198 SIGNMPAC

R0199 2. GENERATE IN MPAC THE SIGNUM FUNCTION OF MPAC:

R0200 ENTRY: RTB

R0201 SIGNMPAC

R0202 IN EITHER CASE, RETURN IS TO THE NEXT INTERPRETIVE INSTRUCTION IN THE CALLING SEQUENCE.

0204			10,3712	0 0006 1	SIGNMPAC	EXTEND	
0205	REF 2	LAST 441	10,3713	3 4733 1	DCA	DPOS MAX	
0206	REF 863	LAST 1398	10,3714	52 155 1	DXCH	MPAC	
0207	REF 473	LAST 1399	10,3715	10 000 0	CCS	A	
0208	REF 272	LAST 1397	10,3716	3 4755 1	DPMODE	CAF ZERO	SETS MPAC +2 TO ZERO IN THE PROCESS
0209	REF 4	LAST 1398	10,3717	1 6057 1	TCF	SLOAD2 +2	
0210			10,3720	1 3721 1	TCF	+1	
0211			10,3721	0 0006 1	EXTEND		
0212	REF 3	LAST 1401	10,3722	4 4732 0	DCA	DPOS MAX	
0213	REF 5	LAST 1401	10,3723	1 6055 0	TCF	SLOAD2	

R0214 RTB OP CODE NORMUNIT IS LIKE INTERPRETIVE INSTRUCTION UNIT, EXCEPT THAT IT CAN BE DEPENDED ON NOT TO BLOW
 R0216 UP WHEN THE VECTOR BEING UNITIZED IS VERY SMALL -- IT WILL BLOW UP WHEN ALL COMPONENTS ARE ZERO. IF NORMUNIT
 R0218 IS USED AND THE UPPER ORDER HALVES OF ALL COMPONENTS ARE ZERO, THE MAGNITUDE RETURNED IN 360 WILL BE TOO LARGE
 R0220 BY A FACTOR OF 2(13) AND THE SQUARED MAGNITUDE RETURNED AT 340 WILL BE TOO BIG BY A FACTOR OF 2(26).

0222	REF 155	LAST 1399	10,3724	3 4753 1	NORMUNX1	CAF ONE	
02221	REF 11	LAST 912	10,3725	1 3727 1	TCF	NORMUNIT +1	
02222	REF 273	LAST 1401	10,3726	3 4755 1	NORMUNIT	CAF ZERO	
02223	REF 62	LAST 1400	10,3727	6 0120 1	AD	FIXLOC	
02224	REF 864	LAST 1401	10,3730	54 156 1	TS	MPAC +2	
02225	REF 321	LAST 1400	10,3731	0 4616 1	TC	BANKCALL	GET SIGN AGREEMENT IN ALL COMPONENTS
0223	REF 3	LAST 1070	10,3732	01010 1	CADR	VECAGREE	
0224	REF 865	LAST 1401	10,3733	10 154 0	CCS	MPAC	
0225	REF 1		10,3734	1 3770 0	TCF	NOSHIFT	
0226			10,3735	1 3737 0	TCF	+2	
0227	REF 2	LAST 1401	10,3736	1 3770 0	TCF	NOSHIFT	
0228	REF 866	LAST 1401	10,3737	10 157 0	CCS	MPAC +3	
0229	REF 3	LAST 1401	10,3740	1 3770 0	TCF	NOSHIFT	
0230			10,3741	1 3743 0	TCF	+2	
0231	REF 4	LAST 1401	10,3742	1 3770 0	TCF	NOSHIFT	
0232	REF 867	LAST 1401	10,3743	10 161 0	CCS	MPAC +5	
0233	REF 5	LAST 1401	10,3744	1 3770 0	TCF	NOSHIFT	
0234			10,3745	1 3747 1	TCF	+2	
0235	REF 6	LAST 1401	10,3746	1 3770 0	TCF	NOSHIFT	

L RTB OP CODES

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0236	REF 868	LAST 1401	10,3747	3 0155 0	CA	MPAC +1	SHIFT ALL COMPONENTS LEFT 13
0237			10,3750	0 0006 1	EXTEND		
0238	REF 79	LAST 1370	10,3751	7 4736 0	MP	BIT14	
0239	REF 869	LAST 1402	10,3752	20 155 1	DAS	MPAC	DAS GAINS A LITTLE ACCURACY
0240	REF 870	LAST 1402	10,3753	3 0160 0	CA	MPAC +4	
0241			10,3754	0 0006 1	EXTEND		
02411	REF 80	LAST 1402	10,3755	7 4736 0	MP	BIT14	
02412	REF 871	LAST 1402	10,3756	20 160 1	DAS	MPAC +3	
02413	REF 872	LAST 1402	10,3757	3 0162 1	CA	MPAC +6	
02414			10,3760	0 0006 1	EXTEND		
02415	REF 81	LAST 1402	10,3761	7 4736 0	MP	BIT14	
02416	REF 873	LAST 1402	10,3762	20 162 0	DAS	MPAC +5	
02417	REF 2	LAST 1070	10,3763	3 4761 0	CAF	THIRTEEN	
02418	REF 874	LAST 1402	10,3764	50 156 0	INDEX	MPAC +2	
02419			10,3765	54 045 1	TS	370	
0242	REF 61	LAST 1389	10,3766	0 4635 0	OFFTUNIT TC	POSTJUMP	
0243	REF 3	LAST 1013	10,3767	01024 0	CADR	UNIT +1	SKIP THE "TC VECAGREE" DONE AT UNIT

02431	REF 274	LAST 1401	10,3770	3 4755 1	NOSHIFT CAF	ZERO
02432	REF 1		10,3771	1 3764 0	TCF	OFFTUNIT -2

R0300 RTB VEC SGNAG ...FORCES SIGN AGREEMENT OF VECTOR IN MPAC.

0301	REF 322	LAST 1401	10,3772	0 4616 1	VECSGNAG TC	BANKCALL
0302	REF 4	LAST 1401	10,3773	01010 1	CADR	VECAGREE
0303	REF 64	LAST 1400	10,3774	0 6061 0	TC	DANZIG

END OF SKIPPER .087

L T6-RUPT PROGRAMS

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R0001 PROGRAM NAMES: (1) T6JOBCHK MOD. NO. 5 OCTOBER 2, 1967
 R0002 (2) DOT6RUPT

R0003 MODIFICATION BY: LOWELL G HULL (A.C. ELECTRONICS)

R0004 THESE PROGRAMS ENABLE THE LM DAP TO CONTROL THE THRUST TIMES OF THE REACTION CONTROL SYSTEM JETS BY USING TIME6.

R0006 SINCE THE LM DAP MAINTAINS EXCLUSIVE CONTROL OVER TIME6 AND ITS INTERRUPTS, THE FOLLOWING CONVENTIONS HAVE BEEN

R0008 ESTABLISHED AND MUST NOT BE TAMPERED WITH:

R0009 1. NO NUMBER IS EVER PLACED INTO TIME6 EXCEPT BY LM DAP.

R0010 2. NO PROGRAM OTHER THAN LM DAP ENABLES THE TIME6 COUNTER.

R0011 3. TO USE TIME6, THE FOLLOWING SEQUENCE IS ALWAYS EMPLOYED:

R0012 A. A POSITIVE (NON-ZERO) NUMBER IS STORED IN TIME6.

R0013 B. THE TIME6 CLOCK IS ENABLED.

R0014 C. TIME6 IS INTERROGATED AND IS:

R0015 I. NEVER FOUND NEGATIVE (NON-ZERO) OR +0.

R0016 II. SOMETIMES FOUND POSITIVE (BETWEEN 1 AND 2400) INDICATING THAT IT IS ACTIVE.

R0018 III. SOMETIMES FOUND POSMAX INDICATING THAT IT IS INACTIVE AND NOT ENABLED.

R0020 IV. SOMETIMES FOUND NEGATIVE ZERO INDICATING THAT:

R0021 A. A T6RUPT IS ABOUT TO OCCUR AT THE NEXT DINC. OR

R0023 B. A T6RUPT IS WAITING IN THE PRIORITY CHAIN. OR

R0025 C. A T6RUPT IS IN PROCESS NOW.

R0026 4) ALL PROGRAMS WHICH OPERATE IN EITHER INTERRUPT MODE OR WITH INTERRUPT INHIBITED MUST CALL T6JOBCHK
 R0028 EVERY 5 MILLISECONDS TO PROCESS A POSSIBLE WAITING T6RUPT BEFORE IT CAN BE HONORED BY THE HARDWARE.

R0030 (5. PROGRAM JTLST, IN Q,R-AXES, HANDLES THE INPUT LIST.)

R0031 T6JOBCHK CALLING SEQUENCE:

A0032 L TC T6JOBCHK
 A0033 L+1 (RETURN)

R0034 DOT6RUPT CALLING SEQUENCE:

A0035 DXCH ARUPT T6RUPT LEAD IN AT LOCATION 4004.
 A0036 EXTEND
 A0037 DCA T6ADR
 A0038 DTCB

R0039 SUBROUTINES CALLED: DOT6RUPT CALLS T6JOBCHK.

R0040 NORMAL EXIT MODES: T6JOBCHK RETURNS TO L+1.

R0041 DOT6RUPT TRANSFERS CONTROL TO RESUME.

R0042 ALARM/ABORT MODES: NONE.

R0043 INPUT: TIME6 NXT6ADR OUTPUT: TIME6 NXT6ADR CHANNEL 5

R0044 T6NEXT T6NEXT +1 T6NEXT T6NEXT +1 CHANNEL 6

R0045 T6FURTHA T6FURTHA +1 T6FURTHA T6FURTHA +1 BIT15/CH13

R0046 DEBRIS: T6JOBCHK CLOBBERS A. DOT6RUPT CLOBBERS NOTHING.

L-----T6-RUPT-PROGRAMS-----

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0055				17,2027			BANK 17	
0056	REF	1		17,2000			SETLOC DAPS2	
0057				17,2027			BANK	
0058	REF	2	LAST 219	E6,1466			EBANK= T6NEXT	
0059	REF	1					COUNT* \$\$/DAPT6	
0060	REF	1		17,2027	10 031 1	T6JOBCHK	CCS	TIME6
0061	REF	388	LAST 1399	17,2030	0 0002 0		TC	Q
0062	REF	20	LAST 1115	17,2031	0 5705 0		TC	CCSHOLE
0063	REF	1		17,2032	0 2032 1		TC	T6JOBCHK +3
0064	CONTROL PASSES TO T6JOB ONLY WHEN C(TIME6) = -0 (I.E. WHEN A T6RUPT MUST BE PROCESSED).							
0066	REF	33	LAST 1381	17,2033	3 4733 1	T6JOB	CAF	POS MAX
0067				17,2034	0 0006 1		EXTEND	
0068	REF	22	LAST 1336	17,2035	03 013 0		WAND	CHAN13
0069	REF	34	LAST 1404	17,2036	3 4733 1		CA	POS MAX
0070				17,2037	22 007 0		ZL	
0071	REF	1		17,2040	53 471 0		DXCH	T6FURTHA
0072	REF	3	LAST 1404	17,2041	53 467 1		DXCH	T6NEXT
0073	REF	2	LAST 219	17,2042	23 465 1		LXCH	NXT6ADR
0074	REF	2	LAST 1404	17,2043	54 031 1		TS	TIME6
0075	REF	7	LAST 1369	17,2044	6 7725 0		AD	PRI037
0076	REF	474	LAST 1401	17,2045	54 000 0		TS	A
0077	REF	1		17,2046	1 2052 0		TCF	ENABLET6
0078	REF	35	LAST 1404	17,2047	3 4733 1		CA	POS MAX
0079	REF	3	LAST 1404	17,2050	54 031 1		TS	TIME6
0080	REF	1		17,2051	1 2063 1		TCF	GOCH56
0081	REF	47	LAST 1382	17,2052	3 4735 1	ENABLET6	CA	BIT15
0082				17,2053	0 0006 1		EXTEND	
0083	REF	23	LAST 1404	17,2054	05 013 0		WOR	CHAN13
0084	REF	4	LAST 1404	17,2055	3 1466 1		CA	T6NEXT
0085	REF	8	LAST 1404	17,2056	6 7725 0		AD	PRI037
0086	REF	475	LAST 1404	17,2057	54 000 0		TS	A
0087	REF	2	LAST 1404	17,2060	1 2063 1		TCF	GOCH56
0088	REF	36	LAST 1404	17,2061	3 4733 1		CA	POS MAX
0089	REF	5	LAST 1404	17,2062	55 466 0		TS	T6NEXT
0090	REF	259	LAST 1398	17,2063	50 001 0	GOCH56	INDEX	L
0091	REF	1		17,2064	1 5753 1		TCF	WRITEP -1
0092				5753			BLOCK	02
0093	REF	1		4000			SETLOC	FFTAG9
0094				5753			BANK	
0095	REF	15	LAST 914	E6,1635			EBANK=	CDUXD
0096	REF	1					COUNT*	\$\$/DAPT6
0097	REF	4	LAST 219	5753	3 1472 1		CA	NEXTP
0098				5754	0 0006 1	WRITEP	EXTEND	
0099	REF	2	LAST 212	5755	01 006 0		WRITE	CHAN6

L T6-RUPT PROGRAMS

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0100	REF 389	LAST 1404	5756	0 0002 0	TC	Q
0101	REF 1		5757	3 1473 0	CA	NEXTU
0102	REF 260	LAST 1404	5760	54 001 1	TS	L
0103	REF 1		5761	4 5774 1	CS	003140CT
0104			5762	0 0006 1	EXTEND	
0105	REF 3	LAST 1026	5763	02 005 0	RAND	CHAN5
0106	REF 261	LAST 1405	5764	6 0001 0	AD	L
0107			5765	0 0006 1	EXTEND	
0108	REF 4	LAST 1405	5766	01 005 0	WRITE	CHAN5
0109	REF 390	LAST 1405	5767	0 0002 0	TC	Q

0110	REF 1		5770	3 1474 1	CA	NEXTV
0111	REF 262	LAST 1405	5771	54 001 1	TS	L
0112	REF 2	LAST 1405	5772	3 5774 0	CA	003140CT
0113			5773	1 5762 0	TCF	-9D
0114			5774	00314 1	003140CT	OCT 00314

0115			17,2065		BANK	17
0116	REF 2	LAST 1404	17,2000		SETLOC	DAPS2
0117			17,2065		BANK	

0118	REF 6	LAST 1404	E6,1466		EBANK=	T6NEXT
0119	REF 2	LAST 1404 TO 1404:	30	30*	COUNT*	\$/DAPT6

0120	REF 11	LAST 1339	17,2065	22 016 0	DOT6RUPT	LXCH	BANKRUPT	(INTERRUPT LEAD INS CONTINUED)
0121			17,2066	0 0006 1	EXTEND			
0122	REF 10	LAST 1339	17,2067	22 012 1	QXCH	ORUPT		

0123	REF 2	LAST 1404	17,2070	0 2027 0	TC	T6JOBCHK	CALL T6JOBCHK.
0124	REF 25	LAST 1339	17,2071	1 5270 0	TCF	RESUME	END TIME6 INTERRUPT PROCESSOR.

L DAP INTERFACE SUBROUTINES

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0001 20,2123
0002 REF 3 LAST 43 20,2000
0003 20,2123

BANK 20
SETLOC DAPS3
BANK

0004 REF 16 LAST 1404 E6.1635
0005 REF 1

EBANK= CDUXD
COUNT* \$\$/DAPIF

R0006 MOD 0 DATE 11/15/66 BY GEORGE W. CHERRY

R0007 MOD 1 1/23/67 MODIFICATION BY PETER ADLER

R0008 FUNCTIONAL DESCRIPTION

R0009 HEREIN ARE A COLLECTION OF SUBROUTINES WHICH ALLOW MISSION CONTROL PROGRAMS TO CONTROL THE MODE
R0011 AND INTERFACE WITH THE DAP.

R0012 CALLING SEQUENCES

R0013 IN INTERRUPT OR WITH INTERRUPT INHIBITED
R0014 TC IBNKCALL
R0015 FCADR ROUTINE

R0016 IN A JOB WITHOUT INTERRUPT INHIBITED

R0017 INHINT
R0018 TC IBNKCALL
R0019 FCADR ROUTINE
R0020 RELINT

R0021 OUTPUT

R0022 SEE INDIVIDUAL ROUTINES BELOW

R0023 DEBRIS

R0024 A.L. AND SOMETIMES MDUETEMP

ODE NOT IN PULSES MODE

L DAP INTERFACE SUBROUTINES

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R0087 SUBROUTINE NAMES:

R0088 SETMAXDB, SETMINDB, RESTORDB, PFLITEDB

R0089 MODIFIED: 30 JANUARY 1968 BY P S WEISSMAN TO CREATE RESTORDB.

R0090 MODIFIED: 1 MARCH 1968 BY P S WEISSMAN TO SAVE EBANK AND CREATE PFLITEDB

R0091 FUNCTIONAL DESCRIPTION:

R0092 SETMAXDB - SET DEADBAND TO 5.0 DEGREES

R0093 SETMINDB - SET DEADBAND TO 0.3 DEGREE

R0094 RESTORDB - SET DEADBAND TO MAX OR MIN ACCORDING TO SETTING OF DBSELECT BIT OF DAPBOOLS

R0096 PFLITEDB - SET DEADBAND TO 1.0 DEGREE AND ZERO THE COMMANDED ATTITUDE CHANGE AND COMMANDED RATE

R0098 ALL ENTRIES SET UP A NOVAC JOB TO DO 1/ACCS SO THAT THE TJETLAW SWITCH CURVES ARE POSITIONED TO

R0100 REFLECT THE NEW DEADBAND. IT SHOULD BE NOTED THAT THE DEADBAND REFERS TO THE ATTITUDE IN THE P-, U-, AND V-AXES.

R0102 SUBROUTINE CALLED: NOVAC

R0103 CALLING SEQUENCE: SAME AS ABOVE

A0104 OR TC RESTORDB +1 FROM ALLCOAST

R0105 DEBRIS: A. L. Q. RUPTREG1, (ITEMS IN NOVAC)

0106 REF 35 LAST 910 20,2123 30 111 0 RESTORDB CAE DAPBOOLS DETERMINE CREW-SELECTED DEADBAND.

0107 REF 1 20,2124 7 4750 0 MASK DBSELECT

0108 20,2125 0 0006 1 EXTEND

0109 REF 6 LAST 853 20,2126 1 2140 1 BZF SETMINDB

0110 REF 1 20,2127 3 2151 0 SETMAXDB CAF WIDEDB SET 5 DEGREE DEADBAND.

0111 REF 2 LAST 212 20,2130 55 346 0 +1 TS DB

0112 20,2131 0 0006 1 EXTEND SET UP JOB TO RE-POSITION SWITCH CURVES.

0113 REF 60 LAST 1377 20,2132 22 070 0 QXCH RUPTREG1

0114 REF 4 LAST 744 20,2133 3 7715 0 CALLACCS CAF PRI027

0115 REF 31 LAST 1371 20,2134 0 5072 1 TC NOVAC

0116 REF 9 LAST 740 E6,1537 EBANK= AUSQ

0117 REF 2 LAST 192 20,2135 02454 0 2CADR 1/ACCJOB

0117 20,2136 40106 1

0118 REF 61 LAST 1407 20,2137 0 0070 0 TC RUPTREG1 RETURN TO CALLER.

0119 REF 1 20,2140 3 2150 1 SETMINDB CAF NARROWDB SET 0.3 DEGREE DEADBAND.

0120 REF 2 LAST 791 20,2141 1 2130 0 TCF SETMAXDB +1

0121 20,2142 0 0006 1 PFLITEDB EXTEND THE RETURN FROM CALLACCS IS TO RUPTREG1.

0122 REF 62 LAST 1407 20,2143 22 070 0 QXCH RUPTREG1

0123 REF 9 LAST 853 20,2144 0 2153 1 TC ZAT'EROR ZERO THE ERRORS AND COMMANDED RATES.

0124 REF 1 20,2145 3 2152 0 CAF POWERDB SET DB TO 1.0 DEG.

0125 REF 3 LAST 1407 20,2146 55 346 0 TS DB

0126 REF 1 20,2147 1 2133 0 TCF CALLACCS SET UP 1/ACCS AND RETURN TO CALLER.

01261 20,2150 00155 0 NARROWDB OCTAL 00155 0.3 DEGREE SCALED AT 45.

L DAP INTERFACE SUBROUTINES

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01262		20,2151	03434 1	WIDEDB	UCTAL	03434	5.0 DEGREES SCALED AT 45.
0127		20,2152	00554 0	POWERDB	DEC	.02222	1.0 DEGREE SCALED AT 45.

0128	REF 8	LAST 903	20,2153	3 5015 0	ZATTEROR	CAF	EBANK6	
0129	REF 81	LAST 1394	20,2154	56 003 1		XCH	EBANK	
0130	REF 263	LAST 1405	20,2155	54 001 1		TS	L	SAVE CALLERS EBANK IN L.
0131	REF 21	LAST 1313	20,2156	30 032 0		CAE	CDUX	
0132	REF 17	LAST 1406	20,2157	55 635 1		TS	CDUXD	
0133	REF 10	LAST 1309	20,2160	30 033 1		CAE	CDUY	
0134	REF 4	LAST 911	20,2161	55 636 1		TS	CDUYD	
0135	REF 13	LAST 1309	20,2162	30 034 0		CAE	CDUZ	
0136	REF 4	LAST 911	20,2163	55 637 0		TS	CDUZD	
0137	REF 8	LAST 924	20,2164	1 2170 1		TCF	STOPRATE +3	

0138	REF 9	LAST 1408	20,2165	3 5015 0	STOPRATE	CAF	EBANK6	
0139	REF 82	LAST 1408	20,2166	56 003 1		XCH	EBANK	
0140	REF 264	LAST 1408	20,2167	54 001 1		TS	L	SAVE CALLERS EBANK IN L.
0141	REF 275	LAST 1402	20,2170	3 4755 1	+3	CAF	ZERO	
0142	REF 11	LAST 918	20,2171	55 643 0		TS	OMEGAPD	
0143	REF 6	LAST 917	20,2172	55 644 1		TS	OMEGAQD	
0144	REF 6	LAST 917	20,2173	55 645 0		TS	OMEGARD	
0145	REF 5	LAST 918	20,2174	55 640 0		TS	DELCUX	
0146	REF 2	LAST 136	20,2175	55 641 1		TS	DELCUY	
0147	REF 2	LAST 136	20,2176	55 642 1		TS	DELCUZ	
0148	REF 4	LAST 918	20,2177	55 277 0		TS	DELPEROR	
0149	REF 2	LAST 369	20,2200	55 300 1		TS	DELQEROR	
0150	REF 2	LAST 369	20,2201	55 301 0		TS	DELREROR	
0151	REF 83	LAST 1408	20,2202	22 003 1		LXCH	EBANK	RESTORE CALLERS EBANK.
0152	REF 391	LAST 1405	20,2203	0 0002 0		TC	Q	

R0153 SUBROUTINE NAME: ALLCOAST

R0154 WILL BE CALLED BY FRESH STARTS AND ENGINE OFF ROUTINES.

R0156 CALLING SEQUENCE: (SAME AS ABOVE)

R0157 EXIT: RETURN TO Q.

R0158 SUBROUTINES CALLED: STOPRATE, RESTORDB, NOVAC

R0159 ZERO: (FOR ALL AXES) AGS, ALPHA, AOSTERM, OMEGAD, DELCDU, DELEROR

R0160 OUTPUT: DRIFTBIT/DAPBDLS, DB, JOB TO DO 1/ACCS

R0161 DEBRIS: A, L, Q, RUPTREG1, RUPTREG2, (ITEMPS IN NOVAC)

0162		20,2204	0 0006 1	ALLCOAST EXTEND		SAVE Q FOR RETURN
0163	REF 23	LAST 1330	20,2205	22 071 1	QXCH	RUPTREG2

L DAP INTERFACE SUBROUTINES

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0164	REF	9	LAST	1408	20,2206	0 2165 1	TC	STUPRATE	CLEAR RATE INTERFACE. RETURN WITH A=0
0165	REF	84	LAST	1408	20,2207	22 003 1	LXCH	EBANK	AND L=EBANK6. SAVE CALLERS EBANK.
0166	REF	10	LAST	1407	20,2210	55'537 0	TS	AOSO	
0167	REF	11	LAST	1409	20,2211	55'540 0	TS	AOSO +1	
0168	REF	2	LAST	740	20,2212	55'541 1	TS	AOSR	
0169	REF	3	LAST	1409	20,2213	55'542 1	TS	AOSR +1	
0170	REF	2	LAST	195	20,2214	55'424 0	TS	ALPHAQ	FOR DOWNLIST.
0171	REF	1			20,2215	55'425 1	TS	ALPHAR	
0172	REF	2	LAST	133	20,2216	55'545 0	TS	AOSQTERM	
0173	REF	1			20,2217	55'546 0	TS	AOSRTERM	
0174	REF	85	LAST	1409	20,2220	22 003 1	LXCH	EBANK	RESTORE EBANK (EBANK6 NO LONGER NEEDED)
0175	REF	36	LAST	1407	20,2221	4 0111 1	CS	DAPBOOLS	SET UP DRIFTBIT
0176	REF	2	LAST	740	20,2222	7 4744 0	MASK	DRIFTBIT	
0177	REF	57	LAST	1409	20,2223	26 111 1	ADS	DAPBOOLS	
0178	REF	8	LAST	854	20,2224	0 2124 1	TC	RESTORDB +1	RESTORE DEADBANK TO CREW-SELECTED VALUE.
0179	REF	24	LAST	1408	20,2225	0 0071 1	TC	RUPTREG2	RETURN.

L DAPIDLER PROGRAM

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R0001 THE DAPIDLER PROGRAM IS STARTED BY FRESH START AND RESTART. THE DAPIDLER PROGRAM IS DONE 10 TIMES
 R0003 PER SECOND UNTIL THE ASTRONAUT DESIRES THE DAP TO WAKE UP, AND THE IMU AND CDUS ARE READY FOR USE BY THE DAP.
 R0005 THE NECESSARY INITIALIZATION OF THE DAP IS DONE BY THE DAPIDLER PROGRAM.

0006 16,2000 BANK 16
 0007 REF 1 16,2000 SETLOC DAPS1
 0008 16,2000 BANK

0009 REF 12 LAST 1409 E6,1537 EBANK= AJSO

0010 REF 1 COUNT* \$\$/DAPID

0011 16,2000 0 0006 1 CHEKBITS EXTEND

0012 REF 8 LAST 911 16,2001 00 031 0 READ CHAN31 IF BOTH BIT13 AND BIT14 ARE ONE, THEN

0013 16,2002 4 0000 0 COM THE MODE SELECT SWITCH IS IN THE OFF

0014 REF 6 LAST 497 16,2003 7 4355 1 MASK BIT13-14 POSITION, AND SO THE DAP SHOULD BE OFF,

0015 16,2004 0 0006 1 EXTEND WITH NO ATTITUDE ERROR DISPLAY.

0016 REF 1 16,2005 1 2157 1 BZF MOREIDLE

0017 REF 51 LAST 1317 16,2006 4 1303 1 CS IMODES33

0018 REF 59 LAST 1391 16,2007 7 4746 1 MASK BIT6

0019 REF 476 LAST 1404 16,2010 10 000 0 CCS A

0020 REF 1 16,2011 1 2206 0 TCF JUMPDSP

0021 REF 4 LAST 219 16,2012 4 1273 1 CS RCSFLAGS IMU NOT USABLE. SET UP INITIALIZATION

0022 REF 39 LAST 1396 16,2013 7 4751 1 MASK BIT3 FLAG FOR ATT ERROR DISPLAY ROUTINE.

0023 REF 5 LAST 1410 16,2014 27 273 1 ADS RCSFLAGS

0024 REF 1 16,2015 1 2163 0 TCF SHUTDOWN

0025 REF 50 LAST 1339 16,2016 3 4742 1 CHEKMORE CAF BIT10 BIT 10 OF 30 IS PGNC'S CONTROL OF S/C

0026 16,2017 0 0006 1 EXTEND

0027 REF 9 LAST 911 16,2020 02 030 0 RAND CHAN30 BITS IN 30 ARE INVERTED

0028 REF 477 LAST 1410 16,2021 10 000 0 CCS A

0029 REF 2 LAST 1410 16,2022 1 2157 1 TCF MOREIDLE

0030 16,2023 0 0002 0 RETURN

L DAPIDLER PROGRAM

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P0031 DAPIDLER ENTRY.

0032	REF	12	LAST 1405	16,2024	22 016 0	DAPIDLER	LXCH	BANKRUPT	INTERRUPT LEAD INS (CONTINUED)
0033				16,2025	0 0006 1		EXTEND		
0034	REF	11	LAST 1405	16,2026	22 012 1		QXCH	QRUPT	
0035	REF	6	LAST 1410	16,2027	3 1273 0		CA	RCSFLAGS	
0036	REF	49	LAST 1366	16,2030	7 4737 1		MASK	BIT13	
0037	REF	478	LAST 1410	16,2031	10 000 0		CCS	A	CHECK IF 1/ACCSJOB HAS BEEN SET UP SINCE
0038	REF	1		16,2032	1 2041 1		TCF	CHECKUP	THE LAST FRESH START OR RESTART.
00381	REF	50	LAST 1411	16,2033	3 4737 0		CA	BIT13	
00382	REF	7	LAST 1411	16,2034	27 273 1		ADS	RCSFLAGS	BIT 13 IS 1.
00383	REF	5	LAST 1407	16,2035	3 7715 0		CAF	PRI027	
0039	REF	32	LAST 1407	16,2036	0 5072 1		TC	NOVAC	SET UP JOB TO DO A LITTLE INITIALIZATION
0040	REF	13	LAST 1410	E6,1537			EBANK	AOSQ	AND EXECUTE 1/ACCS.
0041	REF	1		16,2037	02447 1		2CADR	1/ACCSET	(WILL BRANCH TO MOREIDLE ON ACCSOKAY)
0041	REF	1		16,2040	40106 1				
0042	REF	1		16,2041	0 2000 0	CHECKUP	TC	CHEKBITS	CHECK TO SEE IF LM DAP IS TO GO ON AND
A0043									DO ERROR DISPLAY.
0044	REF	38	LAST 1409	16,2042	30 111 0		CAE	DAPBOOLS	IF 1/ACCS HAS NOT BEEN COMPLETED, IDLE.
0045	REF	2	LAST 219	16,2043	7 4751 1		MASK	ACCSOKAY	NOTE: ONLY FRESH START AND RESTART
0046				16,2044	0 0006 1		EXTEND		KNOCK THIS BIT DOWN.
0047	REF	3	LAST 1410	16,2045	1 2157 1		BZF	MOREIDLE	
0048	REF	50	LAST 1318	16,2046	0 4674 0	STARTDAP	TC	IBNKCALL	ZERO ATTITUDE ERROR AND DESIRED RATES.
0049	REF	10	LAST 1407	16,2047	40153 1		FCADR	ZATTEROR	
0050	REF	276	LAST 1408	16,2050	3 4755 1		CAF	ZERO	***** INITIALIZE: *****
0051	REF	3	LAST 133	16,2051	55 524 1		TS	TJP	
0052	REF	2	LAST 134	16,2052	55 525 0		TS	TJU	
0053	REF	1		16,2053	55 526 0		TS	TJV	
0054	REF	7	LAST 195	16,2054	55 421 0		TS	OMEGAP	RATES IN BODY (PILOT) COORDINATES.
0055	REF	6	LAST 761	16,2055	55 422 0		TS	OMEGAQ	
0056	REF	1		16,2056	55 423 1		TS	OMEGAR	
0057	REF	6	LAST 130	16,2057	55 430 0		TS	TRAPEDP	
0058	REF	1		16,2060	55 431 1		TS	TRAPEDQ	
0059	REF	1		16,2061	55 432 1		TS	TRAPEDR	
0060	REF	14	LAST 1411	16,2062	55 537 0		TS	AOSQ	OFFSET ACCELERATION ESTIMATES.
0061	REF	15	LAST 1411	16,2063	55 540 0		TS	AOSQ +1	
0062	REF	4	LAST 1409	16,2064	55 541 1		TS	AOSR	
0063	REF	5	LAST 1411	16,2065	55 542 1		TS	AOSR +1	
0064	REF	3	LAST 1409	16,2066	55 424 0		TS	ALPHAQ	COPIES OF OFFSET ESTIMATES FOR DOWNLIST.
0065	REF	2	LAST 1409	16,2067	55 425 1		TS	ALPHAR	
0066	REF	3	LAST 134	16,2070	55 501 0		TS	NEGUQ	
0067	REF	1		16,2071	55 503 1		TS	NEGUR	
0068	REF	3	LAST 1409	16,2072	55 545 0		TS	AOSQTERM	Q-RAXIS RATE DERIVATION TERMS AND KALMAN
0069	REF	2	LAST 1409	16,2073	55 546 0		TS	AOSRTERM	FILTER INITIALIZATION TERMS.
0070	REF	1		16,2074	55 510 0		TS	QACCDOT	DESCENT ACCELERATION DERIVATIVE EST.
0071	REF	1		16,2075	55 512 1		TS	RACCDOT	

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0072	REF	1		16,2076	55'502 0	TS	ALLOWGTS	AUSTASK FLAG FOR QRAXIS RCS CONTROL USE.
0073	REF	1		16,2077	55'631 0	TS	CONTROLLER	DO TRYGTS ON FIRST PASS (WILL GO TO RCS)
0074	REF	1		16,2100	55'633 1	TS	INGTS	RECOGNIZE FIRST GTS PASS AS SUCH.
0075	REF	3	LAST 134	16,2101	55'632 0	TS	OGIMTIMR	STOP GIMBAL DRIVES. (PROBABLY WOULD BE
0076	REF	1		16,2102	55'634 0	TS	OGIMTIMR	GOOD ENOUGH JUST TO INACTIVATE TIMERS)
0077	REF	1		16,2103	55'460 0	TS	OLDPMIN	MINIMUM IMPULSE MODE ERASABLES
0078	REF	1		16,2104	55'461 1	TS	OLDQMIN	
00781	*REF	3	LAST 137	16,2105	55'767 1	TS	PJETCTR	INITIALIZE DOCKED JET INHIBITION
00782	*REF	1		16,2106	55'770 1	TS	UJETCTR	COUNTERS
00783	*REF	2	LAST 137	16,2107	55'771 0	TS	VJETCTR	
0079	REF	47	LAST 1380	4747		CALLGMBL	EQUALS BITS	RCSFLAGS INITIALIZATION.
0080	REF	1		16,2110	4 2202 1	CS	MANFLAG	
0081	REF	8	LAST 1411	16,2111	7 1273 1	MASK	RCSFLAGS	NEGUQ(R) HAVE BEEN GENERATED.
0082	REF	9	LAST 1412	16,2112	55'273 1	TS	RCSFLAGS	

R0082 SET UP "OLD" MEASURED CDU ANGLES:

0084				16,2113	0 0006 1	EXTEND		
0085	REF	22	LAST 1408	16,2114	3 0033 1	DCA	CDUX	OLDXFORP AND OLDYFORP
0086	REF	3	LAST 130	16,2115	53'441 0	DXCH	OLDXFORP	
0087	REF	14	LAST 1408	16,2116	3 0034 0	CA	CDUZ	
0088	REF	1		16,2117	55'442 0	TS	OLDZFORQ	
0089	REF	10	LAST 1412	16,2120	4 1273 1	CS	RCSFLAGS	
0090	REF	37	LAST 1367	16,2121	7 4740 1	MASK	BIT12	
00901	REF	11	LAST 1412	16,2122	27'273 1	ADS	RCSFLAGS	BIT 12 SET TO 1.
0091	REF	31	LAST 1364	16,2123	3 4751 0	CA	FOUR	
0092	REF	2	LAST 133	16,2124	55'535 1	TS	SKIPU	
0093	REF	1		16,2125	55'536 1	TS	SKIPV	
0094	REF	37	LAST 1404	16,2126	3 4733 1	CA	POSMAX	
0095	REF	4	LAST 1404	16,2127	54 031 1	TS	TIME6	
0096	REF	7	LAST 1405	16,2130	55'466 0	TS	T6NEXT	
0097	REF	2	LAST 1404	16,2131	55'470 1	TS	T6FURTHA	
0098	REF	277	LAST 1411	16,2132	3 4755 1	CA	ZERO	
0099	REF	8	LAST 1412	16,2133	55'467 1	TS	T6NEXT +1	
0100	REF	3	LAST 1412	16,2134	55'471 0	TS	T6FURTHA +1	
0101	REF	3	LAST 1404	16,2135	55'465 0	TS	NXT6ADR	
0102	REF	5	LAST 1404	16,2136	55'472 0	TS	NEXTP	
0103	REF	2	LAST 1405	16,2137	55'473 1	TS	NEXTU	
0104	REF	2	LAST 1405	16,2140	55'474 0	TS	NEXTV	
0105	REF	8	LAST 1038	16,2141	4 4363 1	CS	TEN	
0106	REF	1		16,2142	55'757 1	TS	DAPZRPT	JASK NOT IN PROGRESS, INITIALIZE NEG.
0107	REF	92	LAST 1391	16,2143	3 4752 0	CA	TWO	
0108	REF	1		16,2144	55'433 0	TS	NPTRAPS	
0109	REF	1		16,2145	55'434 1	TS	NQTRAPS	
0110	REF	1		16,2146	55'435 0	TS	NRTRAPS	
0111				16,2147	0 0006 1	EXTEND		
0112	REF	1		16,2150	3 2205 1	DCA	PAXADIDL	
0113	REF	3	LAST 219	16,2151	53'275 1	DXCH	T5ADR	
0114	REF	1		16,2152	3 7727 1	CAF	MS100	
0115	REF	5	LAST 858	16,2153	54 030 0	TS	TIME5	

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0116	REF	26	LAST	1405	16,2154	1	5270	0	TCF	RESUME	
0117	REF	16	LAST	1411	E6,1537				EBANK=	AOSQ	
0118	REF	2	LAST	222	16,2155	02024	0		IDLERADR	2CADR	DAPIDLER
0118					16,2156	34106	1				
0119	REF	51	LAST	1411	16,2157	0	4674	0	MOREIDLE	TC	IBNKCALL
0120	REF	1			16,2160	36626	0		CADR	QERRCALC	CALCULATE Q,R-AXES ATTITUDE ERRORS.
0121	REF	52	LAST	1413	16,2161	0	4674	0	TC	IBNKCALL	
0122	REF	1			16,2162	35446	1		CADR	CALCPERR	CALCULATE P AXIS ATTITUDE ERRORS.
0123					16,2163	0	0006	1	SHUTDOWN	EXTEND	
0124	REF	1			16,2164	3	2156	1	DCA	IDLERADR	
0125	REF	4	LAST	1412	16,2165	53	275	1	DXCH	T5ADR	
0126	REF	278	LAST	1412	16,2166	3	4755	1	CAF	ZERO	KILL ANY POSSIBLE JET REQUESTS
0127	REF	6	LAST	1412	16,2167	55	472	0	TS	NEXTP	
0128	REF	3	LAST	1412	16,2170	55	473	1	TS	NEXTU	
0129	REF	3	LAST	1412	16,2171	55	474	0	TS	NEXTV	
0130					16,2172	0	0006	1	EXTEND		COMMAND JETS OFF.
0131	REF	5	LAST	1405	16,2173	01	005	0	WRITE	CHAN5	
0132					16,2174	0	0006	1	EXTEND		
0133	REF	3	LAST	1404	16,2175	01	006	0	WRITE	CHAN6	
0134	REF	1			16,2176	4	2203	0	CS	BGIM23	TURN TRIM GIMBAL OFF
0135					16,2177	0	0006	1	EXTEND		
0136	REF	65	LAST	1324	16,2200	03	012	1	WAND	CHAN12	
0137	REF	1			16,2201	1	2152	1	TCF	SETTIMES	RETURN IN 100 MSEC.
01371					16,2202	03021	1		MANFLAG	OCT	03021
0138					16,2203	07400	1		BGIM23	OCTAL	07400
0139	REF	8	LAST	1411	E6,1421				EBANK=	OMEGAP	
0140	REF	1			16,2204	02213	0		PAXADIDL	2CADR	PAXIS
0140	REF	1			16,2205	34106	1				
0141	REF	2	LAST	155	7727				MS100	=	OCT37766
0142	REF	69	LAST	1384	0061				COSMG	=	ITEMP1
01431					16,2206	0	0006	1	JUMPDSP	EXTEND	TRANSFER TO BANK 20
01432	REF	1			16,2207	3	2212	1	DCA	DSPCADR	FOR ATTITUDE ERROR DISPLAYS
01433					16,2210	52	006	0	DTCB		
01434	REF	3	LAST	137	E6,1761				EBANK=	AK	
01435	REF	1			16,2211	02226	0		DSPCADR	2CADR	ALTDSPLY
01435	REF	1			16,2212	40106	1				

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01436 20,2226 BANK 20
 01437 REF 4 LAST 1406 20,2000 SETLOC DAPS3
 01438 20,2226 BANK
 01439 REF 1 COUNT* \$\$/NEEDL

R0144 PROGRAM: ALTDSPY

R0145 MOD 0. 6 DEC 1967

R0146 AUTHOR: CRAIG WORK, DON KEENE, MIT IL

R0147 MOD 3 BY DON KEENE AUG 1, 1968 MOVED PROGRAM TO BANK 20

R0148 PROGRAM DESCRIPTION:

R0149 ALTDSPY REVERSES THE DSPLYALT BIT OF RCSFLAGS EACH TIME IT IS CALLED, WHICH IS PRESUMABLY EVERY 100 MS.
 R0151 IF THE REVERSED BIT IS ONE, NEEDLER IS CALLED TO DISPLAY ATTITUDE ERRORS. IF THE BIT IS ZERO, THE ATTITUDE ER-
 R0153 RORS ARE CALCULATED AS 1) DAP FOLLOWING ERRORS, IF NEEDLFLG = 0, AND 2) TOTAL ATTITUDE ERRORS FOR NEEDLFLG = 1.

R0155 WARNING: ALTDSPY MAY ONLY BE CALLED WITH INTERRUPT INHIBITED.

R0156 WARNING: EBANK MUST BE SET TO 6 WHEN USING THIS ROUTINE.

R0157 INPUT: RCSFLAGS AND 1) IF NEEDLFLG=0, INPUT PERROR, QERROR, RERROR.

R0158 2) IF NEEDLFLG=1, INPUT CPHI, CTHETA, CPSI, CDUX, CDUY, COUZ, M11, M21, M31, M22, M32. (GP MATRIX)

R0160 OUTPUTS: RCSFLAGS WITH DSPLYALT REVERSED, AK, AK1, AK2, + NEEDLER OUTPUTS.

R0161 ENTRY: TCF ALTDSPY

R0162 EXIT: TCF CHEKMORE

R0163 ALARM OR ABORT EXITS: NONE

R0164 SUBPROGRAMS CALLED: NEEDLER, OVERSUB2

R0165 DEBRIS: A, L, AND NEEDLER DEBRIS.

0166 REF 12 LAST 1412 20,2226 3 1273 0 ALTDSPY CA RCSFLAGS INVERT THE DISPLAY ALTERNATION BIT.
 0167 REF 265 LAST 1408 20,2227 54 001 1 TS L
 0168 REF 1 20,2230 3 4750 1 CA DSPLYALT
 0169 20,2231 0 0006 1 EXTEND
 0170 REF 18 LAST 1391 20,2232 06 001 0 RXOR LGHAN
 0171 REF 13 LAST 1414 20,2233 55 273 1 TS RCSFLAGS
 0172 REF 2 LAST 1414 20,2234 7 4750 0 MASK DSPLYALT
 0173 REF 479 LAST 1411 20,2235 10 000 0 CCS A IS ALTERNATION FLAG ZERO?
 0174 REF 1 20,2236 1 2322 1 TCF NEEDLER
 0175 REF 33 LAST 1376 20,2237 30 074 1 CAE FLAGWRDO NEEDLFLG WILL INDICATE TOTAL OR DAP AT-

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0176	REF	1		20,2240	7 4750 0	MASK	NEEDLBIT	TITUDE ERROR DISPLAY REQUEST.
0177	REF	480	LAST 1414	20,2241	10 000 0	CCS	A	
0178	REF	1		20,2242	1 2252 1	TCF	DSPLYTOT	TOTAL ERROR IS NEEDED IN AK, AK +1, AK +2
0179	REF	2	LAST 132	20,2243	4 1450 0	CS	QERRDR	YES. DISPLAY ATT ERRORS ON THE , -BALL.
0180	REF	4	LAST 1413	20,2244	55 762 1	TS	AK +1	ERROR COMPLEMENTS ARE INPUT TO NEEDLER.
0181	REF	2	LAST 132	20,2245	4 1452 1	CS	RERROR	
01815	REF	5	LAST 1415	20,2246	55 763 0	TS	AK +2	
0182	REF	2	LAST 154	20,2247	4 1464 1	CS	PERROR	
0183	REF	6	LAST 1415	20,2250	57 761 0	XCH	AK	
0184	REF	1		20,2251	1 2442 0	TCF	RETN MORE	DISPLAY THESE THE NEXT TIME THROUGH
R0185	CALCULATE GIMBAL ANGLE TOTAL ERRORS, RESOLVE INTO PILOT AXES, STORE TOTAL ERRORS FOR NEEDLER. Q-AXIS FIRST.							
0187				20,2252	0 0006 1	DSPLYTOT	EXTEND	
0188	REF	70	LAST 1413	20,2253	22 061 0	QXCH	ITEMP1	SAVE Q FOR CHEKBITS RETURN.
0189	REF	3	LAST 478	20,2254	3 0322 1	CA	CTHETA	DESIRED ATTITUDE, Y-AXIS. 2'S COMP.
0190				20,2255	0 0006 1	EXTEND		SUBTRACT CURRENT ATTITUDE.
0191	REF	11	LAST 1408	20,2256	20 033 0	MSU	CDUY	DIFFERENCE SCALED AT PI, 1'S COMP.
0192	REF	7	LAST 1415	20,2257	55 761 1	TS	AK	SAVE FOR R-ERROR CALCULATION.
0193				20,2260	0 0006 1	EXTEND		
0194	REF	2	LAST 189	20,2261	7 1415 1	MP	M21	(CTHETA-CDUY)*M21 SCALED AT PI RADIANS.
0195	REF	8	LAST 1415	20,2262	57 762 0	XCH	AK +1	STORE FIRST TERM OF Q-ERROR.
0196	REF	5	LAST 518	20,2263	3 0323 0	CA	CPSI	DESIRED ATTITUDE, Z-AXIS. 2'S COMP.
0197				20,2264	0 0006 1	EXTEND		SUBTRACT CURRENT ATTITUDE.
0198	REF	15	LAST 1412	20,2265	20 034 1	MSU	CDUZ	DIFFERENCE SCALED AT PI, 1'S COMP.
0199	REF	9	LAST 1415	20,2266	55 763 0	TS	AK +2	SAVE Z-AXIS TERM FOR R ERROR CALCULATION
0200				20,2267	0 0006 1	EXTEND		
0201	REF	5	LAST 903	20,2270	7 1417 0	MP	M22	(CPSI-CDUZ)*M22, SCALED AT PI RADIANS.
0202	REF	10	LAST 1415	20,2271	6 1762 0	AD	AK +1	Q ERROR COMPLETE . AT PI RAD.
0203	REF	1		20,2272	0 2435 1	TC	OVERSUB2	PIN NEEDLES IN CASE OF OVERFLOW.
0204	REF	11	LAST 1415	20,2273	55 762 1	TS	AK +1	
R0205	R ERROR CALCULATION NEXT.							
0206	REF	12	LAST 1415	20,2274	3 1761 0	CA	AK	Y-AXIS DIFFERENCE STORED BY Q-AXIS CALC.
0207				20,2275	0 0006 1	EXTEND		
0208	REF	2	LAST 189	20,2276	7 1416 1	MP	M31	(CTHETA-CDUY)*M31, SCALED AT PI RADIANS.
0209	REF	13	LAST 1415	20,2277	57 763 1	XCH	AK +2	FIRST TERM OF R-ERROR.
A0210								Z-AXIS DIFFERENCE. STORED BY A-CALC. IS
0211				20,2300	0 0006 1	EXTEND		RECOVERED BY THE EXCHANGE.
0212	REF	3	LAST 903	20,2301	7 1420 1	MP	M32	(CPSI-CDUZ)*M32, SCALED AT PI RADIANS.
0213	REF	14	LAST 1415	20,2302	6 1763 1	AD	AK +2	R ERROR COMPLETE . AT PI RAD.
0214	REF	2	LAST 1415	20,2303	0 2435 1	TC	OVERSUB2	PIN NEEDLES IN CASE OF OVERFLOW.
0215	REF	15	LAST 1415	20,2304	55 763 0	TS	AK +2	
R0216	NOW CALCULATE P-ERROR. (NOTE THAT M13 = 1. SCALED AT 1. SO THE MULTIPLICATION IS BY-PASSED.)							

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0218	REF	16	LAST 1415	20,2305	3 1761 0	CA	AK	Y-AXIS DIFFERENCE STORED BY Q AXIS CALC.
0219				20,2306	0 0006 1	EXTEND		
0220	REF	7	LAST 188	20,2307	7 1414 0	MP	M11	(CTHETA-CDUY)*M11 SCALED AT PI RADIANS.
0221	REF	17	LAST 1416	20,2310	57 761 0	XCH	AK	FIRST TERM OF P-ERROR IN AK, AT PI RAD.
0222	REF	11	LAST 914	20,2311	30 321 1	CAE	CPHI	DESIRED ATTITUDE, X-AXIS, 2'S COMP.
0223				20,2312	0 0006 1	EXTEND		SUBTRACT CURRENT X ATTITUDE.
0224	REF	23	LAST 1412	20,2313	20 032 1	MSU	CDUX	X-AXIS DIFFERENCE, 1'S COMP. AT PI RAD.
R0225	M13 = 1. SO BYPASS THE MULTIPLICATION.							
R0226	EXTEND							
R0227	MP	M13	(CPHI-CDUX)*M13 SCALED AT PI RADIANS.					
0228	REF	18	LAST 1416	20,2314	6 1761 0	AD	AK	P ERROR COMPLETE . SCALED AT PI RAD
0229	REF	3	LAST 1415	20,2315	0 2435 1	TC	OVERSUB2	PIN NEEDLES IN CASE OF OVERFLOW.
0230	REF	19	LAST 1416	20,2316	55 761 1	TS	AK	
0231				20,2317	0 0006 1	EXTEND		
0232	REF	71	LAST 1415	20,2320	22 061 0	QXCH	ITEMP1	RESTORE Q FOR CHEKBITS RETURN.
0233	REF	2	LAST 1415	20,2321	1 2442 0	TCF	RETN MORE	DISPLAY THESE THE NEXT TIME THROUGH

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PC234 FDAI ATTITUDE ERROR DISPLAY SUBROUTINE

R0235 PROGRAM DESCRIPTION: D. KEENE 5/24/67

R0236 MOD 1 BY CRAIG WORK, 12 DEC 67

R0237 MOD 2 BY CRAIG WORK, 6 APRIL 68 CONVERTS ATTITUDE ERROR DISPLAY SCALING FROM 16 7/8 DEG. TO 42 3/16 DEGREES.

R0239 THIS SUBROUTINE IS USED TO DISPLAY ATTITUDE ERRORS ON THE FDAI VIA THE DIGITAL TO ANALOG CONVERTERS (DACS)
R0241 IN THE CDUS. CARE IS TAKEN TO METER OUT THE APPROPRIATE NUMBER OF PULSES TO THE IMU ERROR COUNTERS AND PREVENT
R0243 OVERFLOW, TO CONTROL THE RELAY SEQUENCING, AND TO AVOID INTERFERENCE WITH THE COARSE ALIGN LOOP WHICH ALSO USES
R0245 THE DACS.

R0246 CALLING SEQUENCE:

R0247 DURING THE INITIALIZATION SECTION OF THE USER'S PROGRAM, BIT3 OF RCSFLAGS SHOULD BE SET TO INITIATE THE
R0249 TURN-ON SEQUENCE WITHIN THE NEEDLES PROGRAM:

R0250 CS RCSFLAGS IN EBANK6
R0251 MASK BIT3
R0252 ADS RCSFLAGS

R0253 THEREAFTER, THE ATTITUDE ERRORS GENERATED BY THE USER SHOULD BE TRANSFERED TO THE FOLLOWING LOCATIONS IN EBANK6:

R0255 AK SCALED 180 DEGREES NOTE: THESE LOCATIONS ARE SUBJECT
R0256 AK1 SCALED 180 DEGREES TO CHANGE
R0257 AK2 SCALED 180 DEGREES

R0258 FULL SCALED DEFLECTION OF THE NEEDLES CORRESPONDS TO 5 1/16 DEGREES, WHILE 384 BITS IN THE IMU ERROR COUNTER
R0260 CORRESPONDS TO 42 3/16 DEGREES. (DAC MAXIMUM CAPACITY IS 384 BITS.) 46 BITS EFFECTIVELY PIN THE NEEDLES.

R0262 A CALL TO NEEDLER WILL THEN UPDATE THE DISPLAY:

R0263 INHINT
R0264 TC IBNKCALL NOTE: EBANK SHOULD BE SET TO E6
R0265 CADR NEEDLER
R0266 RELINT

R0267 THIS PROCESS SHOULD BE REPEATED EACH TIME THE ERRORS ARE UPDATED. AT LEAST 3 PASSES THRU THE PROGRAM ARE
R0269 REQUIRED BEFORE ANYTHING IS ACTUALLY DISPLAYED ON THE ERROR METERS.

R0270 NOTE: EACH CALL TO NEEDLER MUST BE SEPARATED BY AT LEAST 50MS TO ASSURE PROPER RELAY SEQUENCING.

R0272 ERASABLE USED:

R0273 AK CDUXCMD
R0274 AK1 CDUYCMD
R0275 AK2 CDUZCMD
R0276 EDRIVEX A.L.Q
R0277 EDRIVEY T5TEMP
R0278 EDRIVEZ DINDX

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R0279 SWITCHES: RCSFLAGS BITS 3,2

R0280 I/O CHANNELS: CHAN12 BIT 4 (COARSE ALIGN - READ ONLY)

R0281 CHAN12 BIT 6 (IMU ERROR COUNTER ENABLE)

R0282 CHAN14 BIT 13,14,15 (DAC ACTIVITY)

R0283 SIGN CONVENTION< AK = THETAC - THETA

R0284 WHERE THETAC = COMMAND ANGLE

R0285 THETA = PRESENT ANGLE

0286	REF	14	LAST	1414	20,2322	3	1273	0	NEEDLER	CA	RCSFLAGS	
0287	REF	27	LAST	1370	20,2323	7	6242	1		MASK	SIX	
0288					20,2324	0	0006	1		EXTEND		
0289	REF	1			20,2325	1	2362	0		BZF	NEEDLES3	
0290	REF	40	LAST	1410	20,2326	7	4751	1		MASK	BIT3	
0291					20,2327	0	0006	1		EXTEND		
0292	REF	1			20,2330	1	2353	1		BZF	NEEDLER2	BIT3 = 0, BIT2 = 1
0293	REF	60	LAST	1410	20,2331	4	4746	1		CS	BIT6	FIRST PASS BIT3 = 1
0294					20,2332	0	0006	1		EXTEND		DISABLE IMU ERROR COUNTER TO ZERO DACS
0295	REF	66	LAST	1413	20,2333	03	012	1		WAND	CHAN12	MUST WAIT AT LEAST 60 MS BEFORE
0296	REF	279	LAST	1413	20,2334	4	4755	0	NEEDLER1	CS	ZERO	ENABLING COUNTERS.
0297	REF	20	LAST	1416	20,2335	55	761	1		TS	AK	ZERO THE INPUTS ON FIRST PASS
0298	REF	1			20,2336	55	762	1		TS	AK1	
0299	REF	1			20,2337	55	763	0		TS	AK2	
0300	REF	3	LAST	137	20,2340	55	764	1		TS	EDRIVEX	ZERO THE DISPLAY REGISTERS
0301	REF	1			20,2341	55	765	0		TS	EDRIVEY	
0302	REF	1			20,2342	55	766	0		TS	EDRIVEZ	
0303	REF	4	LAST	1313	20,2343	54	050	0		TS	CDUXCMD	ZERO THE OUT COUNTERS
0304	REF	2	LAST	174	20,2344	54	051	1		TS	CDUYCMD	
0305	REF	2	LAST	175	20,2345	54	052	1		TS	CDUZCMD	
0306	REF	28	LAST	1418	20,2346	4	6242	1		CS	SIX	RESET RCSFLAGS FOR PASS2
0307	REF	15	LAST	1418	20,2347	7	1273	1		MASK	RCSFLAGS	
0308	REF	52	LAST	1394	20,2350	6	4752	0		AD	BIT2	
0309	REF	16	LAST	1418	20,2351	55	273	1		TS	RCSFLAGS	
0310	REF	3	LAST	1416	20,2352	1	2442	0		TCF	RETNMORE	
0311	REF	61	LAST	1418	20,2353	3	4746	0	NEEDLER2	CAF	BIT6	ENABLE IMU ERROR COUNTERS
0312					20,2354	0	0006	1		EXTEND		
0313	REF	67	LAST	1418	20,2355	05	012	1		WOR	CHAN12	
0314	REF	29	LAST	1418	20,2356	4	6242	1		CS	SIX	RESET RCSFLAGS TO DISPLAY ATTITUDE
0315	REF	17	LAST	1418	20,2357	7	1273	1		MASK	RCSFLAGS	ERRORS WAIT ATLEAST 4 MS FOR
0316	REF	18	LAST	1418	20,2360	55	273	1		TS	RCSFLAGS	RELAY CLOSURE
0317	REF	4	LAST	1418	20,2361	1	2442	0		TCF	RETNMORE	
0318	REF	62	LAST	1418	20,2362	3	4746	0	NEEDLES3	CAF	BIT6	CHECK TO SEE IF IMU ERROR COUNTER
0319					20,2363	0	0006	1		EXTEND		IS ENABLED
0320	REF	68	LAST	1418	20,2364	02	012	0		RAND	CHAN12	

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0321	REF 481	LAST 1415	20,2365	10 000 0	CCS	A	IF NOT, RE-INITIALIZE NEEDLER.
0322	REF 1		20,2366	1-2373-0	TCF	NEEDLES	
0323	REF 19	LAST 1418	20,2367	4 1273 1	CS	RCSFLAGS	SET UP INITIALIZATION FLAG IN RCSFLAGS.
0324	REF 41	LAST 1418	20,2370	7-4751-1	MASK	BIT3	
0325	REF 20	LAST 1419	20,2371	27-273 1	ADS	PCSFLAGS	
0326	REF 5	LAST 1418	20,2372	1-2442-0	TCF	RETNMORE	
0327	REF 93	LAST 1412	20,2373	3-4752-0	NEEDLES	CAF	TWO
0328	REF 1		20,2374	54 063 0	DACLOOP	TS	DINDX
0329	REF 1		20,2375	4-2434-1	CS	ONETENTH	RESCALE INPUTS TO + OR - 1800 DEGREES.
0330			20,2376	0 0006-1	EXTEND		
0331	REF 2	LAST 1419	20,2377	5-0063-1	INDEX	DINDX	
0332	REF 21	LAST 1418	20,2400	7-1761-1	MP	AK	
0333	REF 266	LAST 1414	20,2401	54-001-1	TS	L	
0334	REF 482	LAST 1419	20,2402	10-000-0	CCS	A	
0335	REF 1		20,2403	5 2432 0	CA	DACLIMIT	
0336			20,2404	1-2406-0	TCF	+2	
0337	REF 2	LAST 1419	20,2405	4 2432 1	CS	DACLIMIT	
0338	REF 267	LAST 1419	20,2406	6-0001-0	AD	L	
0339	REF 1		20,2407	54-061-1	TS	T5TEMP	OVFLO CHK
0340			20,2410	1-2414-0	TCF	+4	
0341	REF 483	LAST 1419	20,2411	50-000 1	INDEX	A	ON-OVERFLOW-LIMIT-OUTPUT-TO +-384
0342	REF 3	LAST 1419	20,2412	3 2432 0	CAF	DACLIMIT	
0343	REF 268	LAST 1419	20,2413	54-001-1	TS	L	
0344	REF 3	LAST 1419	20,2414	50-063-1	INDEX	DINDX	
0345	REF 4	LAST 1418	20,2415	4-1764-1	CS	EDRIVEX	CURRENT-VALUE-OF-DAC
0346	REF 269	LAST 1419	20,2416	6-0001-0	AD	L	
0347	REF 4	LAST 1419	20,2417	50 063 1	INDEX	DINDX	
0348	REF 5	LAST 1418	20,2420	26-050-0	ADS	CDUXCMD	
0349	REF 5	LAST 1419	20,2421	50-063-1	INDEX	DINDX	
0350	REF 5	LAST 1419	20,2422	23-764 0	LXCH	EDRIVEX	
0351	REF 6	LAST 1419	20,2423	10-063-0	CCS	DINDX	
0352	REF 1		20,2424	1-2374-1	TCF	DACLOOP	
0353	REF 5	LAST 1372	20,2425	3-7740-0	CAF	13,14,15	
0354			20,2426	0-0006-1	EXTEND		
0355	REF 23	LAST 1326	20,2427	05 014 1	WOR	CHAN 14	SET DAC ACTIVITY BITS
0356	REF 6	LAST 1419	20,2430	1-2442-0	TCF	RETNMORE	
0357			20,2431	77177-0	DEC	-384	
0358			20,2432	37200-1	DACLIMIT	DEC	16000
0359			20,2433	00600-1	DEC	384	
0360			20,2434	03146-1	ONETENTH OCT	03146	DECIMAL +0.1, SCALED AT-1.
0361	REF 55	LAST 1366	4750		DSPLYALT	EQUALS BIT4	100-MS-ALTERNATION-BIT-IN-RCSFLAGS
0362			20,2435	54-007-1	OVERSUB2	TS	7
0363	REF 392	LAST 1408	20,2436	0-0002-0	TC	0	RETURNS A UNCHANGED OR LIMITED TO POSMAX OR NEGMAX IF A HAS OVERFLOW
0364	REF 484	LAST 1419	20,2437	50-000-1	INDEX	A	

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0365	REF	7	LAST 1399	20,2440	4 4734 1	CS	LIMITS	DUPLICATE CODING IN BANK 16
0366	REF	393	LAST 1419	20,2441	0 0002 0	TC	Q	

0367				20,2442	0 0006 1	RETNMORE	EXTEND	RETURN TO CHEKMORE
0368	REF	1		20,2443	3 2446 0	DCA	MORECADR	
0369				20,2444	52 006 0	DTCB		

0370	REF	17	LAST 1413	E6,1537		EBANK=	ADSQ	
0371	REF	1		20,2445	02016 1	MORECADR	2CADR	CHEKMORE
0371	REF	1		20,2446	34106 1			

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0001 16,2213 BANK 16
 0002 REF 2 LAST 1410 16,2000 SETLOC DAPSI
 0003 16,2213 BANK
 0004 REF 3 LAST 1415 E6,1464 EBANK= PERROR
 0005 REF 1 COUNT* \$\$/DAPP

R0006 THE FOLLOWING T5RUPT ENTRY BEGINS THE PROGRAM WHICH CONTROLS THE P-AXIS ACTION OF THE LEM USING THE RCS JETS.
 R0008 THE NOMINAL TIME BETWEEN THE P-AXIS RUPTS IS 100 MS IN ALL NON-IDLING MODES OF THE DAP.

0010 REF 2 LAST 1412 16,2213 3-7727-1 PAXIS CA MS100
 0011 REF 6 LAST 1412 16,2214 26 030 0 ADS TIME5 *** NECESSARY IN ORDER TO ALLOW SYN-
 A00115 CHRONIZATION WITH OTHER INTERRUPTS ***

0012 REF 13 LAST 1411 16,2215 22 016 0 LXCH BANKRUPT INTERRUPT LEAD IN (CONTINUED)
 0013 16,2216 0 0006 1 EXTEND
 0014 REF 12 LAST 1411 16,2217 22 012 1 QXCH QRUPT

R0015 CHECK IF DAP PASS IS PERMISSIBLE

0016 REF 2 LAST 1412 16,2220 11'757 1 CCS DAPZRUPT IF DAPZRUPT POSITIVE, DAP (JASK) IS
 0017 REF 1 16,2221 0 5634 0 TC BAILOUT STILL IN PROGRESS AND A RESTART IS
 0018 16,2222 02000 0 GCT 02000 CALLED FOR. IT IS NEVER ZERO.
 0019 REF 2 LAST 1411 16,2223 0 2000 0 TC CHEKBITS RETURN IS TO I+1 IF DAP SHOULD STAY ON.

00191 REF 24 LAST 1416 16,2224 3 0032 0 CA CDUX READ AND STORE CDU'S
 00192 REF 2 LAST 131 16,2225 55'750 0 TS DAPTREG4
 00193 REF 12 LAST 1415 16,2226 3 0033 1 CA CDUY
 00194 REF 2 LAST 131 16,2227 55'751 1 TS DAPTREG5
 00195 REF 16 LAST 1415 16,2230 3 0034 0 CA CDUZ
 00196 REF 2 LAST 133 16,2231 55'752 1 TS DAPTREG6

R0020 ***** KALCMANU-DAP AND "RATE-HOLD"-DAP INTERFACE *****

R0021 THE FOLLOWING SECTION IS EXECUTED EVERY 100 MS (10 TIMES A SECOND) WITHIN THE P-AXIS REACTION CONTROL SYSTEM
 R0023 AUTOPILOT (WHENEVER THE DAP IS IN OPERATION).

0024 REF 18 LAST 1408 16,2232 3-1635-0 CA CDUXD
 0025 16,2233 0 0006 1 EXTEND
 0026 REF 6 LAST 1408 16,2234 21'640 0 MSU DELCDUX
 0027 REF 1 16,2235 0 2256 1 TC 1STOTWOS
 0028 REF 19 LAST 1421 16,2236 55'635 1 TS CDUXD
 0029 REF 5 LAST 1408 16,2237 3-1636-0 CA CDUYD
 0030 16,2240 0 0006 1 EXTEND
 0031 REF 3 LAST 1408 16,2241 21'641 1 MSU DELCDUY
 0032 REF 2 LAST 1421 16,2242 0 2256 1 TC 1STOTWOS
 0033 REF 6 LAST 1421 16,2243 55'636 1 TS CDUYD
 0034 REF 5 LAST 1408 16,2244 3-1637-1 CA CDUZD
 0035 16,2245 0 0006 1 EXTEND
 0036 REF 3 LAST 1408 16,2246 21'642 1 MSU DELCDUZ

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0037	REF	3	LAST 1421	16,2247	0 2256 1	TC	1STOTWOS	
0038	REF	6	LAST 1421	16,2250	55'637 0	TS	GDUZD	
00381				16,2251	0 0006 1	EXTEND		DIMINISH MANUAL CONTROL DIRECT RATE
00382	REF	1		16,2252	27'445 1	DIM	TCR	TIME COUNTERS.
00383				16,2253	0 0006 1	EXTEND		
00384	REF	1		16,2254	27'457 1	DIM	TCR	
A0039						RATELOOP COMPUTES JETRATER, JETRATER, AND 1JACC*NO. PJETS IN ITEM .		
A0040						RETURNS TO BACKP.		
A0041						JETRATE = 1JACC*NO.PJETS*TJP (NOTE TJ IS THE TIME FIRED DURING CSP)		
A0042						JETRATEQ= 1JACCQ(TJU*NO.UJETS - TJV*NO.VJETS)		
A0043						JETRATER= 1JACCR(TJU*NO.UJETS + TJV*NO.VJETS)		
0044	REF	1		16,2255	1 2647 1	TCF	PAXFILT	PROCEEDS TO RATELOOP AFTER SUPERJOB
0045	REF	485	LAST 1419	16,2256	10 000 0	1STOTWOS	CCS	A
0046	REF	156	LAST 1401	16,2257	6 4753 1	AD	ONE	
0047	REF	394	LAST 1420	16,2260	0 0002 0	TC	Q	
0048	REF	486	LAST 1422	16,2261	4 0000 0	CS	A	
0049	REF	395	LAST 1422	16,2262	0 0002 0	TC	Q	
0050				16,2263	0 0006 1	SUBDIVDE	EXTEND	OVERFLOW PROCTION ROUTINE TO GIVE
0051	REF	3	LAST 133	16,2264	7 1741 0	MP	DAPTEMP3	POSMAX OR NEGMAX IF THE DIVIDE WOULD
0052	REF	3	LAST 130	16,2265	21'427 0	DAS	OMEGAU	OVERFLOW
0053				16,2266	0 0006 1	+3	EXTEND	
00531	REF	4	LAST 1422	16,2267	3 1427 1	DCA	OMEGAU	
00532	REF	2	LAST 131	16,2270	53'744 0	DXCH	DAPTEMP5	
00533	REF	5	LAST 1422	16,2271	11'426 1	CCS	OMEGAU	
0054				16,2272	1 2274 0	TCF	+2	
0055	REF	1		16,2273	1 2304 0	TCF	DIVIDER	
0056	REF	1		16,2274	6 2315 1	AD	-OCT630	
0057				16,2275	0 0006 1	EXTEND		
0058	REF	2	LAST 1422	16,2276	6 2304 1	BZMF	DIVIDER	
0059	REF	6	LAST 1422	16,2277	11'426 1	CCS	OMEGAU	
0060	REF	38	LAST 1412	16,2300	3 4733 1	CA	POSMAX	45 DEG/SEC
0061	REF	396	LAST 1422	16,2301	0 0002 0	TC	Q	
0062	REF	39	LAST 1422	16,2302	4 4733 0	CS	POSMAX	
0063	REF	397	LAST 1422	16,2303	0 0002 0	TC	Q	
0064	REF	7	LAST 1422	16,2304	53'427 0	DIVIDER	DXCH	OMEGAU
0065				16,2305	0 0006 1	EXTEND		
0066	REF	3	LAST 1421	16,2306	11'750 0	DV	DAPTREG4	
0067	REF	398	LAST 1422	16,2307	0 0002 0	TC	Q	
0068				16,2310	54 007 1	OVERSUB	TS	7
0069	REF	399	LAST 1422	16,2311	0 0002 0	TC	Q	RETURNS A UNCHANGED OR LIMITED TO
0070	REF	487	LAST 1422	16,2312	50 000 1	INDEX	A	POSMAX OR NEGMAX IF A HAS OVERFLOW
0071	REF	48	LAST 1404	16,2313	4 4734 1	CS	BIT15	-1

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0072 REF 400 LAST 1422 16,2314 0 0002 0 TC Q

0073 16,2315 77147 0 -OCT630 OCT 77147

0074 REF 19 LAST 137 16,2316 3 1737 0 BACKP CA DAPTEMP1

0075 16,2317 0 0006 1 EXTEND

0076 REF 7 LAST 918 16,2320 7 1530 1 MP 1JACC

0077 REF 3 LAST 132 16,2321 55 745 1 TS JETRATE

A0078 BEGINNING OF THE RATE DERIVATION

A0079 OMEGAP,Q,R BODY RATES SCALED AT PI/4

A0080 TRAPER,Q,R BODY ANGLE ERRORS FROM PREDICTED ANGLE (PI/40)

A0081 NP(QR)TRAPS NUMBER OF TIMES ANGLE ERROR HAS BEEN ACCUMULATED

A0082 AOSQ(R)TERM CHANGE IN RATE DUE TO OFFSET ACCELERATION. (PI/4)

A0083 JETRATE,Q,R CHANGE IN RATE DUE TO JET ACCELERATION. (PI/4)

A0084 TRAPSIZE NEGATIVE LIMIT OF MAGNITUDE OF TRAPEDP,ECT.

A0086 OMEGAU DP-TEMPORARY STORAGE

A0087 OMEGA = OMEGA + JETRATE + AOSTERM (+TRAPED/NTRAPS IF TRAPED BIG)

0088 REF 4 LAST 1422 16,2322 31 750 1 CAE DAPTREG4 CDUX IS STORED HERE

0089 REF 270 LAST 1419 16,2323 54 001 1 TS L

0090 16,2324 0 0006 1 EXTEND

0091 REF 4 LAST 1412 16,2325 21 440 1 MSU OLDXFORP SCALED AT PI

0092 REF 5 LAST 1423 16,2326 23 440 0 LXCH OLDXFORP

0093 REF 20 LAST 1423 16,2327 55 737 1 TS DAPTEMP1

0094 REF 1 16,2330 3 3620 0 CA 1/40

0095 REF 5 LAST 1423 16,2331 55 750 0 TS DAPTREG4

0096 REF 4 LAST 1423 16,2332 4 1745 1 CS JETRATE

0097 16,2333 0 0006 1 EXTEND

0098 REF 82 LAST 1402 16,2334 7 4736 0 MP BIT14

0099 REF 7 LAST 1411 16,2335 27 430 0 ADS TRAPEDP

0100 REF 1 16,2336 3 1746 0 CA JETRATEQ

0101 REF 4 LAST 1411 16,2337 6 1545 1 AD AOSQTERM

0102 16,2340 0 0006 1 EXTEND

0103 REF 1 16,2341 7 7736 0 MP -BIT14

0104 REF 2 LAST 1411 16,2342 27 431 1 ADS TRAPEDQ

0105 REF 1 16,2343 3 1747 1 CA JETRATER

0106 REF 3 LAST 1411 16,2344 6 1546 1 AD AOSRTERM

0107 16,2345 0 0006 1 EXTEND

0108 REF 2 LAST 1423 16,2346 7 7736 0 MP -BIT14

0109 REF 2 LAST 1411 16,2347 27 432 1 ADS TRAPEDR

0110 REF 3 LAST 1421 16,2350 3 1751 0 CA DAPTREG5 CDUY IS STORED HERE

0111 REF 271 LAST 1423 16,2351 54 001 1 TS L

0112 16,2352 0 0006 1 EXTEND

0113 REF 1 16,2353 21 441 0 MSU OLDYFORP SCALED AT PI

0114 REF 2 LAST 1423 16,2354 23 441 1 LXCH OLDYFORP

0115 REF 3 LAST 133 16,2355 55 740 1 TS DAPTEMP2

0116 16,2356 0 0006 1 EXTEND

0117 REF 8 LAST 1416 16,2357 7 1414 0 MP M11 M11 SCALED AT 1

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0118	REF	21	LAST 1423	16,2360	6 1737 0	AD	DAPTEMP1	
0119	REF	8	LAST 1422	16,2361	53'427 0	DXCH	OMEGAU	
0120	REF	1		16,2362	0 2266 1	TC	SUBDIVDE +3	RETURNS WITH CDU-RATE AT PI/4
0121				16,2363	0 0006 1	EXTEND		
0122	REF	9	LAST 1413	16,2364	61'421 1	SU	OMEGAP	
0123	REF	8	LAST 1423	16,2365	27'430 0	ADS	TRAPEDP	
0124	REF	1		16,2366	0 2310 1	TC	OVERSUB	
0125	REF	9	LAST 1424	16,2367	55'430 0	TS	TRAPEDP	
012501				16,2370	0 0006 1	EXTEND		
012502	REF	3	LAST 1422	16,2371	3 1744 1	DCA	DAPTEMP5	
012503	REF	3	LAST 130	16,2372	21'447 0	DAS	DXERROR	
012504	REF	1		16,2373	4 1454 1	CS	PLAST	
012505				16,2374	0 0006 1	EXTEND		
012506	REF	2	LAST 1423	16,2375	7 3620 1	MP	1/40	
012507	REF	4	LAST 1424	16,2376	21'447 0	DAS	DXERROR	MANUAL MODE X-ATTITUDE ERROR (DP)
0126	REF	3	LAST 1421	16,2377	3 1752 0	CA	DAPTREG6	CDUZ IS STORED HERE
0127	REF	272	LAST 1423	16,2400	54 001 1	TS	L	
0128				16,2401	0 0006 1	EXTEND		
0129	REF	2	LAST 1412	16,2402	21'442 0	MSU	OLDZFORQ	
0130	REF	4	LAST 1422	16,2403	55'741 0	TS	DAPTEMP3	
0131	REF	3	LAST 1424	16,2404	23'442 1	LXCH	OLDZFORQ	
0132	REF	3	LAST 1415	16,2405	3 1415 0	CA	M21	
0133				16,2406	0 0006 1	EXTEND		
0134	REF	4	LAST 1423	16,2407	7 1740 1	MP	DAPTEMP2	
0135	REF	9	LAST 1424	16,2410	53'427 0	DXCH	OMEGAU	
0136	REF	6	LAST 1415	16,2411	3 1417 1	CA	M22	
0137	REF	2	LAST 1424	16,2412	0 2263 1	TC	SUBDIVDE	
0138				16,2413	0 0006 1	EXTEND		
0139	REF	7	LAST 1411	16,2414	61'422 1	SU	OMEGAQ	
0140	REF	3	LAST 1423	16,2415	27'431 1	ADS	TRAPEDQ	
0141	REF	2	LAST 1424	16,2416	0 2310 1	TC	OVERSUB	
0142	REF	4	LAST 1424	16,2417	55'431 1	TS	TRAPEDQ	
014201				16,2420	0 0006 1	EXTEND		
014202	REF	4	LAST 1424	16,2421	3 1744 1	DCA	DAPTEMP5	
014203	REF	2	LAST 130	16,2422	21'451 1	DAS	DYERROR	
014204	REF	1		16,2423	4 1455 0	CS	QLAST	
014205				16,2424	0 0006 1	EXTEND		
014206	REF	3	LAST 1424	16,2425	7 3620 1	MP	1/40	
014207	REF	3	LAST 1424	16,2426	21'451 1	DAS	DYERROR	MANUAL MODE Y-ATTITUDE ERROR (DP)
0143	REF	3	LAST 1415	16,2427	3 1416 0	CA	M31	
0144				16,2430	0 0006 1	EXTEND		
0145	REF	5	LAST 1424	16,2431	7 1740 1	MP	DAPTEMP2	
0146	REF	10	LAST 1424	16,2432	53'427 0	DXCH	OMEGAU	
0147	REF	4	LAST 1415	16,2433	3 1420 0	CA	M32	
0148	REF	3	LAST 1424	16,2434	0 2263 1	TC	SUBDIVDE	

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0149				16,2435	0 0006 1	EXTEND	
0150	REF	2	LAST 1411	16,2436	61'423 0	SU	OMEGAR
0151	REF	3	LAST 1423	16,2437	27'432 1	ADS	TRAPEDR
0152	REF	3	LAST 1424	16,2440	0 2310 1	TC	OVERSUB
0153	REF	4	LAST 1425	16,2441	55'432 1	TS	TRAPEDR
TRAPEDS HAVE ALL BEEN COMPUTED							
015301				16,2442	0 0006 1	EXTEND	
015302	REF	5	LAST 1424	16,2443	3 1744 1	DCA	DAPTEMP5
015303	REF	2	LAST 130	16,2444	21'453 0	DAS	DZERROR
015304	REF	1		16,2445	4 1456 0	CS	RLAST
015305				16,2446	0 0006 1	EXTEND	
015306	REF	4	LAST 1424	16,2447	7 3620 1	MP	1/40
015307	REF	3	LAST 1425	16,2450	21'453 0	DAS	DZERROR
01531	REF	39	LAST 1411	16,2451	3 0111 0	CA	DAPROOLS
01532	REF	7	LAST 910	16,2452	7 4737 1	MASK	CSMDOCKD
01533				16,2453	0 0006 1	EXTEND	
01534	REF	1		16,2454	1 2462 1	BZF	LONLY
01535				16,2455	0 0006 1	EXTEND	DOCKED
01536	REF	2	LAST 213	16,2456	3 1405 1	DCA	DKOMEGAN
01537	REF	6	LAST 1423	16,2457	53'751 1	DXCH	DAPTREG4
01538	REF	2	LAST 213	16,2460	3 1403 1	CA	DKTRAP
015382				16,2461	1 2466 0	TCF	+5
015384				16,2462	0 0006 1	EXTEND	UNDOCKED
015386	REF	2	LAST 213	16,2463	3 1410 0	DCA	LMOMEGAN
015388	REF	7	LAST 1425	16,2464	53'751 1	DXCH	DAPTREG4
01539	REF	2	LAST 213	16,2465	3 1406 1	CA	LMTRAP
015392	REF	4	LAST 1424	16,2466	55'752 1	TS	DAPTREG6
0154	REF	10	LAST 1424	16,2467	11'430 0	CCS	TRAPEDP
0155				16,2470	1 2472 0	TCF	+2
0156	REF	1		16,2471	1 2507 0	TCF	SMALPDIF
0157	REF	5	LAST 1425	16,2472	6 1752 0	AD	DAPTREG6
0158				16,2473	0 0006 1	EXTEND	
0159	REF	2	LAST 1425	16,2474	6 2507 1	BZMF	SMALPDIF
0160				16,2475	22 007 0	ZL	
0161	REF	11	LAST 1425	16,2476	23'430 1	LXCH	TRAPEDP
0162	REF	280	LAST 1418	16,2477	3 4755 1	CA	ZERO
0163				16,2500	0 0006 1	EXTEND	
0164	REF	2	LAST 1412	16,2501	11'453 0	DV	NPTRAPS
0165	REF	10	LAST 1424	16,2502	27'421 0	ADS	OMEGAP
0166	REF	4	LAST 1425	16,2503	0 2310 1	TC	OVERSUB
0167	REF	11	LAST 1425	16,2504	55'421 0	TS	OMEGAP
0168	REF	8	LAST 1425	16,2505	3 1750 1	CA	DAPTREG4
0169	REF	3	LAST 1425	16,2506	55'433 0	TS	NPTRAPS
0170	REF	4	LAST 1425	16,2507	25'453 1	INCR	NPTRAPS
0171	REF	5	LAST 1423	16,2510	3 1745 0	CA	JETRAT
0172	REF	12	LAST 1425	16,2511	27'421 0	ADS	OMEGAP
0173	REF	5	LAST 1425	16,2512	0 2310 1	TC	OVERSUB
0174	REF	13	LAST 1425	16,2513	55'421 0	TS	OMEGAP
0175	REF	5	LAST 1424	16,2514	11'431 1	CCS	TRAPEDQ

MANUAL MODE Z-ATTITUDE ERROR (DP)
PICK UP PAD LOADED STATE ESTIMATOR GAINS

TRAPSIZE > ABOUT 77001 %-1.4DEG/SEC"

ABOUT 10 OR 0 FOR DOCKED OR UNDOCKED

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0176			16,2515	1 2517 1	TCF	+2	
0177	REF	1	16,2516	1 2544 1	TCF	Q-RATE	
0178	REF	6	16,2517	6 1752 0	AD	DAPTRG6	TRAPSIZE > ABOUT 77001 % -1.4DEG/SEC"
0179			16,2520	0 0006 1	EXTEND		
0180	REF	2	16,2521	6 2544 0	BZMF	Q-RATE	
0181			16,2522	22 007 0	ZL		
0182	REF	6	16,2523	23 431 0	LXCH	TRAPEDQ	
0183	REF	281	16,2524	3 4755 1	CA	ZERO	
0184			16,2525	0 0006 1	EXTEND		
0185	REF	2	16,2526	11 434 1	DV	NQTRAPS	
0186	REF	22	16,2527	55 737 1	TS	DAPTEMP1	SAVE FOR OFFSET ESTIMATE
0189	REF	8	16,2530	27 422 0	ADS	OMEGAQ	
0190	REF	6	16,2531	0 2310 1	TC	OVERSUB	
0191	REF	9	16,2532	55 422 0	TS	OMEGAQ	
0192	REF	9	16,2533	3 1750 1	CA	DAPTRG4	ABOUT 10 OR 0 FOR DOCKED OR UNDOCKED
0193	REF	3	16,2534	57 434 0	XCH	NQTRAPS	
0194	REF	4	16,2535	6 1751 0	AD	DAPTRG5	KAOS > ABOUT 60D %N/N_60"
0195	REF	23	16,2536	57 737 0	XCH	DAPTEMP1	
0196			16,2537	0 0006 1	EXTEND		
0197	REF	24	16,2540	7 4756 0	MP	FIVE	
0198			16,2541	0 0006 1	EXTEND		
0199	REF	24	16,2542	11 737 1	DV	DAPTEMP1	
0200	REF	18	16,2543	27 537 0	ADS	ADSQ	
0201	REF	4	16,2544	25 434 0	INCR	NQTRAPS	Q-RATE
0202	REF	2	16,2545	3 1746 0	CA	JETRATEG	
0203	REF	5	16,2546	6 1545 1	AD	ADSQTERM	
0204	REF	10	16,2547	27 422 0	ADS	OMEGAQ	
0205	REF	7	16,2550	0 2310 1	TC	OVERSUB	
0206	REF	11	16,2551	55 422 0	TS	OMEGAQ	
0207	REF	5	16,2552	11 432 1	CCS	TRAPEDR	
0208			16,2553	1 2555 1	TCF	+2	
0209	REF	1	16,2554	1 2602 0	TCF	R-RATE	
0210	REF	7	16,2555	6 1752 0	AD	DAPTRG6	TRAPSIZE > ABOUT 77001 % -1.4DEG/SEC"
0211			16,2556	0 0006 1	EXTEND		
0212	REF	2	16,2557	6 2602 1	BZMF	R-RATE	
0213			16,2560	22 007 0	ZL		
0214	REF	6	16,2561	23 432 0	LXCH	TRAPEDR	
0215	REF	282	16,2562	3 4755 1	CA	ZERO	
0216			16,2563	0 0006 1	EXTEND		
0217	REF	2	16,2564	11 435 0	DV	NRTRAPS	
0218	REF	6	16,2565	55 740 1	TS	DAPTEMP2	SAVE FOR OFFSET ESTIMATE
0221	REF	3	16,2566	27 423 1	ADS	OMEGAR	
0222	REF	8	16,2567	0 2310 1	TC	OVERSUB	
0223	REF	4	16,2570	55 423 1	TS	OMEGAR	
0224	REF	10	16,2571	3 1750 1	CA	DAPTRG4	ABOUT 10 OR 0 FOR DOCKED OR UNDOCKED
0225	REF	3	16,2572	57 435 1	XCH	NRTRAPS	
0226	REF	5	16,2573	6 1751 0	AD	DAPTRG5	KAOS > ABOUT 60D %N/N_60"
0227	REF	7	16,2574	57 740 0	XCH	DAPTEMP2	
0228			16,2575	0 0006 1	EXTEND		

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0229	REF	25	LAST	1426	16,2576	7 4756 0	MP	FIVE
0230					16,2577	0-0006-1	EXTEND	
0231	REF	8	LAST	1426	16,2600	11'740 1	DV	DAPTEMP2
0232	REF	6	LAST	1411	16,2601	27'541 1	ADS	AUSR
0233	REF	4	LAST	1426	16,2602	25'435 1	R-RATE	INCR NRTRAPS
0234	REF	2	LAST	1423	16,2603	3 1747 1	CA	JETKATER
0235	REF	4	LAST	1423	16,2604	6-1546-1	AD	AOSRTERM
0236	REF	5	LAST	1426	16,2605	27'423 1	ADS	OMEGAR
0237	REF	9	LAST	1426	16,2606	0-2310-1	TC	OVERSUB
0238	REF	6	LAST	1427	16,2607	55'423 1	TS	OMEGAR

A0239

END OF RATE DERIVATION

A0240

BEGIN OFFSET ESTIMATOR

A0241

IN POWERED FLIGHT, AUSTASK WILL BE CALLED EVERY 2 SECONDS.

A0242

AOS = AOS + K*SUMRATE

0243	REF	40	LAST	1425	16,2610	4-0111-1	CS	DAPBOOLS	
0244	REF	3	LAST	1409	16,2611	7 4744 0	MASK	DRIFTBIT	
0245	REF	488	LAST	1422	16,2612	10-000-0	CGS	A	
0246	REF	1			16,2613	1-2624-1	TCF	WORKTIME	
0247	REF	4	LAST	1411	16,2614	55'424 0	TS	ALPHAQ	ZERO THE OFFSET ACCELERATION VALUES.
0248	REF	3	LAST	1411	16,2615	55'425 1	TS	ALPHAR	
0249	REF	6	LAST	1426	16,2616	55'545 0	TS	AOSQTERM	
0250	REF	5	LAST	1427	16,2617	55'546 0	TS	AOSRTERM	
0251	REF	19	LAST	1426	16,2620	55'537 0	TS	AOSQ	
0252	REF	7	LAST	1427	16,2621	55'541 1	TS	AUSR	
0253	REF	1			16,2622	1-2667-0	TCF	PRETIMCK	
0254					16,2623	00074-1	KAOS	DEC	60
0255	REF	2	LAST	1411	16,2624	3-1510-1	WORKTIME	CA	RACCDOT
0256					16,2625	0-0006-1	EXTEND		
0257	REF	3	LAST	1015	16,2626	7 4766 0	MP	CALLCODE	OCTAL 00032 IS DECIMAL .1 AT 2(6).
0258	REF	20	LAST	1427	16,2627	21'540 0	DAS	AOSQ	
0259	REF	21	LAST	1427	16,2630	3 1537 1	CA	AOSQ	
0260	REF	5	LAST	1427	16,2631	55'424 0	TS	ALPHAQ	
0261					16,2632	0-0006-1	EXTEND		
0262	REF	1			16,2633	7 3616 1	MP	200MS	.2 AT 1
0263	REF	7	LAST	1427	16,2634	55'545 0	TS	AOSQTERM	
0264	REF	2	LAST	1411	16,2635	3-1512-0	CA	RACCDOT	
0265					16,2636	0-0006-1	EXTEND		
0266	REF	4	LAST	1427	16,2637	7 4766 0	MP	CALLCODE	OCTAL 00032 IS DECIMAL .1 AT 2(6).
0267	REF	8	LAST	1427	16,2640	21'542 1	DAS	AOSR	
0268	REF	9	LAST	1427	16,2641	3-1541-0	CA	AOSR	
0269	REF	4	LAST	1427	16,2642	55'425 1	TS	ALPHAR	
0270					16,2643	0-0006-1	EXTEND		
0271	REF	2	LAST	1427	16,2644	7-3616-1	MP	200MS	.2 AT 1
0272	REF	6	LAST	1427	16,2645	55'546 0	TS	AOSRTERM	
02721	REF	2	LAST	1427	16,2646	1 2667 0	TCF	PRETIMCK	

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R0273

0274	REF	1		16,2647	3 4747 1	PAXFILT	CA	CALLGMBL	EXECUTE ACDT+C12, IF NEEDED.
02742	REF	21	LAST 1419	16,2650	7 1273 1		MASK	RCSFLAGS	
02744	REF	489	LAST 1427	16,2651	10 000 0		CCS	A	CALLGMBL IS NOT BIT15. SO THIS TEST IS
02746	REF	1		16,2652	0 3736 0		TC	ACD1+C12	VALID.
0275	REF	12	LAST 1129	16,2653	52 011 0		DXCH	ARUPT	
0276	REF	4	LAST 137	16,2654	53 754 1		DXCH	DAPARUPT	
0277	REF	1		16,2655	3 2666 0		CA	SUPERJOB	SETTING UP THE SUPERJOB
0278	REF	3	LAST 1383	16,2656	56 017 1		XCH	BRUPT	
0279	REF	13	LAST 1421	16,2657	22 012 1		LXCH	QRUPT	
0280	REF	1		16,2660	53 756 0		DXCH	DAPBQRPT	
0281	REF	1		16,2661	3 2665 0		CA	SUPERADR	
0282	REF	1		16,2662	52 016 1		DXCH	ZRUPT	
0283	REF	3	LAST 1421	16,2663	53 760 0		DXCH	DAPZRUPT	
0284	REF	1		16,2664	1 5275 0		TCF	NOQBRSM +1	RELINT (JUST IN CASE) AND RESUME. IN THE
A0285									FORM OF A JASK. AT SUPERJOB.

0286 REF 2 LAST 1428 16,2665 02667 1 SUPERADR GENADR SUPERJOB +1
 R0287 COUNT DOWN GIMBAL DRIVE TIMERS AND TURN OFF DRIVES IF REQUIRED.

0288	REF	1		16,2666	1 3641 0	SUPERJOB	TCF	RATELOOP	
02881	REF	4	LAST 1412	16,2667	11 632 0	PRETIMCK	CCS	QGIMTIMR	
0289	REF	1		16,2670	1 2710 1		TCF	DECQTIMR	POSITIVE- COUNTING DOWN
0290	REF	1		16,2671	1 2714 0		TCF	TURNOFFQ	NEGATIVE- DRIVE SHOULD BE ENDED
0291	REF	2	LAST 1412	16,2672	11 634 0	CHKRTIMR	CCS	RGIMTIMR	NEGATIVE- INACTIVE
0292	REF	1		16,2673	1 2712 0		TCF	DECRTIMR	(NEG ZERO- IMPOSSIBLE)
0293	*REF	1		16,2674	1 2724 0		TCF	TURNOFFR	REPEATED (ABOVE) FOR R-AXIS.
0294	*			16,2675	0 0006 1		EXTEND		DECREMENT DOCKED JET INHIBITION COUNTERS
0295	*REF	4	LAST 1412	16,2676	27 767 1		DIM	PJETCTR	
0296	*			16,2677	0 0006 1		EXTEND		
0297	*REF	2	LAST 1412	16,2700	27 770 1		DIM	UJETCTR	
0298	*			16,2701	0 0006 1		EXTEND		
0299	*REF	3	LAST 1412	16,2702	27 771 0		DIM	VJETCTR	
0300	REF	38	LAST 1412	16,2703	3 4740 0		CA	BIT12	
0301	REF	22	LAST 1428	16,2704	7 1273 1		MASK	RCSFLAGS	
0302				16,2705	0 0006 1		EXTEND		
0303	REF	1		16,2706	1 2734 1		BZF	SKIPPAXS	
0304	REF	1		16,2707	0 2740 0		TC	CHKVISFZ	
0305	REF	5	LAST 1428	16,2710	55 632 0	DECQTIMR	TS	QGIMTIMR	COUNT TIMERS DOWN TO POS ZERO.
0306	REF	1		16,2711	1 2672 1		TCF	CHKRTIMR	
0307	REF	3	LAST 1428	16,2712	55 634 0	DECRTIMR	TS	RGIMTIMR	
0308	REF	2	LAST 1428	16,2713	1 2675 0		TCF	CHKRTIMR +3	
0309	REF	4	LAST 1411	16,2714	55 501 0	TURNOFFQ	TS	NEGUQ	HALT DRIVES.
0310	REF	3	LAST 1427	16,2715	55 510 0		TS	QACCDOT	
0311	REF	1		16,2716	4 5007 1		CS	QGIMBITS	
0312				16,2717	0 0006 1		EXTEND		

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0313	REF	69	LAST	1418	16,2720	03 012 1	WAND	CHAN12	
0314	REF	8	LAST	1122	16,2721	3 4735 1	CAF	NEGMAX	
0315	REF	6	LAST	1428	16,2722	55 632 0	TS	QGIMTIMR	
0316	REF	3	LAST	1428	16,2723	1 2672 1	TCF	CHKRTIMR	
0317	REF	2	LAST	1411	16,2724	55 503 1	TURNOFFR	TS	NEGUR
0318	REF	3	LAST	1427	16,2725	55 512 1	TS	RACCDOT	
0319	REF	1			16,2726	4 5020 1	CS	RGIMBITS	
0320					16,2727	0 0006 1	EXTEND		
0321	REF	70	LAST	1429	16,2730	03 012 1	WAND	CHAN12	
0322	REF	9	LAST	1429	16,2731	3 4735 1	CAF	NEGMAX	
0323	REF	4	LAST	1428	16,2732	55 634 0	TS	RGIMTIMR	
0324	REF	4	LAST	1429	16,2733	1 2675 0	TCF	CHKRTIMR +3	
0325	REF	12	LAST	1303	5007		QGIMBITS	EQUALS	OCT1400
0326	REF	4	LAST	1286	5020		RGIMBITS	EQUALS	PRID3
									BITS 9 AND 10 (OF CHANNEL 12).
									BITS 11 AND 12 (OF CHANNEL 12).
0327	REF	23	LAST	1428	16,2734	4 1273 1	SKIPPAXS	CS	RCSFLAGS
0328	REF	39	LAST	1428	16,2735	7 4740 1	MASK	BIT12	
0329	REF	24	LAST	1429	16,2736	27 273 1	ADS	RCSFLAGS	BIT-12-SET-TO-1.
0330	REF	1			16,2737	1 3624 0	TCF	QPAXIS	GO TO QPAXIS OR TO GTS.

A0331-----Y-Z-TRANSLATION-----

A0332-----INPUT: BITS 9-12 OF CH31 (FROM TRANSLATION CONTROLLER)-----

A0333-----OUTPUT: NEXTP-----

A0334-----NEXTP IS THE CHANNEL 6 CODE OF JETS FOR THE DESIRED TRANSLATION.
 A0335-----IF THERE ARE FAILURES IN THE DESIRED POLICY, THEN

A0336----- (1) FOR DIAGONAL TRANS: UNFAILED PAIR
 A0337-----ALARM (IF NO PAIR)

A0338----- (2) FOR PRINCIPAL TRANS: TRY TO TACK WITH DIAGONAL PAIRS
 A0339-----ALARM (IF DIAGONAL PAIRS ARE FAILED)

0340					16,2740	0 0006 1	CHKVISFZ	EXTEND	
0341	REF	9	LAST	1410	16,2741	00 031 0	READ	CHAN31	
0342	REF	490	LAST	1428	16,2742	4 0000 0	CS	A	
0343	REF	1			16,2743	7 3613 1	MASK	074000CT	
0344					16,2744	0 0006 1	EXTEND		
0345	REF	1			16,2745	1 3014 0	BZF	TSNEXTP	
0346					16,2746	0 0006 1	EXTEND		
0347	REF	43	LAST	1299	16,2747	7 4745 1	MP	BIT7	
0348	REF	491	LAST	1429	16,2750	50 000 1	INDEX	A	
0349	REF	1			16,2751	3 5572 1	CA	INDXYZ	
0350	REF	1			16,2752	55 744 0	TS	ROTINDEX	
0351	REF	30	LAST	1418	16,2753	3 6242 0	TRYUORV	CA	SIX
0352	REF	1			16,2754	0 3551 0	TC	SELECTYZ	
0353	REF	31	LAST	1429	16,2755	4 6242 1	CS	SIX	
0354	REF	1			16,2756	6 1743 0	AD	NUMBERT	
0355					16,2757	0 0006 1	EXTEND		

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0356	REF	2	LAST 1429	16,2760	1 3013 1	BZF	TSNEXTP -1	
0357	REF	26	LAST 1427	16,2761	4 4756 0	CS	FIVE	
0358	REF	2	LAST 1429	16,2762	6 1744 1	AD	ROTINDEX	
0359				16,2763	0 0006 1	EXTEND		
0360	REF	1		16,2764	6 3002 0	BZMF	ALTERYZ	
0361	REF	2	LAST 1429	16,2765	4 1743 1	CS	NUMBERT	
0362	REF	32	LAST 1412	16,2766	6 4751 0	AD	FOUR	
0363				16,2767	0 0006 1	EXTEND		
0364	REF	3	LAST 1430	16,2770	6 3013 0	BZMF	TSNEXTP -1	
0365	REF	48	LAST 1318	16,2771	0 5567 0	TC	ALARM	
0366				16,2772	02001 1	OCT	02001	
0367	REF	58	LAST 1394	16,2773	3 4753 1	CA	BIT1	INVERT BIT 1 OF RCSFLAGS.
0368	REF	25	LAST 1429	16,2774	23 273 0	LXCH	RCSFLAGS	
0369				16,2775	0 0006 1	EXTEND		
0370				16,2776	06 001 0	RXOR	1	
0371	REF	26	LAST 1430	16,2777	55 273 1	TS	RCSFLAGS	
0372	REF	283	LAST 1426	16,3000	3 4755 1	CA	ZERO	
0373	REF	4	LAST 1430	16,3001	1 3014 0	TCF	TSNEXTP	
0374	REF	59	LAST 1430	16,3002	3 4753 1	CA	BIT1	INVERT BIT 1 OF RCSFLAGS.
0375	REF	27	LAST 1430	16,3003	23 273 0	LXCH	RCSFLAGS	
0376				16,3004	0 0006 1	EXTEND		
0377				16,3005	06 001 0	RXOR	1	
0378	REF	28	LAST 1430	16,3006	55 273 1	TS	RCSFLAGS	
0379	REF	60	LAST 1430	16,3007	7 4753 0	MASK	BIT1	
0380	REF	33	LAST 1430	16,3010	6 4751 0	AD	FOUR	
0381	REF	3	LAST 1430	16,3011	27 1744 0	ADS	ROTINDEX	
0382	REF	1		16,3012	1 2753 0	TCF	TRYUORV	
0383	REF	1		16,3013	3 1741 1	CA	POLYTEMP	
0384	REF	7	LAST 1413	16,3014	55 472 0	TSNEXTP	TS	NEXTP
A0385						STATE LOGIC		
A0386						CHECK IN ORDER:		IF ON
A0387						LPDPHASE		GO TO PURGENCY
A0388						PULSES		MINIMUM PULSE LOGIC
A0389						DETENT(BIT15 CH31)		RATE COMMAND
A0390						GO TO PURGENCY		
0391	REF	51	LAST 1411	16,3015	3 4737 0	CA	BIT13	CHECK STICK IF IN ATT. HOLD.
0392				16,3016	0 0006 1	EXTEND		
0393	REF	10	LAST 1429	16,3017	02 031 1	RAND	CHAN31	
0394				16,3020	0 0006 1	EXTEND		
0395	REF	1		16,3021	1 3027 0	BZF	MANMODE	
0396	REF	41	LAST 1427	16,3022	3 0111 0	CA	DAPBOOLS	
0397	REF	2	LAST 910	16,3023	7 4743 1	MASK	XOVINHIB	
0398	REF	492	LAST 1429	16,3024	10 000 0	CCS	A	
0399	REF	1		16,3025	1 3463 1	TCF	PURGENCY	ATTITUDE STEER DURING VISIBILITY PHASE
0400	REF	1		16,3026	1 3071 0	TCF	DETENTCK	
0401	REF	4	LAST 739	16,3027	3 4735 1	CA	PULSES	PULSES IS ONE FOR PULSE MODE
0402	REF	42	LAST 1430	16,3030	7 0111 1	MASK	DAPBOOLS	

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0403			16,3031	0 0006 1	EXTEND		
0404	REF 2	LAST 1430	16,3032	1 3071 0	BZF	DETENTCK	BRANCH FOR RATE COMMAND
0405	REF 284	LAST 1430	16,3033	3 4755 1	CA	ZERO	
0406	REF 4	LAST 1421	16,3034	55'464 1	TS	PERROR	
R0407	MINIMUM IMPULSE MODE						
0408	REF 25	LAST 1421	16,3035	3 0032 0	CA	CDUX	
0409	REF 20	LAST 1421	16,3036	55'635 1	TS	CDUXD	
0410	REF 2	LAST 1412	16,3037	11'460 0	CCS	OLDPMIN	
0411	REF 1		16,3040	1 3054 1	TCF	CHECKP	
0412	REF 42	LAST 1419	16,3041	3 4751 0	CA	BIT3	
0413			16,3042	0 0006 1	EXTEND		
0414	REF 11	LAST 1430	16,3043	02 031 1	RAND	CHAN31	
0415			16,3044	0 0006 1	EXTEND		
0416	REF 1		16,3045	1 3064 1	BZF	+XMIN	
0417	REF 56	LAST 1419	16,3046	3 4750 1	CA	BIT4	
0418			16,3047	0 0006 1	EXTEND		
0419	REF 12	LAST 1431	16,3050	02 031 1	RAND	CHAN31	
0420			16,3051	0 0006 1	EXTEND		
0421	REF 1		16,3052	1 3062 1	BZF	-XMIN	
0422	REF 1		16,3053	1 3442 1	TCF	JETSOFF	
0423			16,3054	0 0006 1	CHECKP	EXTEND	
0424	REF 13	LAST 1431	16,3055	00 031 0	READ	CHAN31	
0425	REF 493	LAST 1430	16,3056	4 0000 0	CS	A	
0426	REF 5	LAST 1331	16,3057	7 5751 0	MASK	OCT14	
0427	REF 3	LAST 1431	16,3060	55'460 0	TS	OLDPMIN	
0428	REF 2	LAST 1431	16,3061	1 3442 1	TCF	JETSOFF	
0429	REF 9	LAST 1412	16,3062	4 4363 1	-XMIN	CS	TEN
0430			16,3063	1 3065 0	TCF	+2	ANYTHING LESS THAN 14MS. CORRECTED
0431	REF 10	LAST 1431	16,3064	3 4363 0	+XMIN	CA	TEN
0432	REF 4	LAST 1411	16,3065	55'524 1	TS	TJP	IN JET SELECTION ROUTINE
0433	REF 157	LAST 1422	16,3066	3 4753 1	CA	ONE	
0434	REF 4	LAST 1431	16,3067	55'460 0	TS	OLDPMIN	
0435	REF 1		16,3070	1 3350 0	TCF	PJETSLEC -6	

R0436-----MANUAL RATE COMMAND MODE

R0437-----=====

R0438-----BY ROBERT F. STENGEL

R0439

R0440 THIS MODE PROVIDES RCAH MANUAL CONTROL THRU 2 CONTROL LAWS:

1) DIRECT RATE AND 2) PSEUDO-AUTO.

R0442 THE DIRECT RATE MODE AFFORDS IMMEDIATE CONTROL WITHOUT OVERSHOOT. THE PSEUDO-AUTO MODE PROVIDES PRECISE

R0444 RATE CONTROL AND ATTITUDE HOLD.

R0445

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R0446 IN DIRECT RATE, JETS ARE FIRED WHEN STICK POSITION CHANGES BY A FIXED NUMBER OF INCREMENTS IN ONE DAP CYCLE.
 R0448 THE 'BREAKOUT LEVEL' IS .6 D/S FOR LM ONLY AND .3 D/S FOR CSM DOCKED. THIS LAW NULLS THE RATE ERROR TO WITHIN
 R0450 THE 'TARGET DEADBAND', WHICH EQUALS THE BREAKOUT LEVEL.
 R0451 IN PSEUDO-AUTO, BODY-FIXED RATE AND ATTITUDE ERRORS ARE SUPPLIED TO TJETLAW, WHICH EXERCISES CONTROL.
 R0453 CONTROL SWITCHES FROM DIRECT RATE TO PSEUDO-AUTO IF THE TARGET DB IS ACHIEVED OR IF TIME IN (1) EXCEEDS 4 SEC.
 R0455 IF THE INITIAL COMMAND DOES NOT EXCEED THE BREAKOUT LEVEL, CONTROL GOES TO PSEUDO-AUTO IMMEDIATELY.
 R0457
 R0458 SINCE P-AXIS CONTROL IS SEPARATE FROM Q,R AXES CONTROL, IT IS POSSIBLE TO USE (1) IN P-AXIS AND (2) IN Q,R AXES,
 R0460 OR VICE VERSA. THIS ALLOWS A DEGREE OF ATTITUDE HOLD IN UNCONTROLLED AXES. DUE TO U,V CONTROL, HOWEVER, Q AND
 R0462 R AXES ARE COUPLED AND MUST USE THE SAME CONTROL LAW.
 R0463
 R0464 HAND CONTROLLER COMMANDS ARE SCALED BY A LINEAR/QUADRATIC LAW. FOR THE LM-ALONE, MAXIMUM COMMANDED RATES ARE 20
 R0466 AND 4 D/S IN NORMAL AND FINE SCALING; HOWEVER, STICK SENSITIVITY AT ZERO COUNTS (OBTAINED AT A STICK DEFLECTION
 R0468 OF 2 DEGREES FROM THE CENTERED POSITION) IS .5 OR .1 D/S PER DEGREE. NORMAL AND FINE SCALINGS FOR THE CSM-DOCKED
 R0470 CASE IS AUTOMATICALLY SET TO 1/10 THE ABOVE VALUES. SCALING IS DETERMINED IN ROUTINE 3.
 A0472 ZEROENBL ENABLES COUNTERS SO THEY CAN BE READ NEXT TIME
 A0473 JUSTOUT FIRST DETECTION OF OUT-OF-DETENT (BY DURRCBIT)
 A0474
 A0475
 0476 16,3071 0 0006 1 DETENTCK EXTEND
 0477 REF 14 LAST 1431 16,3072 00 031 0 READ CHAN31
 0478 REF 1 16,3073 55 443 1 TS CH31TEMP
 0479 REF 49 LAST 1422 16,3074 7 4735 0 MASK BIT15 CHECK OUT-OF-DETENT BIT.
 0480 16,3075 0 0006 1 EXTEND
 0481 REF 1 16,3076 1 3223 0 BZF RHCMOVED BRANCH IF OUT-OF-DETENT.
 0482 REF 1 16,3077 3 4740 0 CAF DURRCBIT IN-DETENT. CHECK THE RATE COMMAND BIT.
 0483 REF 43 LAST 1430 16,3100 7 0111 1 MASK DAPBOOLS
 0484 16,3101 0 0006 1 EXTEND
 0485 REF 2 LAST 1430 16,3102 1 3463 1 BZF PURGENCY BRANCH IF NOT IN RATE COMMAND LAST PASS.
 R0486
 0487 REF 33 LAST 1393 16,3103 3 4743 0 CA BIT9 JUST-IN-DETENT??
 0488 REF 29 LAST 1430 16,3104 7 1273 1 MASK RCSFLAGS
 0489 16,3105 0 0006 1 EXTEND
 0490 REF 1 16,3106 1 3120 0 BZF RUTH
 0491 REF 52 LAST 1430 16,3107 3 4737 0 CAF BIT13 CHECK FOR ATTITUDE HOLD.
 0492 16,3110 0 0006 1 EXTEND
 0493 REF 15 LAST 1432 16,3111 02 031 1 RAND CHAN31
 0494 16,3112 0 0006 1 EXTEND
 0495 REF 1 16,3113 1 3220 0 BZF RATEDAMP BRANCH IF IN ATTITUDE HOLD.
 0496 REF 1 16,3114 4 5014 0 CS BITS9,11 IN-AUTO.
 0497 REF 30 LAST 1432 16,3115 7 1273 1 MASK RCSFLAGS (X-AXIS-OVERRIDE)
 0498 REF 31 LAST 1432 16,3116 55 273 1 TS RCSFLAGS ZERO-ORBIT (BIT 11) AND JUST-IN-BIT (9).
 0499 REF 2 LAST 1432 16,3117 1 3220 0 TCF RATEDAMP
 0500 REF 32 LAST 1432 16,3120 3 1273 0 RUTH CA RCSFLAGS
 0501 REF 1 16,3121 7 4742 0 MASK PBIT IN-ATTITUDE HOLD.
 0502 16,3122 0 0006 1 EXTEND
 0503 16,3123 1 3125 0 BZF +2 BRANCH IF P-RATE-DAMPING IS FINISHED.
 0504 REF 3 LAST 1432 16,3124 1 3220 0 TCF RATEDAMP

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0505	REF	33	LAST 1432	16,3125	3 1273 0	CA	RCSFLAGS	
0506	REF	1		16,3126	7 4741 0	MASK	QRBIT	
0507				16,3127	0 0006 1	EXTEND		
0508	REF	1		16,3130	1 3136 1	BZF	RATEDONE	BRANCH IF Q,R RATE DAMPING IS FINISHED.
0509	REF	4	LAST 1432	16,3131	1 3220 0	TCF	RATEDAMP	

R0510 =====

0511				16,3132	00001 0	1/10SEC	OCT	1
0512				16,3133	00050 1	40CYC	OCT	50
0513				16,3134	74777 0	PQRBIT	OCT	74777
0514	REF	13	LAST 958	5014		BITS9,11	EQUALS	EBANK5
0515				16,3135	00056 1	LINRATP	DEC	46

R0516 =====

0517	REF	2	LAST 1432	16,3136	4 4740 1	RATEDONE	CS	CURRCBIT	MANUAL COMMAND AND DAMPING COMPLETED IN
0518				16,3137	0 0004 0		INHINT		ALL AXES.
0519	REF	44	LAST 1432	16,3140	7 0111 1	MASK	DAPBOOLS		
0520	REF	45	LAST 1433	16,3141	54 111 1	TS	DAPBOOLS		

R0521 READ CDUS INTO CDU DESIRED REGISTERS

0522	REF	53	LAST 1432	16,3142	3 4737 0	CAF	BIT13	
0523				16,3143	0 0006 1	EXTEND		
0524	REF	16	LAST 1432	16,3144	02 031 1	RAND	CHAN31	
0525				16,3145	0 0006 1	EXTEND		
0526				16,3146	1 3152 0	BZF	+4	
0527	REF	26	LAST 1431	16,3147	3 0032 0	CA	CDUX	(X-AXIS-OVERRIDE)
0528	REF	21	LAST 1431	16,3150	55 635 1	TS	CDUXD-	
0529				16,3151	0 3154 1	TC	+3	
0530	REF	53	LAST 1413	16,3152	0 4674 0	TC	IBNKGALL	
0531	REF	11	LAST 1411	16,3153	40153 1	FCADR	ZATTEROR	
0532				16,3154	0 0003 1	RELINT		
0533	REF	3	LAST 1432	16,3155	1 3463 1	TCF	PURGENCY	

0534	REF	5	LAST 1431	16,3156	55 464 1	TS	PERROR		
0535	REF	3	LAST 1433	16,3157	3 4740 0	JUSTOUT	CA	CURRCBIT	INITIALIZATION - FIRST MANUAL PASS.
0536	REF	46	LAST 1433	16,3160	26 111 1	ADS	DAPBOOLS		
0537	REF	285	LAST 1431	16,3161	3 4755 1	CA	ZERO		
0538	REF	5	LAST 1424	16,3162	55 446 1	TS	DXERROR		
0539	REF	6	LAST 1433	16,3163	55 447 0	TS	DXERROR +1		
0540	REF	4	LAST 1424	16,3164	55 450 0	TS	DYERROR		
0541	REF	5	LAST 1433	16,3165	55 451 1	TS	DYERROR +1		
0542	REF	4	LAST 1425	16,3166	55 452 1	TS	DZERROR		
0543	REF	5	LAST 1433	16,3167	55 453 0	TS	DZERROR +1		
0544	REF	2	LAST 1424	16,3170	55 454 1	TS	PLAST		
0545	REF	2	LAST 1424	16,3171	55 455 0	TS	QLAST		
0546	REF	2	LAST 1425	16,3172	55 456 0	TS	RLAST		
0547	REF	1		16,3173	54 042 0	TS	Q-RHCCTR		
0548	REF	1		16,3174	54 044 0	TS	R-RHCCTR		
0549	REF	1		16,3175	3 3134 1	CA	PQRBIT		
0550	REF	34	LAST 1433	16,3176	7 1273 1	MASK	RCSFLAGS		
0551	REF	35	LAST 1433	16,3177	55 273 1	TS	RCSFLAGS	BITS 10 AND 11 OF RCSFLAGS ARE 0.	

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0552	REF 36	LAST 1433	16,3200	4 1273 1	CS	RCSFLAGS	SET 'JUST-IN' BIT TO 1.
0553	REF 34	LAST 1432	16,3201	7 4743 1	MASK	BIT9	
0554	REF 37	LAST 1434	16,3202	27 273 1	ADS	RCSFLAGS	
0555	REF 1		16,3203	0 3205 0	TC	ZEROENBL	
0556	REF 3	LAST 1431	16,3204	1 3442 1	TCF	JETSOFF	
0557	REF 2	LAST 1433	16,3205	22 044 1	ZEROENBL LXCH	R-RHCCTR	
0558	REF 2	LAST 1433	16,3206	3 0042 1	CA	Q-RHCCTR	
0559	REF 1		16,3207	53 463 0	DXCH	SAVEHAND	
0560	REF 286	LAST 1433	16,3210	3 4755 1	CA	ZERO	
0561	REF 1		16,3211	54 043 1	TS	P-RHCCTR	
0562	REF 3	LAST 1434	16,3212	54 042 0	TS	Q-RHCCTR	
0563	REF 3	LAST 1434	16,3213	54 044 0	TS	R-RHCCTR	
0564	REF 1		16,3214	3 3617 1	CA	BITS8,9	
0565			16,3215	0 0006 1	EXTEND		
0566	REF 24	LAST 1404	16,3216	05 013 0	WOR	CHAN13	COUNTERS ZEROED AND ENABLED
0567	REF 401	LAST 1423	16,3217	0 0002 0	TC	Q	
0568	REF 287	LAST 1434	16,3220	3 4755 1	RATEDAMP CA	ZERO	
0569	REF 2	LAST 1434	16,3221	54 043 1	TS	P-RHCCTR	
0570	REF 1		16,3222	1 3227 1	TCF	RATERROR	
0571	REF 4	LAST 1433	16,3223	3 4740 0	RHCMOVED CA	CURRCBIT	P CONTROL
0572	REF 47	LAST 1433	16,3224	7 0111 1	MASK	DAPBOOLS	
0573			16,3225	0 0006 1	EXTEND		
0574	REF 1		16,3226	1 3156 1	BZF	JUSTOUT -1	
0575	REF 27	LAST 1433	16,3227	3 0032 0	RATERROR CA	CDUX	FINDCDUX REQUIRES THAT CDUXD=CDUX DURING
0576	REF 22	LAST 1433	16,3230	55 635 1	TS	CDUXD	X-AXIS OVERRIDE
0577	REF 3	LAST 1434	16,3231	10 043 1	CCS	P-RHCCTR	
0578			16,3232	1 3235 1	TCF	+3	
0579			16,3233	1 3235 1	TCF	+2	
0580			16,3234	1 3235 1	TCF	+1	
0581			16,3235	6 0000 1	DOUBLE		LINEAR/QUADRATIC CONTROLLER SCALING
0582			16,3236	6 0000 1	DOUBLE		(SEE EXPLANATION IN Q,R-AXES RCS
0583	REF 1		16,3237	6 3135 0	AD	LINRATP	AUTOPILOT)
0584			16,3240	0 0006 1	EXTEND		
0585	REF 4	LAST 1434	16,3241	7 0043 1	MP	P-RHCCTR	
0586	REF 273	LAST 1424	16,3242	3 0001 0	CA	L	
0587			16,3243	0 0006 1	EXTEND		
0588	REF 6	LAST 294	16,3244	7 1444 0	MP	STIKSENS	
0589	REF 3	LAST 1433	16,3245	57 454 0	XCH	PLAST	
0590			16,3246	4 0000 0	COM		
0591	REF 4	LAST 1434	16,3247	6 1454 0	AD	PLAST	
0592	REF 25	LAST 1426	16,3250	55 737 1	TS	DAPTEMP1	
0593	REF 2	LAST 1434	16,3251	0 3205 0	TC	ZEROENBL	INTERVAL. ZERO AND ENABLE ACA COUNTERS.
0594	REF 5	LAST 1434	16,3252	4 1454 1	CS	PLAST	
0595	REF 14	LAST 1425	16,3253	6 1421 1	AD	OMEGAP	
0596	REF 1		16,3254	55 427 0	TS	EDOTP	
0597	REF 26	LAST 1434	16,3255	11 737 1	CCS	DAPTEMP1	IF P COMMAND CHANGE EXCEEDS BREAKOUT
0598			16,3256	1 3261 0	TCF	+3	LEVEL, GO TO DIRECT RATE CONTROL. IF NOT
0599			16,3257	1 3267 0	TCF	+8	CHECK FOR DIRECT RATE CONTROL LAST TIME.
0600			16,3260	1 3261 0	TCF	+1	

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0601	REF	5	LAST	294	16,3261	6	1476	0	AD	-RATEDB	
0602					16,3262	0	0006	1	EXTEND		
0603					16,3263	6	3267	1	BZMF	+4	
0604	REF	1			16,3264	3	3133	0	CA	40CYC	
0605	REF	2	LAST	1422	16,3265	55	445	1	TS	TCP	
0606	REF	1			16,3266	0	3300	1	TC	PEGI	
0607	REF	38	LAST	1434	16,3267	3	1273	0	CA	RCSFLAGS	CHECK FOR DIRECT RATE COMMAND LAST TIME.
0608	REF	2	LAST	1432	16,3270	7	4742	0	MASK	PBIT	
0609					16,3271	0	0006	1	EXTEND		
0610					16,3272	1	3274	1	BZF	+2	
0611	REF	2	LAST	1435	16,3273	0	3300	1	TC	PEGI	TO PURE RATE COMMAND
0612	REF	7	LAST	1433	16,3274	3	1446	0	CA	DXERROR	PSEUDO-AUTO CONTROL.
0613	REF	1			16,3275	55	752	1	TS	E	X-ATTITUDE ERROR (SP)
0614	REF	6	LAST	1433	16,3276	55	464	1	TS	PERROR	LOAD P-AXIS ERROR FOR MODEL FDAI DISPLAY
0615	REF	4	LAST	1433	16,3277	0	3467	1	TC	PURGENCY +4	
0616	REF	28	LAST	1434	16,3300	3	0032	0	CA	CDUX	DIRECT RATE CONTROL.
0617	REF	23	LAST	1434	16,3301	55	635	1	TS	CDUXD	
0618	REF	288	LAST	1434	16,3302	3	4755	1	CA	ZERO	
0619	REF	8	LAST	1435	16,3303	55	446	1	TS	DXERROR	
0620	REF	9	LAST	1435	16,3304	55	447	0	TS	DXERROR +1	
0621	REF	7	LAST	1435	16,3305	55	464	1	TS	PERROR	ZERO P-AXIS ERROR FOR MODEL FDAI DISPLAY
0622	REF	2	LAST	1434	16,3306	11	427	0	CCS	EDOTP	
0623					16,3307	0	3312	1	TC	+3	
0624					16,3310	0	3312	1	TC	+2	
0625					16,3311	0	3312	1	TC	+1	
0626	REF	1			16,3312	55	737	1	TS	ABSEDOTP	
0627	REF	1			16,3313	6	1476	0	AD	TARGETDB	
0628					16,3314	0	0006	1	EXTEND		IF RATE ERROR IS LESS THAN DEADBAND,
0629	REF	1			16,3315	6	3325	0	BZMF	LAST	FIRE, AND SWITCH TO PSEUDO-AUTO.
0630	REF	3	LAST	1435	16,3316	3	1445	0	CA	TCP	
0631					16,3317	0	0006	1	EXTEND		IF TIME IN RATE COMMAND EXCEEDS 4 SEC.,
0632	REF	2	LAST	1435	16,3320	6	3325	0	BZMF	LAST	
0633	REF	39	LAST	1435	16,3321	4	1273	1	CS	RCSFLAGS	
0634	REF	3	LAST	1435	16,3322	7	4742	0	MASK	PBIT	
0635	REF	40	LAST	1435	16,3323	27	273	1	ADS	RCSFLAGS	BIT 10 IS 1.
0636					16,3324	1	3330	0	TCF	+4	
0637	REF	4	LAST	1435	16,3325	4	4742	0	CS	PBIT	
0638	REF	41	LAST	1435	16,3326	7	1273	1	MASK	RCSFLAGS	
0639	REF	42	LAST	1435	16,3327	55	273	1	TS	RCSFLAGS	BIT 10 IS 0.
0640	REF	3	LAST	1435	16,3330	4	1427	0	CS	EDOTP	
0641					16,3331	0	0006	1	EXTEND		
0642	REF	1			16,3332	7	1551	0	MP	1/ANETP	1/2JTACC SCALED AT 2EXP(7)/PI
0643	REF	494	LAST	1431	16,3333	20	001	1	DAS	A	
0644	REF	10	LAST	1427	16,3334	0	2310	1	TC	OVERSUB	
0645					16,3335	0	0006	1	EXTEND		
0646	REF	1			16,3336	7	7716	1	MP	25/32	A CONTAINS TJET SCALED AT 2EXP(4)(16/25)
0647	REF	5	LAST	1431	16,3337	55	524	1	TS	TJP	4.JET-TIME
0648	REF	2	LAST	1435	16,3340	3	1737	0	CA	ABSEDOTP	
0649	REF	2	LAST	130	16,3341	6	1475	0	AD	-2JITLIM	COMPARING DELTA RATE WITH 2 JET LIMIT
0650					16,3342	0	0006	1	EXTEND		

L P-AXIS RCS AUTOPILOT

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0651 16,3343 6 3346 0

BZMF +3

0652 REF 32 LAST 1429 16,3344 3 6242 0

CA SIX

0653 16,3345 1 3355 0

TCF +8D

0654 REF 6 LAST 1435 16,3346 3 1524 0

CA TJP

0655 REF 7 LAST 1436 16,3347 27 1524 1

ADS TJP

A0656

GOES TO PJETSLEC FOR TWO JETS

A0657

P-JET-SELECTION-ROUTINE (ROTATION)

A0658

INPUT: NUMBERT 4,5,6 FOR WHICH PAIR OR 4 JETS

A0659

TJP + FOR +P ROTATION

A0660

OUTPUT: CHANNEL 6

A0661

PJUMPADR

FOR P-AXIS SKIP

A0662

(JTST CALL)

(SMALL TJP)

A0663

ORDER OF POLICIES TRIED IN CASE OF FAILURE.

A0664

+P

-P

A0665

7,15

8,16

A0666

4,12

3,11

A0667

4,7

8,11

A0668

7,12

11,16

A0669

12,15

3,16

A0670

4,15

3,8

A0671

ALARM

ALARM

0672 REF 1 16,3350 3 4747 1

CA AGRBSYST

0673 REF 48 LAST 1434 16,3351 7 0111 1

MASK DAPBOOLS

0674 REF 495 LAST 1435 16,3352 10 000 0

CCS A

0675 REF 158 LAST 1431 16,3353 3 4753 1

CA ONE

0676 REF 34 LAST 1430 16,3354 6 4751 0

AD FOUR

0677 REF 3 LAST 1430 16,3355 55 743 1

TS NUMBERT

0678 REF 159 LAST 1436 16,3356 3 4753 1

PJETSLEC

CA ONE

0679 REF 274 LAST 1434 16,3357 54 001 1

TS L

0680 REF 8 LAST 1436 16,3360 11 1524 1

CCS TJP

0681 16,3361 1 3366 0

TCF +5

0682 REF 4 LAST 1434 16,3362 1 3442 1

TCF JETSOFF

0683 16,3363 1 3365 0

TCF +2

0684 REF 5 LAST 1436 16,3364 1 3442 1

TCF JETSOFF

0685 16,3365 22 007 0

ZL

0686 REF 160 LAST 1436 16,3366 6 4753 1

AD ONE

0687 REF 1 16,3367 55 737 1

TS ABSTJ

0688 REF 4 LAST 1430 16,3370 23 744 1

LXCH ROTINDEX

0689 REF 1 16,3371 0 3531 0

TC SELECTP

0690 REF 33 LAST 1436 16,3372 4 6242 1

CS SIX

0691 REF 4 LAST 1436 16,3373 6 1743 0

AD NUMBERT

0692 16,3374 0 0006 1

EXTEND

0693 16,3375 1 3377 0

BZF +2

0694 REF 94 LAST 1419 16,3376 4 4752 1

CS TWO

L P-AXIS RCS-AUTOPILOT

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0695	REF	35	LAST 1436	16,3377	6 4751 0	AD	FOUR	
0696	REF	2	LAST 133	16,3400	55 521 1	TS	NO PJETS	
0697	REF	2	LAST 1430	16,3401	3 1741 1	CA	POLYTEMP	
0698	REF	2	LAST 1404	16,3402	0 5754 1	TC	WRITEP	
0699	REF	2	LAST 1436	16,3403	4 1737 1	CS	ABSTJ	
0700	REF	1		16,3404	6 3612 1	AD	+150MST6	
0701				16,3405	0 0006 1	EXTEND		
0702	REF	2	LAST 1429	16,3406	6 3624 1	BZMF	QRAXIS	GO TO QRAXIS OR TO GTS.
0703	REF	1		16,3407	6 3572 1	AD	-136MST6	
0704				16,3410	0 0006 1	EXTEND		
0705				16,3411	6 3416 1	BZMF	+5	
0706	REF	3	LAST 1437	16,3412	27 737 1	ADS	ABSTJ	
0707	REF	5	LAST 1436	16,3413	51 744 1	INDEX	ROTINDEX	
0708	REF	1		16,3414	3 3621 1	CA	MINTIMES	
0709	REF	9	LAST 1436	16,3415	55 524 1	TS	TJP	
0710	REF	4	LAST 1437	16,3416	3 1737 0	CA	ABSTJ	
0711				16,3417	22 007 0	ZL		
0712				16,3420	0 0004 0	INHINT		
0713	REF	4	LAST 1412	16,3421	53 471 0	DXCH	T6FURTHA	
0714	REF	54	LAST 1433	16,3422	0 4674 0	TC	IBNKCALL	
0715	REF	1		16,3423	37114 1	CADR	JTLST	
0716	REF	40	LAST 1429	16,3424	4 4740 1	CS	BIT12	
0717	REF	43	LAST 1435	16,3425	7 1273 1	MASK	RCSFLAGS	
0718	REF	44	LAST 1437	16,3426	55 273 1	TS	RCSFLAGS	BIT 12 SET TO 0.
0719	REF	1		16,3427	0 3431 1	TC	ALTSYST	
0720	REF	3	LAST 1437	16,3430	1 3624 0	TCF	QRAXIS	
0721	REF	49	LAST 1436	16,3431	3 0111 0	ALTSYST	CA	DAPBOOLS
0722	REF	275	LAST 1436	16,3432	54 001 1	TS	L	ALTERNATE P-AXIS JETS
0723	REF	2	LAST 1436	16,3433	3 4747 1	CA	AORBSYST	
0724				16,3434	0 0006 1	EXTEND		
0725	REF	19	LAST 1414	16,3435	06 001 0	RXOR	LCHAN	
0726	REF	50	LAST 1437	16,3436	54 111 1	TS	DAPBOOLS	
0727				16,3437	0 0003 1	RELINT		
0728	REF	402	LAST 1434	16,3440	0 0002 0	TC	Q	
0729	REF	2	LAST 1437	16,3441	0 3431 1	DKALT	TC	ALTSYST
0730	REF	3	LAST 1437	16,3442	0 5753 0	JETSOFF	TC	WRITEP--1
0731	REF	289	LAST 1435	16,3443	3 4755 1	CA	ZERO	
0732	REF	10	LAST 1437	16,3444	55 524 1	TS	TJP	
0733	REF	4	LAST 1437	16,3445	1 3624 0	TCF	QRAXIS	
R0734	(NOTE -- M13 = 1 IDENTICALLY IMPLIES NULL MULTIPLICATION.)							
0735	REF	13	LAST 1421	16,3446	3 0033 1	CALCPERR	CA	CDUY
0736				16,3447	0 0006 1	EXTEND		P-ERROR CALCULATION.
0737	REF	7	LAST 1421	16,3450	21 636 1	MSU	CDUYD	CDU VALUE -- ANGLE DESIRED (Y-AXIS)

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0738				16,3451	0 0006 1	EXTEND		
0739	REF	9	LAST 1423	16,3452	7 1414 0	MP	M11	(CDUY-CDUYD)M11 SCALED AT PI RADIANS
0740	REF	2	LAST 1435	16,3453	57 752 0	XCH	E	SAVE FIRST TERM (OF TWO)
0741	REF	29	LAST 1435	16,3454	3 0032 0	CA	CDUX	THIRD COMPONENT
0742				16,3455	0 0006 1	EXTEND		
0743	REF	24	LAST 1435	16,3456	21 635 1	MSU	CDUXD	CDU VALUE - ANGLE DESIRED (X-AXIS)
R0744						EXTEND		
R0745						MP	M13	
0746	REF	5	LAST 1408	16,3457	6 1277 1	AD	DELPERR	KALCHMANU INTERFACE ERROR
0747	REF	3	LAST 1438	16,3460	27 752 1	ADS	E	SAVE SUM OF TERMS. - COULD BE OVERFLOW.
0748	REF	8	LAST 1435	16,3461	57 464 0	XCH	PERRR	SAVE P-ERROR FOR EIGHT-BALL DISPLAY.
0749	REF	403	LAST 1437	16,3462	0 0002 0	TC	Q	RETURN TO CALLER

R0750 P-AXIS URGENCY FUNCTION CALCULATION.

0751	REF	2	LAST 1413	16,3463	0 3446 1	PURGENCY	TC	CALCPERR	CALCULATE P-AXIS ERRORS.
0752	REF	12	LAST 1408	16,3464	4 1643 0		CS	OMEGAPD	THIS CODING IS COMMON TO BOTH LM DAP AND
0753	REF	15	LAST 1434	16,3465	6 1421 1		AD	OMEGAP	SPS-BACKUP MODE.
0754	REF	4	LAST 1435	16,3466	55 427 0		TS	EDOTP	EDOTP = OMEGAP - OMEGAPD AT PI/4 RAD/SEC

0755	REF	161	LAST 1436	16,3467	4 4753 0		CS	ONE	
0756	REF	2	LAST 132	16,3470	55 505 1		TS	AXISCTR	
0757	REF	51	LAST 1437	16,3471	3 0111 0		CA	DAPBOOLS	
0758	REF	8	LAST 1425	16,3472	7 4737 1		MASK	CSMDOCKD	
0759				16,3473	0 0006 1		EXTEND		
0760	REF	1		16,3474	1 3505 0		BZF	HEADTJET	
0761				16,3475	0 0004 0		INHINT		IF CSMDOCKD = 1, GO TO DOCKED RCS LOGIC
0762	REF	55	LAST 1437	16,3476	0 4674 0		TC	IBNKCALL	
0763	REF	1		16,3477	43727 1		CADR	SPSRCS	

0764	REF	11	LAST 1437	16,3500	3 1524 0		CA	TJP	
0765				16,3501	0 0006 1		EXTEND		
0766	REF	1		16,3502	1 3441 1		BZF	DKALT	IF TJP = ZERO, CHANGE AORBSYST.
0767				16,3503	0 0003 1		RELINT		
0768	REF	2	LAST 1431	16,3504	1 3350 0		TCF	PJETSLEC -6	SELECT AORBSYST AND USE TWO JETS
0769	REF	290	LAST 1437	16,3505	3 4755 1	HEADTJET	CA	ZERO	
0770	REF	1		16,3506	55 500 1		TS	SENSETYP	
0771				16,3507	0 0004 0		INHINT		
0772	REF	56	LAST 1438	16,3510	0 4674 0		TC	IBNKCALL	
0773	REF	1		16,3511	37252 0		CADR	TJETLAW	
0774				16,3512	0 0003 1		RELINT		

0775	REF	1		16,3513	4 1741 0		CS	FIREFCT	
0776	REF	1		16,3514	6 3530 1		AD	-FOURDEG	
0777				16,3515	0 0006 1		EXTEND		
0778	REF	3	LAST 1438	16,3516	6 3350 1		BZMF	PJETSLEC -6	
0779	REF	12	LAST 1438	16,3517	11 524 1		CCS	TJP	
0780				16,3520	1 3522 0		TCF	+2	
0781	REF	6	LAST 1436	16,3521	1 3442 1		TCF	JETSOFF	

L P-AXIS RCS AUTOPILOT

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0782	REF	1	16,3522	6 3527 1	AD	-160MST6
0783			16,3523	0 0006 1	EXTEND	
0784	REF	4	16,3524	6 3350 1	BZMF	PJETSLEC -6
0785	REF	34	16,3525	3 6242 0	CA	SIX
0786	REF	5	16,3526	1 3355 0	TCF	PJETSLEC -1
0787			16,3527	77377 1	-160MST6 DEC	-256
0788			16,3530	75117 1	-FOURDEG DEC	-.08888

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P0789 JET POLICY-CONSTRUCTION-SUBROUTINE

A0790

INPUT: ROTINDEX, NUMBERT

A0791

OUTPUT: POLYTEMP (JET-POLICY)

A0792

THIS SUBROUTINE SELECT A SUBSET OF THE DESIRED JETS WHICH HAS NO FAILURE

0793	REF	35	LAST	1439	16,3531	3-6242-0	SELECTP	CA	SIX	
0794	REF	1			16,3532	55-742-0		TS	TEMPNUM	
0795	REF	5	LAST	1436	16,3533	51-743-0		INDEX	NUMBERT	
0796	REF	1			16,3534	3-3563-1		CA	TYPEP	
0797	REF	6	LAST	1437	16,3535	51-744-1		INDEX	ROTINDEX	
0798	REF	1			16,3536	7-3554-1		MASK	JETSALL	
0799	REF	3	LAST	1437	16,3537	55-741-0		TS	POLYTEMP	
0800	REF	6	LAST	212	16,3540	7-1263-0		MASK	CH6MASK	
0801	REF	496	LAST	1436	16,3541	10-000-0		CCS	A	
0802					16,3542	1-3544-0		TCF	+2	
0803	REF	404	LAST	1438	16,3543	0-0002-0		TC	Q	
0804	REF	2	LAST	1440	16,3544	11-742-0		CCS	TEMPNUM	
0805					16,3545	1-3551-1		TCF	+4	
0806	REF	49	LAST	1430	16,3546	0-5567-0		TC	ALARM	
0807					16,3547	02003-0		OCT	02003	
0808	REF	7	LAST	1438	16,3550	1-3442-1		TCF	JETSOFF	*****TCF ALARMJET *****
0809	REF	6	LAST	1440	16,3551	55-743-1	SELECTYZ	TS	NUMBERT	
0810	REF	2	LAST	1436	16,3552	1-3532-1		TCF	SELETP +1	
0811	REF	1			16,3553	1-2773-1	-1	TCF	ABORTYZ +2	
0812					16,3554	00252-1	JETSALL	OCT	00252	
0813					16,3555	00125-1		OCT	00125	+P
0814					16,3556	00140-1		OCT	00140	-Y
0815					16,3557	00006-1		OCT	00006	-Z
0816					16,3560	00220-1		OCT	00220	+Y
0817					16,3561	00011-1		OCT	00011	+Z
0818					16,3562	00151-1		OCT	00151	+V
0819					16,3563	00146-1	TYPEP	OCT	00146	-U
0820					16,3564	00226-1		OCT	00226	-V
0821					16,3565	00231-1		OCT	00231	+U
0822					16,3566	00151-1		OCT	00151	+V
0823					16,3567	00132-1		OCT	00132	1-3
0824					16,3570	00245-1		OCT	00245	2-4
0825					16,3571	00377-1		OCT	00377	ALL
0826	REF	2	LAST	1437	16,3572		INDXYZ	=	-136MST6	
0827					16,3572	77445-1	-136MST6	DEC	-218	
0828					16,3573	00004-0		DEC	4	
0829					16,3574	00002-0		DEC	2	
0830					16,3575	07776-0		OCT	07776	
0831					16,3576	00005-1		DEC	5	
0832					16,3577	00011-1		DEC	9	
0833					16,3600	00012-1		DEC	10	
0834					16,3601	07776-0		OCT	07776	
0835					16,3602	00003-1		DEC	3	

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0836		16,3603	00010 0	DEC	8	
0837		16,3604	00007 0	DEC	7	
0838		16,3605	07776 0	OCT	07776	THESE INDEXES OF MASK JETSALL WILL
0839		16,3606	07776 0	OCT	07776	CHANGE THE INSTRUCTION AT SELECTP +4
0840		16,3607	07776 0	OCT	07776	TO BE TC JETSALL -1
0841		16,3610	07776 0	OCT	07776	ONLY USED FOR TRANSLATION FAILURE
0842		16,3611	07776 0	OCT	07776	
0843		16,3612	00360 1 +150MST6	DEC	240	
0844		16,3613	07400 1 07400	OCT	07400	

R0845 T-JET LAW FIXED CONSTANTS

0846		16,3614	00266 0	NORMSCL	OCT	266	
0847		16,3615	74631 0	-100MS	DEC	.1	
0848		16,3616	06315 0	200MS	DEC	.2	
0849	REF 4 LAST 965	7716	25/32	=	PRI(31	(DEC .78125)	
0850		16,3617	00600 1	BITS8,9	OCTAL	00600	
0851		16,3620	00632 0	1/40	DEC	.02500	
0852		16,3621	77751 1	MINTIMES	DEC	-22	
0853		16,3622	00026 0		DEC	22	
0854	RLF 2 LAST 1428	16,3623	02734 0	PSKIPADR	GENADR	SKIPPAXS	

A0855 GOES TO Q,R-AXES RCS-AUTOPILOT

0856	REF 7 LAST 1408	16,3624	4 1645 0	QRAXIS	CS	OMEGARD	
0857	REF 7 LAST 1427	16,3625	6 1423 0		AD	OMEGAR	
0858	REF 11 LAST 1435	16,3626	0 2310 1		TC	OVERSUB	
0859	REF 2 LAST 130	16,3627	55 437 1		TS	EDOTR	
0860	REF 7 LAST 1408	16,3630	4 1644 1		CS	OMEGAQD	
0861	REF 12 LAST 1426	16,3631	6 1422 1		AD	OMEGAQ	
0862	REF 12 LAST 1441	16,3632	0 2310 1		TC	OVERSUB	
0863	REF 3 LAST 130	16,3633	55 436 0		TS	EDOTQ	
0864		16,3634	0 0006 1		EXTEND		
0865	REF 1	16,3635	3 3640 0		DCA	QERRCALL	
0866		16,3636	52 006 0		DTCB		

0867	REF 22 LAST 1427	E6,1537		EBANK=	A0SQ	
0868	REF 1	16,3637	02072 0	QERRCALL	2CADR	CALLQERR
0868	REF 1	16,3640	36106 0			

L Q,R-AXES RCS AUTOPILOT

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0001				17,2072		BANK	17	
0002	REF	3	LAST 1405	17,2000		SETLOC	DAPS2	
0003				17,2072		BANK		
0004	REF	25	LAST 1438	E6,1635		EBANK=	CDUXD	
0005	REF	1				COUNT*	\$\$/DAPQR	
R0006								
00061	REF	54	LAST 1433	17,2072	3 4737 0	CALLQERR	CA	BIT13
00062				17,2073	0 0006 1	EXTEND		
00063	REF	17	LAST 1433	17,2074	02 031 1	RAND	CHAN31	
00064	REF	497	LAST 1440	17,2075	10 000 0	CCS	A	
00065				17,2076	1 2103 0	TCF	+5	
0007	REF	52	LAST 1438	17,2077	4 0111 1	CS	DAPBOOLS	
00071	REF	5	LAST 1434	17,2100	7 4740 1	MASK	QURRCBIT	
00072				17,2101	0 0006 1	EXTEND		
00073	REF	1		17,2102	1 2104 1	BZF	Q,RORGTS	
00074	REF	2	LAST 1413	17,2103	0 2626 1	TC	QERRCALC	
R0008								
0009	REF	2	LAST 1412	17,2104	11 631 0	Q,RORGTS	CCS	COTROLER
0010	REF	1		17,2105	1 2607 0	TCF	GTOGTS	
0011	REF	1		17,2106	1 2574 1	TCF	TRYGTS	
0012	REF	291	LAST 1438	17,2107	3 4755 1	RCS	CAF	ZERO
0013	REF	3	LAST 1442	17,2110	55 631 0	TS	COTROLER	
0014	REF	4	LAST 1441	17,2111	53 437 1	DXCH	EDDTQ	
0015	REF	1		17,2112	0 3146 1	TC	ROT-TOUV	
0016	REF	11	LAST 1424	17,2113	53 427 0	DXCH	OMEGAU	
A0017						X - TRANSLATION:		
A0018						INPUT:	BITS 7,8 OF CH31 (TRANSLATION CONTROLLER)	
A0019						ULLAGER		
A0020						APSFLAG, DRIFTBIT		
A0021						ACC4OR2X, AORBTRAN		
A0022						OUTPUT:	NEXTU, NEXTV	CODES OF TRANSLATION FOR AFTER ROTATION
A0023						SENSETYP		TELL ROTATION DIRECTION AND DESIRE
R0024								
R0026								
0028	REF	44	LAST 1429	17,2114	3 4745 0	SENSEGET	CA	BIT7
0029				17,2115	0 0006 1	EXTEND		
0030	REF	18	LAST 1442	17,2116	02 031 1	RAND	CHAN31	
0031				17,2117	0 0006 1	EXTEND		
0032	REF	1		17,2120	1 2146 1	BZF	+XDRULGE	

X-TRANS POLICIES ARE EITHER 4 JETS OR A DIAGONAL PAIR. IN 2-JET TRANSLATION THE SYSTEM IS SPECIFIED. A FAILURE WILL OVERRIDE THIS SPECIFICATION. AN ALARM RESULTS WHEN NO POLICY IS AVAILABLE BECAUSE OF FAILURES.

INPUT BITS OVERRIDE THE INTERNAL BITS
SENSETYP WILL NOT OPPOSE ANYTRANS

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0033	REF 42	LAST 1365	17,2121	3 4744 1	CA	BIT8	
0034			17,2122	0 0006 1	EXTEND		
0035	REF 19	LAST 1442	17,2123	02 031 1	RAND	CHAN31	
0036			17,2124	0 0006 1	EXTEND		
0037	REF 1		17,2125	1 2147 0	BZF	-XTRANS	
0038	REF 3	LAST 743	17,2126	3 4746 0	CA	ULLAGER	
0039	REF 53	LAST 1442	17,2127	7 0111 1	MASK	DAPBOOLS	
0040	REF 498	LAST 1442	17,2130	10 000 0	CCS	A	
0041	REF 2	LAST 1442	17,2131	1 2146 1	TCF	+XORULGE	
0042	REF 4	LAST 1413	17,2132	55 473 1	TS	NEXTU	STORE NULL TRANSLATION POLICIES
0043	REF 4	LAST 1413	17,2133	55 474 0	TS	NEXTV	
0047	REF 54	LAST 1443	17,2134	4 0111 1	CS	DAPBOOLS	BURNING OR DRIFTING?
0048	REF 4	LAST 1427	17,2135	7 4744 0	MASK	DRIFTBIT	
0049			17,2136	0 0006 1	EXTEND		
0050	REF 1		17,2137	1 2144 0	BZF	TSSENSE	
0051	REF 22	LAST 1385	17,2140	3 0106 0	CA	FLGWRD10	DPS (INCLUDING DOCKED) OR APS?
0052	REF 14	LAST 862	17,2141	7 4737 1	MASK	APSFLBIT	
0053	REF 499	LAST 1443	17,2142	10 000 0	CCS	A	
0054	REF 95	LAST 1436	17,2143	3 4752 0	CAF	TWO	FAVOR +X JETS DURING AN APS BURN.
0055	REF 2	LAST 1438	17,2144	55 500 1	TSSENSE TS	SENSETYP	
0056	REF 1		17,2145	1 2200 0	TCF	QRCONTRL	
0057	REF 162	LAST 1438	17,2146	3 4753 1	+XORULGE CAF	ONE	
0058	REF 36	LAST 1437	17,2147	6 4751 0	-XTRANS AD	FOUR	
0059	REF 7	LAST 1440	17,2150	55 744 0	TS	ROTINDEX	
0060	REF 7	LAST 1393	17,2151	6 7745 0	AD	NEG	
00601	REF 3	LAST 1443	17,2152	55 500 1	TS	SENSETYP	FAVOR APPROPRIATE JETS DURING TRANS.
0061	REF 55	LAST 1443	17,2153	3 0111 0	CA	DAPBOOLS	
0062	REF 2	LAST 293	17,2154	7 4741 0	MASK	ACC4OR2X	
0063	REF 500	LAST 1443	17,2155	10 000 0	CCS	A	
0064	REF 1		17,2156	1 2321 1	TCF	TRANS4	
0065	REF 56	LAST 1443	17,2157	3 0111 0	CA	DAPBOOLS	
0066	REF 1		17,2160	7 4742 0	MASK	AORBTAN	
0067	REF 501	LAST 1443	17,2161	10 000 0	CCS	A	
0068	REF 163	LAST 1443	17,2162	3 4753 1	CA	ONE	THREE FOR B
0069	REF 96	LAST 1443	17,2163	6 4752 0	AD	TWO	TWO FOR A SYSTEM 2 JET X TRANS
0070	REF 7	LAST 1440	17,2164	55 743 1	TSNUMBRT TS	NUMBERT	
0071	REF 1		17,2165	0 3173 1	TC	SELCTSUB	
0072	REF 4	LAST 1440	17,2166	11 741 0	CCS	POLYTEMP	
0073			17,2167	1 2172 0	TCF	+3	
0074	REF 50	LAST 1440	17,2170	0 5567 0	TC	ALARM	
0075			17,2171	02002 1	OCT	02002	
0076	REF 3	LAST 1405	17,2172	3 5774 0	CA	00314OCT	
0077	REF 5	LAST 1443	17,2173	7 1741 0	MASK	POLYTEMP	
0078	REF 5	LAST 1443	17,2174	55 473 1	TSNEXTS TS	NEXTU	

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0079 REF 4 LAST 1443 17,2175 4 5774 1 CS 003140CT
 0080 REF 6 LAST 1443 17,2176 7 1741 0 MASK POLYTEMP
 0081 REF 5 LAST 1443 17,2177 55 474 0 TS NEXTV

A0082-----Q,R-AXES RCS-CONTROL-MODE-SELECTION-----

A0083 SWITCHES INDICATION WHEN SET
 A0085 BIT13/CHAN31 AUTO. GO TO ATTSTEER
 A0086 PULSES MINIMUM IMPULSE MODE
 A0087 (OTHERWISE) RATE-COMMAND/ATTITUDE-HOLD-MODE

0088 REF 55 LAST 1442 17,2200 3 4737 0 QRCONTRL CA BIT13 CHECK-MODE-SELECT-SWITCH.
 0089 17,2201 0 0006 1 EXTEND
 0090 REF 20 LAST 1443 17,2202 02 031 1 RAND CHAN31 BITS-INVERTED
 0091 REF 502 LAST 1443 17,2203 10 000 0 CCS A
 0092 REF 1 17,2204 1 2661 0 TCF ATTSTEER
 0093 REF 5 LAST 1430 17,2205 3 4735 1 CHKBIT10 CAF PULSES PULSES = 1 FOR MIN IMP USE OF RHC
 0094 REF 57 LAST 1443 17,2206 7 0111 1 MASK DAPBOOLS
 0095 17,2207 0 0006 1 EXTEND
 0096 REF 1 17,2210 1 2323 0 BZF CHEKSTIK IN-ATT-HOLD/RATE-COMMAND IF BIT10=0

R0097-----MINIMUM-IMPULSE-MODE-----

0098 17,2211 0 0004 0 INHINT
 0099 REF 57 LAST 1438 17,2212 0 4674 0 TC IBNKCALL
 0100 REF 12 LAST 1433 17,2213 40 153 1 CADR ZATTEROR
 0101 REF 292 LAST 1442 17,2214 3 4755 1 CA ZERO
 0102 REF 3 LAST 1415 17,2215 55 450 0 TS QERROR
 0103 REF 3 LAST 1415 17,2216 55 452 1 TS REKRROR FOR-DISPLAYS
 0104 17,2217 0 0003 1 RELINT
 0105 17,2220 0 0006 1 EXTEND
 0106 REF 21 LAST 1444 17,2221 00 031 0 READ CHAN31
 0107 REF 1 17,2222 55 737 1 TS TEMP31 IS-EQUAL-TO-DAPTEMP1
 0108 REF 2 LAST 1412 17,2223 11 461 1 CCS OLDQRMIN
 0109 REF 1 17,2224 1 2246 1 TCF CHECKIN
 0110 REF 2 LAST 1444 17,2225 3 1737 0 FIREQR CA TEMP31
 0111 REF 61 LAST 1430 17,2226 7 4753 0 MASK BIT1
 0112 17,2227 0 0006 1 EXTEND
 0113 REF 1 17,2230 1 2252 1 BZF +QMIN
 0114 REF 3 LAST 1444 17,2231 3 1737 0 CA TEMP31
 0115 REF 53 LAST 1418 17,2232 7 4752 1 MASK BIT2
 0116 17,2233 0 0006 1 EXTEND
 0117 REF 1 17,2234 1 2256 0 BZF -QMIN
 0118 REF 4 LAST 1444 17,2235 3 1737 0 CA TEMP31
 0119 REF 48 LAST 1412 17,2236 7 4747 0 MASK BIT5

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0120				17,2237	0 0006 1		EXTEND	
0121	REF	1		17,2240	1 2262 1		BZF	+RMIN
0122	REF	5	LAST 1444	17,2241	3 1757 0		CA	TEMP31
0123	REF	63	LAST 1418	17,2242	7 4746 1		MASK	BIT6
0124				17,2243	0 0006 1		EXTEND	
0125	REF	1		17,2244	1 2264 1		BZF	-RMIN
0126	REF	1		17,2245	1 3063 0		TCF	XTRANS
0127	REF	6	LAST 1445	17,2246	4 1737 1	CHECKIN	CS	TEMP31
0128	REF	1		17,2247	7 2320 0		MASK	OCT63
0129	REF	3	LAST 1444	17,2250	55 461 1		TS	OLDQRMIN
0130	REF	2	LAST 1445	17,2251	1 3063 0		TCF	XTRANS
0131	REF	1		17,2252	3 3107 1	+QMIN	CA	14MS
0132	REF	3	LAST 1411	17,2253	55 525 0		TS	TJU
0133	REF	2	LAST 1445	17,2254	4 3107 0		CS	14MS
0134	REF	1		17,2255	1 2266 0		TCF	MINQR
0135	REF	3	LAST 1445	17,2256	4 3107 0	-QMIN	CS	14MS
0136	REF	4	LAST 1445	17,2257	55 525 0		TS	TJU
0137	REF	4	LAST 1445	17,2260	3 3107 1		CA	14MS
0138	REF	2	LAST 1445	17,2261	1 2266 0		TCF	MINQR
0139	REF	5	LAST 1445	17,2262	3 3107 1	+RMIN	CA	14MS
0140				17,2263	1 2265 0		TCF	+2
0141	REF	6	LAST 1445	17,2264	4 3107 0	-RMIN	CS	14MS
0142	REF	5	LAST 1445	17,2265	55 525 0		TS	TJU
0143	REF	2	LAST 1411	17,2266	55 526 0	MINQR	TS	TJV
0144	REF	1		17,2267	3 2317 0		CA	MINADR
0145	REF	1		17,2270	55 477 0		TS	RETJADR
0146	REF	164	LAST 1443	17,2271	3 4753 1		CA	ONE
0147	REF	4	LAST 1445	17,2272	55 461 1		TS	OLDQRMIN
0148	REF	3	LAST 1438	17,2273	55 505 1	MINRTN	TS	AXISCTR
0149	*REF	58	LAST 1444	17,2274	3 0111 0		CA	DAPBOOLS
0150	*REF	9	LAST 1438	17,2275	7 4737 1		MASK	C5MDOCKD
0151	*			17,2276	0 0006 1		EXTEND	
0152	*REF	1		17,2277	1 2307 0		BZF	MIMRET
0153	*REF	4	LAST 1445	17,2300	51 505 0		INDEX	AXISCTR
0154	*REF	6	LAST 1445	17,2301	11 525 0		CCS	TJU
0155	*REF	1		17,2302	3 2316 1		CA	60MS
0156	*			17,2303	1 2305 1		TCF	+2
0157	*REF	2	LAST 1445	17,2304	4 2316 0		CS	60MS
0158	*REF	5	LAST 1445	17,2305	51 505 0		INDEX	AXISCTR
0159	*REF	7	LAST 1445	17,2306	55 525 0		TS	TJU
0160	*REF	59	LAST 1445	17,2307	3 0111 0	MIMRET	CA	DAPBOOLS
0161	REF	2	LAST 1443	17,2310	7 4742 0		MASK	AORBTRAN
0162	REF	503	LAST 1444	17,2311	10 000 0		CCS	A
0163	REF	165	LAST 1445	17,2312	3 4753 1		CA	ONE
0164	REF	97	LAST 1443	17,2313	6 4752 0		AD	TWO
0165	REF	8	LAST 1443	17,2314	55 743 1		TS	NUMBERT

IF DOCKED, USE 60MS MINIMUM IMPULSE

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0166	REF	1		17,2315	1 2727 0	TCF	AFTERTJ
0167	*			17,2316	00140 1 60MS	DEC	96.0
0168	REF	1		17,2317	02273 0 MINADR	GENADR	MINRTN
0169				17,2320	00063 1 OCT63	OCT	63
0170	REF	1		17,3107	14MS	=	+TJMINT6
0171	REF	37	LAST 1443	17,2321	3 4751 0 TRANS4	CA	FOUR
0172	REF	1		17,2322	1 2164 1	TCF	TSNUMBRT

A0173-----RATE COMMAND MODE:

A0174-----DESCRIPTION (SAME AS P-AXIS)

0175	REF	2	LAST 1412	17,2323	55'633 1	CHEKSTIK	TS	INGTS	NOT IN GTS WHEN IN ATT HOLD
0176	REF	166	LAST 1445	17,2324	4 4753 0		CS	ONE	1/ACCS WILL DO THE NULLING DRIVES
0177	REF	4	LAST 1442	17,2325	55'631 0		TS	COTROLER	COME BACK TO RCS NEXT TIME
0178	REF	50	LAST 1432	17,2326	3 4735 1		CA	BIT15	
0179	REF	2	LAST 1432	17,2327	7 1443 1		MASK	CH31TEMP	
0180				17,2330	0 0006 1		EXTEND		
0181	REF	1		17,2331	1 2350 1		BZF	RHCACTIV	BRANCH IF OUT OF DETENT.
0182	REF	6	LAST 1442	17,2332	3 4740 0		CA	GURACBIT	*****
0183	REF	60	LAST 1445	17,2333	7 0111 1		MASK	DAPBOOLS	*IN DETENT* CHECK FOR MANUAL CONTROL
0184				17,2334	0 0006 1		EXTEND		***** LAST TIME.
0185	REF	1		17,2335	1 2661 0		BZF	STILLRCS	
0186	REF	35	LAST 1434	17,2336	4 4743 1		CS	BIT9	
0187	REF	45	LAST 1437	17,2337	7 1273 1		MASK	RCSFLAGS	
0188	REF	46	LAST 1446	17,2340	55'273 1		TS	RCSFLAGS	BIT 9 IS 0.
0189	REF	1		17,2341	1 2345 0		TCF	DAMPING	
0190				17,2342	00050 1 40CYCL		OCT	50	
0191				17,2343	00001 0 1/10S		OCT	1	
0192				17,2344	00056 1 LINRAT		DEC	46	
R0193	=====								
0194	REF	293	LAST 1444	17,2345	3 4755 1	DAMPING	CA	ZERO	
0195	REF	2	LAST 1434	17,2346	55'462 1		TS	SAVEHAND	
0196	REF	3	LAST 1446	17,2347	55'463 0		TS	SAVEHAND +1	
0197	REF	4	LAST 1446	17,2350	11'462 1	RHCACTIV	CCS	SAVEHAND	*****
0198				17,2351	1 2354 0		TCF	+3	Q,R MANUAL CONTROL WC = A*(B+|D|)*D
0199				17,2352	1 2354 0		TCF	+2	*****
0200				17,2353	1 2354 0		TCF	+1	
0201				17,2354	6 0000 1		DOUBLE		WHERE
0202				17,2355	6 0000 1		DOUBLE		
0203	REF	1		17,2356	6 2344 0		AD	LINRAT	WC = COMMANDED ROTATIONAL RATE
0204				17,2357	0 0006 1		EXTEND		A = QUADRATIC SENSITIVITY FACTOR
0205	REF	5	LAST 1446	17,2360	7 1462 1		MP	SAVEHAND	B = LINEAR/QUADRATIC SENSITIVITY
0206	REF	276	LAST 1437	17,2361	3 0001 0		CA	L	|D| = ABS. VALUE OF DEFLECTION
0207				17,2362	0 0006 1		EXTEND		D = HAND-CONTROLLER DEFLECTION
0208	REF	7	LAST 1434	17,2363	7 1444 0		MP	STIKSENS	
0209	REF	3	LAST 1433	17,2364	57'455 1		XCH	QLAST	COMMAND Q RATE SCALED 45 DEG/SEC
0210				17,2365	4 0000 0		COM		

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0211	REF	4	LAST 1446	17,2366	6 1455 1	AD	QLAST	
0212	REF	5	LAST 1424	17,2367	55 741 0	TS	DAPTEMP3	
0213	REF	6	LAST 1446	17,2370	11 463 0	CCS	SAVEHAND +1	
0214				17,2371	1 2374 1	TCF	+3	
0215				17,2372	1 2374 1	TCF	+2	
0216				17,2373	1 2374 1	TCF	+1	
0217				17,2374	6 0000 1	DOUBLE		
0218				17,2375	6 0000 1	DOUBLE		
0219	REF	2	LAST 1446	17,2376	6 2344 0	AD	LINRAT	
0220				17,2377	0 0006 1	EXTEND		
0221	REF	7	LAST 1447	17,2400	7 1463 0	MP	SAVEHAND +1	
0222	REF	277	LAST 1446	17,2401	3 0001 0	CA	L	
0223				17,2402	0 0006 1	EXTEND		
0224	REF	8	LAST 1446	17,2403	7 1444 0	MP	STIKSENS	
0225	REF	3	LAST 1433	17,2404	57 456 1	XCH	RLAST	
0226				17,2405	4 0000 0	COM		
0227	REF	4	LAST 1447	17,2406	6 1456 1	AD	RLAST	
0228	REF	3	LAST 133	17,2407	55 742 0	TS	DAPTEMP4	
0229	REF	5	LAST 1447	17,2410	4 1455 0	CS	QLAST	INTERVAL.
0230	REF	13	LAST 1441	17,2411	6 1422 1	AD	OMEGAQ	
0231	REF	1		17,2412	55 436 0	TS	QRATEDIF	
0232	REF	5	LAST 1447	17,2413	4 1456 0	CS	RLAST	
0233	REF	8	LAST 1441	17,2414	6 1423 0	AD	OMEGAR	
0234	REF	1		17,2415	55 437 1	TS	RRATEDIF	
0235	REF	2	LAST 1447	17,2416	55 437 1	DXCH	QRATEDIF	TRANSFORM RATES FROM Q,R TO U,V AXES
0236	REF	2	LAST 1442	17,2417	0 3146 1	TC	ROT-TOUV	
0237	REF	1		17,2420	53 427 0	DXCH	URATEDIF	
0238	REF	6	LAST 1447	17,2421	11 741 0	CCS	DAPTEMP3	CHECK IF Q COMMAND CHANGE EXCEEDS
0239				17,2422	0 2425 0	TC	+3	BREAKOUT LEVEL. IF NOT, CHECK R.
0240				17,2423	0 2425 0	TC	+2	
0241				17,2424	0 2425 0	TC	+1	
0242	REF	6	LAST 1435	17,2425	6 1476 0	AD	-RATEDB	
0243				17,2426	0 0006 1	EXTEND		
0244				17,2427	6 2431 0	BZMF	+2	
0245	REF	1		17,2430	1 2447 0	TCF	ENTERUV -2	BREAKOUT LEVEL EXCEEDED. DIRECT RATE.
0246	REF	4	LAST 1447	17,2431	11 742 0	CCS	DAPTEMP4	R COMMAND BREAKOUT CHECK.
0247				17,2432	0 2435 1	TC	+3	
0248				17,2433	0 2435 1	TC	+2	
0249				17,2434	0 2435 1	TC	+1	
0250	REF	7	LAST 1447	17,2435	6 1476 0	AD	-RATEDB	
0251				17,2436	0 0006 1	EXTEND		
0252				17,2437	6 2441 1	BZMF	+2	
0253	REF	2	LAST 1447	17,2440	1 2447 0	TCF	ENTERUV -2	BREAKOUT LEVEL EXCEEDED. DIRECT RATE.
0254	REF	47	LAST 1446	17,2441	3 1273 0	CA	RCSFLAGS	BREAKOUT LEVEL NOT EXCEEDED. CHECK FOR
0255	REF	2	LAST 1433	17,2442	7 4741 0	MASK	QRBIT	DIRECT RATE CONTROL LAST TIME.
0256				17,2443	0 0006 1	EXTEND		
0257				17,2444	1 2446 1	BZF	+2	
0258	REF	3	LAST 1447	17,2445	1 2451 1	TCF	ENTERUV	CONTINUE DIRECT RATE CONTROL.
0259	REF	2	LAST 1446	17,2446	1 2661 0	TCF	STILLRCS	PSEUDO-AUTO CONTROL.
0260	REF	1		17,2447	3 2342 0	CA	40CYCL	

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0261	REF	2	LAST 1422	17,2450	55'457-1	TS	TCQR	
0262				17,2451	0 0004 0	ENTERUV	INHINT	DIRECT RATE CONTROL.
0263	REF	58	LAST 1444	17,2452	0 4674 0	TC	IBNKCALL	
0264	REF	13	LAST 1444	17,2453	40153-1	FGADR	ZATTEROR	
0265				17,2454	0 0003-1	RELINT		
0266	REF	294	LAST 1446	17,2455	3 4755-1	CA	ZERO	
0267	REF	6	LAST 1433	17,2456	55'450-0	TS	DYERROR	
0268	REF	7	LAST 1448	17,2457	55'451 1	TS	DYERROR +1	
0269	REF	6	LAST 1433	17,2460	55'452-1	TS	DZERROR	
0270	REF	7	LAST 1448	17,2461	55'453 0	TS	DZERROR +1	
0271	REF	2	LAST 1447	17,2462	11'426-1	CCS	URATEDIF	
0272				17,2463	1 2466 0	TCF	+3	
0273				17,2464	1 2466 0	TCF	+2	
0274				17,2465	1 2466 0	TCF	+1	
0275	REF	2	LAST 1435	17,2466	6 1476 0	AD	TARGETDB	IF TARGET DB IS EXCEEDED, CONTINUE
0276				17,2467	0 0006-1	EXTEND		DIRECT RATE CONTROL.
0277	REF	1		17,2470	6 2504 1	BZMF	VDB	
0278	REF	1		17,2471	11'427-0	CCS	VRATEDIF	
0279				17,2472	1 2475-1	TCF	+3	
0280				17,2473	1 2475-1	TCF	+2	
0281				17,2474	1 2475-1	TCF	+1	
0282	REF	3	LAST 1448	17,2475	6 1476 0	AD	TARGETDB	
0283				17,2476	0 0006-1	EXTEND		
0284				17,2477	6 2501-1	BZMF	+2	
0285	REF	1		17,2500	1 2515 0	TCF	QRTIME	
0286	REF	295	LAST 1448	17,2501	3 4755-1	CA	ZERO	
0287	REF	2	LAST 1448	17,2502	55'427 0	TS	VRATEDIF	
0288	REF	2	LAST 1448	17,2503	1 2515 0	TCF	QRTIME	
0289	REF	3	LAST 1448	17,2504	11'427 0	CCS	VRATEDIF	
0290				17,2505	0 2510-1	TC	+3	
0291				17,2506	0 2510-1	TC	+2	
0292				17,2507	0 2510-1	TC	+1	
0293	REF	4	LAST 1448	17,2510	6 1476 0	AD	TARGETDB	IF TARGET DB IS EXCEEDED, CONTINUE
0294				17,2511	0 0006-1	EXTEND		DIRECT RATE CONTROL. IF NOT, FIRE AND
0295	REF	1		17,2512	6 2524 0	BZMF	TOPSEUDO	SWITCH TO PSEUDO-AUTO CONTROL ON NEXT
0296	REF	296	LAST 1448	17,2513	3 4755-1	CA	ZERO	PASS.
0297	REF	3	LAST 1448	17,2514	55'426-1	TS	URATEDIF	
0298	REF	3	LAST 1448	17,2515	3 1457 0	QRTIME	CA	TCCR
0299				17,2516	0 0006-1	EXTEND		
0300				17,2517	6 2524 0	BZMF	+5	BRANCH IF TIME EXCEEDS 4 SEC.
0301	REF	48	LAST 1447	17,2520	4 1273-1	CS	RCSFLAGS	
0302	REF	3	LAST 1447	17,2521	7 4741-0	MASK	QRBIT	
0303	REF	49	LAST 1448	17,2522	27'273-1	ADS	RCSFLAGS	BIT 11 IS 1.
0304				17,2523	0 2527 0	TC	+4	
0305	REF	4	LAST 1448	17,2524	4 4741-0	TOPSEUDO	CS	QRBIT
0306	REF	50	LAST 1448	17,2525	7 1273-1	MASK	RCSFLAGS	
0307	REF	51	LAST 1448	17,2526	55'273-1	TS	RCSFLAGS	BIT 11 IS 0.
0308	REF	1		17,2527	3 2573-1	CA	HANDADR	
0309	REF	2	LAST 1445	17,2530	55'477 0	TS	RETJADR	
0310	REF	167	LAST 1446	17,2531	3 4753-1	CA	ONE	

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0311 REF 6 LAST 1445 17,2532 55'505 1 BACKHAND TS AXISCTR

0312 REF 38 LAST 1446 17,2533 3 4751 0 CA FOUR

0313 REF 9 LAST 1445 17,2534 55'743 1 TS NUMBERT

0314 REF 7 LAST 1449 17,2535 51'505 0 INDEX AXISCTR

0315 REF 3 LAST 1412 17,2536 51'535 0 INDEX SKIPU

0316 17,2537 1 2540 0 TCF +1

0317 REF 39 LAST 1449 17,2540 3 4751 0 CA FOUR

0318 REF 8 LAST 1449 17,2541 51'505 0 INDEX AXISCTR

0319 REF 4 LAST 1449 17,2542 55'535 1 TS SKIPU

0320 REF 1 17,2543 1 3005 0 TCF LOOPER

0321 REF 9 LAST 1449 17,2544 51'505 0 INDEX AXISCTR

0322 REF 4 LAST 1448 17,2545 11'426 1 CCS URATEDIF

0323 REF 297 LAST 1448 17,2546 3 4755 1 CA ZERO

0324 17,2547 1 2551 0 TCF +2

0325 REF 168 LAST 1448 17,2550 3 4753 1 CA ONE

0326 REF 10 LAST 1449 17,2551 51'505 0 INDEX AXISCTR

0327 REF 1 17,2552 6 3722 0 AD AXISDIFF

INDEX	AXIS	QUANTITY
0	-U	1/JETACC-AOSU
1	+U	1/JETACC+AOSU
16	-V	1/JETACC-AOSV
17	+V	1/JETACC+AOSV

JETACC = 2 JET ACCELERATION (1-FOR-FAIL)

0328 REF 504 LAST 1445 17,2553 50 000 1 INDEX A

0329 REF 1 17,2554 4 1571 1 CS 1/ANET2 +1

0330 17,2555 0 0006 1 EXTEND

0331 REF 11 LAST 1449 17,2556 5 1505 0 INDEX AXISCTR

0332 REF 5 LAST 1449 17,2557 7 1426 1 MP URATEDIF

0333 REF 405 LAST 1440 17,2560 54 002 1 TS Q

0334 REF 505 LAST 1449 17,2561 20 001 1 DAS A

0335 REF 406 LAST 1449 17,2562 6 0002 0 AD Q

0336 REF 506 LAST 1449 17,2563 54 000 0 TS A

0337 17,2564 1 2566 1 TCF +2

0338 REF 407 LAST 1449 17,2565 3 0002 0 CA 0

0339 REF 12 LAST 1449 17,2566 51'505 0 SETTIME INDEX AXISCTR

0340 REF 8 LAST 1445 17,2567 55'525 0 TS TJJ

0341 REF 2 LAST 1446 17,2570 1 2727 0 TCF AFTERTJ

URATEDIF IS SCALED AT PI/4 RAD/SEC
JET TIME IN A SCALED 32 SEC

OVERFLOW SKIP

RIGHT SIGN AND BIGGER THAN 150MS

SCALED AT 10.67 WHICH IS CLOSE TO 10.24

0342 REF 298 LAST 1449 17,2571 3 4755 1 ZEROTJ CA ZERO

0343 REF 1 17,2572 1 2566 1 TCF SETTIME

0344 REF 1 17,2573 02532 1 HANDADR GENADR BACKHAND

A0345 GTS WILL BE TRIED IF

A0346 1. USEQRJTS= 0.

A0347 2. ALLOWGTS POS.

A0348 3. JETS ARE OFF(Q,R-AXES)

0349 REF 4 LAST 863 17,2574 3 4736 1 TRYGTS CAF USEQRJTS

0350 REF 61 LAST 1446 17,2575 7 0111 1 MASK DAPBOLS

0351 REF 507 LAST 1449 17,2576 10 000 0 CCS A

0352 REF 1 17,2577 1 2107 1 TCF RCS

0353 REF 2 LAST 1412 17,2600 11'502 0 CCS ALLOWGTS

IS JET USE MANDATORY. (AS LONG AS
USEQRJTS BIT IS NOT BIT 15, CCS IS SAFE)

NO. DOES AOSTASK-OK CONTROL FOR GTS?

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0354			17,2601	1 2603 1	TCF	+2	
0355	REF	2	LAST 1449	17,2602	1 2107 1	TCF	RCS
0356			17,2603	0 0006 1	EXTEND		
0357	REF	6	LAST 1413	17,2604	00 005 1	READ	CHAN5
0358	REF	508	LAST 1449	17,2605	10 000 0	CCS	A
0359	REF	1		17,2606	1 2612 1	TCF	CHKINGTS
0360			17,2607	0 0006 1	GOTOGTS	EXTEND	
0361	REF	1		17,2610	3 2625 1	DCA	GTSCADR
0362			17,2611	52 006 0	DTCB		

0363	REF	3	LAST 1446	17,2612	11 633 1	CHKINGTS	CCS	INGTS	WAS THE TRIM GIMBAL CONTROLLING
0364			17,2613	1 2615 0	TCF	+2			YES. SET UP A DAMPED NULLING DRIVE.
0365	REF	3	LAST 1450	17,2614	1 2107 1	TCF	RCS		NO. NULLING WAS SET UP BEFORE. DO RCS
0366			17,2615	0 0004 0	INHINT				
0367	REF	59	LAST 1448	17,2616	0 4674 0	TC	IBNKCALL		
0368	REF	1		17,2617	43330 0	CADR	TIM GMBL		
0369			17,2620	0 0003 1	RELINT				
0370	REF	299	LAST 1449	17,2621	3 4755 1	CAF	ZERO		
0371	REF	4	LAST 1450	17,2622	55 633 1	TS	INGTS		
0372	REF	4	LAST 1450	17,2623	1 2107 1	TCF	RCS		

0373	REF	26	LAST 1442	E6,1635		EBANK=	CDUXD		
0374	REF	1		17,2624	03077 1	GTSCADR	2CADR	GTS	
0374	REF	1		17,2625	42106 0				

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P0375 SUBROUTINE TO COMPUTE Q,R-AXES ATTITUDE ERRORS FOR USE IN THE RCS AND GTS CONTROL LAWS AND THE DISPLAYS.

0377	REF	14	LAST 1437	17,2626	30 033 1	QERRCALC	CAE	CDUY	Q-ERROR CALCULATION
0378				17,2627	0 0006 1		EXTEND		
0379	REF	8	LAST 1437	17,2630	21 636 1		MSU	CDUYD	CDU ANGLE - ANGLE DESIRED (Y-AXIS)
0380	REF	27	LAST 1434	17,2631	55 737 1		TS	DAPTEMP1	SAVE FOR RERRCALC
0381				17,2632	0 0006 1		EXTEND		
0382	REF	4	LAST 1424	17,2633	7 1415 1		MP	M21	(CDUY-CDUYD)*M21 SCALED AT PI RADIANS
0383	REF	4	LAST 1438	17,2634	55 752 1		TS	E	
0384	REF	17	LAST 1421	17,2635	30 034 0		CAE	CDUZ	SECOND TERM CALCULATION:
0385				17,2636	0 0006 1		EXTEND		
0386	REF	7	LAST 1422	17,2637	21 637 0		MSU	CDUZD	CDU ANGLE - ANGLE DESIRED (Z-AXIS)
0387	REF	9	LAST 1427	17,2640	55 740 1		TS	DAPTEMP2	SAVE FOR RERRCALC
0388				17,2641	0 0006 1		EXTEND		
0389	REF	7	LAST 1424	17,2642	7 1417 0		MP	M22	(CDUZ-CDUZD)*M22 SCALED AT PI RADIANS
0390	REF	3	LAST 1408	17,2643	6 1300 0		AD	DELQEROR	KALCHMANU INERFACE ERROR
0391	REF	5	LAST 1451	17,2644	6 1752 0		AD	E	
0392	REF	4	LAST 1444	17,2645	57 450 1		XCH	Q-PROR	SAVE Q-ERROR FOR EIGHT-BALL DISPLAY.
0393	REF	28	LAST 1451	17,2646	31 737 0	RERRCALC	CAE	DAPTEMP1	R-ERROR CALCULATION:
0394				17,2647	0 0006 1		EXTEND		
0395	REF	4	LAST 1424	17,2650	7 1416 1		MP	M31	(CDUY-CDUYD)*M31 SCALED AT PI RADIANS
0396	REF	6	LAST 1451	17,2651	55 752 1		TS	E	
0397	REF	10	LAST 1451	17,2652	31 740 0		CAE	DAPTEMP2	SECOND TERM CALCULATION:
0398				17,2653	0 0006 1		EXTEND		
0399	REF	5	LAST 1424	17,2654	7 1420 1		MP	M32	(CDUZ-CDUZD)*M32 SCALED AT PI RADIANS
0400	REF	3	LAST 1408	17,2655	6 1301 1		AD	DELQEROR	KALCHMANU INERFACE ERROR
0401	REF	7	LAST 1451	17,2656	6 1752 0		AD	E	
0402	REF	4	LAST 1444	17,2657	57 452 0		XCH	RERROR	SAVE R-ERROR FOR EIGHT-BALL DISPLAY.
0403	REF	408	LAST 1449	17,2660	0 0002 0		TC	Q	

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P0404 "ATTSTEER" IS THE ENTRY POINT FOR Q,R-AXES (U,V-AXES) ATTITUDE CONTROL USING THE REACTION CONTROL SYSTEM

0406 REF 3 LAST 1447 17,2661 ATTSTEER EQUALS STILLRCS "STILLRCS" IS THE RCS EXIT FROM TRYGTS.

0407 REF 5 LAST 1451 17,2661 3 1452 0 STILLRCS CA RERROR
 0408 REF 509 LAST 1450 17,2662 22 000 1 LXCH A
 0409 REF 5 LAST 1451 17,2663 3 1450 1 CA QERROR
 0410 REF 3 LAST 1447 17,2664 0 3146 1 TC ROT-TOUV
 0411 REF 2 LAST 131 17,2665 53 752 1 DXCH UERROR

A0412 PREPARES CALL TO TJETLAW (OR SPSRCS(DOCKED))
 A0413 PREFORMS SKIP LOGIC ON U OR Y AXIS IF NEEDED.

0414 REF 1 17,2666 3 3113 1 TJLAW CA TJLAWADR
 0415 REF 3 LAST 1448 17,2667 55 477 0 TS RETJADR
 0416 REF 169 LAST 1449 17,2670 3 4753 1 CA ONE
 0417 REF 13 LAST 1449 17,2671 55 505 1 TS AXISCTR
 0418 REF 14 LAST 1452 17,2672 51 505 0 INDEX AXISCTR
 0419 REF 5 LAST 1449 17,2673 51 535 0 INDEX SKIPU
 0420 17,2674 1 2675 0 TCF +1
 0421 REF 40 LAST 1449 17,2675 3 4751 0 CA FOUR
 0422 REF 15 LAST 1452 17,2676 51 505 0 INDEX AXISCTR
 0423 REF 6 LAST 1452 17,2677 55 535 1 TS SKIPU
 0424 REF 2 LAST 1449 17,2700 1 3005 0 TCF LOOPER
 0425 REF 16 LAST 1452 17,2701 51 505 0 INDEX AXISCTR
 0426 REF 3 LAST 1452 17,2702 3 1751 0 CA UERROR
 0427 REF 8 LAST 1451 17,2703 55 752 1 TS E
 0428 REF 17 LAST 1452 17,2704 51 505 0 INDEX AXISCTR
 0429 REF 12 LAST 1442 17,2705 3 1426 0 CA OMEGAU
 0430 REF 2 LAST 130 17,2706 55 427 0 TS EDOT
 0431 REF 62 LAST 1449 17,2707 3 0111 0 CA DAPBOOLS
 0432 REF 10 LAST 1445 17,2710 7 4737 1 MASK CSMDOCKD
 0433 REF 510 LAST 1452 17,2711 10 000 0 CCS A
 0434 17,2712 1 2715 1 TCF +3
 0435 REF 2 LAST 1438 17,2713 0 3252 1 TC TJETLAW
 0436 REF 3 LAST 1449 17,2714 1 2727 0 TCF AFTERTJ
 0437 REF 63 LAST 1452 17,2715 4 0111 1 +3 CS DAPBOOLS DOCKED. IF GIMBAL USABLE DO GTS CONTROL
 0438 REF 5 LAST 1449 17,2716 7 4736 0 MASK USEQRJTS ON THE NEXT PASS.
 0439 REF 511 LAST 1452 17,2717 10 000 0 CCS A USEQRJTS BIT MUST NOT BE BIT 5.
 0440 REF 5 LAST 1446 17,2720 55 631 0 TS COTROLER GIMBAL USABLE. STORE POSITIVE VALUE.
 0441 * 17,2721 0 0004 0 INHINT
 0442 *REF 60 LAST 1450 17,2722 0 4674 0 TC IBNKCALL
 0443 *REF 2 LAST 1438 17,2723 43727 1 CADR SPSRCS DETERMINE RCS CONTROL
 0444 * 17,2724 0 0003 1 RELINT
 0445 REF 41 LAST 1452 17,2725 3 4751 0 CAF FOUR ALWAYS CALL FOR 2-JET CONTROL ABOUT U,V.
 0446 REF 10 LAST 1449 17,2726 55 743 1 TS NUMBERT FALL THROUGH TO JET SELECTION, ETC.

A0447-----Q,R-JET-SELECTION-LOGIC-----

A0448 INPUT: AXISCTR 0.1 FOR U,V
 A0449 SNUFFBIT ZERO TJETU,V-AND-TRANS.-ONLY-IF-SET-IN-A-DPS-BURN

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A0450	TJU, TJV	JET TIME SCALED 10.24 SEC.
A0451	NUMBERT	INDICATES NUMBER OF JETS AND TYPE OF POLICY
A0452	RETJADR	WHERE TO RETURN TO

A0453 OUTPUT: NO.U(V)JETS RATE DERIVATION FEEDBACK
A0454 CHANNEL 5
A0455 SKIPU,SKIRV FOR LESS THAN 150MS FIRING

A0456
 A0457
 A0458
 A0459

NOTES: IN CASE OF FAILURE IN DESIRED ROTATION POLICY, "ALL" UNFAILED
 JETS OF THE DESIRED POLICY ARE SELECTED. SINCE THERE ARE ONLY
 TWO JETS, THIS MEANS THE OTHER ONE OR NONE. THE ALARM IS SENT
 IF NONE CAN BE FOUND.

A0460 TIMES LESS THAN 14 MSEC ARE TAKEN TO CALL FOR A SINGLE-JET
A0461 MINIMUM IMPULSE, WITH THE JET CHOSEN SEMI-RANDOMLY.

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0462 REF 30 LAST 1338 17,2727 3 0101 1 AFTERTJ CA FLAGWRD5 IF SNUFFBIT SET DURING A DPS BURN GO TO
0463 REF 1 17,2730 7 4737 1 MASK SNUFFBIT XTRANS:-THAT-IS,-INHIBIT-CONTROL.

```

0465	REF	1		17,2732	1	2743	1	BZF	DOROTAT
0466	REF	23	LAST 1443	17,2733	4	0106	1	CS	FLGWRD10
0467	REF	15	LAST 1443	17,2734	7	4737	1	MASK	AP5FLBIT

0469	REF	2	LAST 1453	17,2736	1-2743-1	BZF	DOROTAT
0470	REF	64	LAST 1452	17,2737	3-0111-0	CA	DAPBOOLS
0471	REF	5	LAST 1443	17,2740	7-4744-0	MASK	DRIETBIT

0473	REF	3	LAST	1445	17,2742	1	3063	0	BZF	XTRANS
------	-----	---	------	------	---------	---	------	---	-----	--------

0474	REF 98	LAST 1445	17,2743	3 4752 0	DOROTAT	CAF	TWO
0475	REF 278	LAST 1447	17,2744	54 001 1		TS	L
0476	REF 18	LAST 1452	17,2745	51 505 0		INDEX	AXISCTR

0477	REF	9	LAST	1449	17,2746	11'525 0	CCS	TJU
0478					17,2747	1-2754 1	TCF	+5
0479	REF	1			17,2750	1-2777 0	TCF	NOROTAI

0481	REF	2	LAST 1453	17,2752	1-2777-0	TCF	NOROTAT
0482				17,2753	22-007-0	ZL	

0485	REF	19	LAST	1453	17,2756	3-1505-0	CA	AXISCTR	
0486	REF	279	LAST	1453	17,2757	6-0001-0	AD	L	
0487	REF	8	LAST	1443	17,2760	55-744-0	TS	ROUTINDEX	0-1-2-3 = -U -V --+U +V

0498	REF	6	LAST 1453	17,2761	3 1757 0	CA	ABSTJ
0489	REF	1		17,2762	6 3110 1	AD	-150MS
0490				17,2763	0 0006 1	EXTEND	
0491	REF	1		17,2764	6 3010 0	BZMF	DOSKIP

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0492	REF	2	LAST 1443	17,2765	0 3173 1	TC	SELCTSUB	
0493	REF	20	LAST 1453	17,2766	51'505 0	INDEX	AXISCTR	
0494	REF	1		17,2767	3 3105 0	CA	INDEXES	
0495	REF	280	LAST 1453	17,2770	54 001 1	TS	L	
0496	REF	7	LAST 1444	17,2771	3 1741 1	CA	POLYTEMP	
0497				17,2772	0 0004 0	INHINT		
0498	REF	281	LAST 1454	17,2773	50 001 0	INDEX	L	
0499	REF	4	LAST 1437	17,2774	0 5754 1	TC	WRITEP	
0500				17,2775	0 0003 1	RELINT		
0501	REF	1		17,2776	1 3051 1	TCF	FEEDBACK	
0502	REF	21	LAST 1454	17,2777	51'505 0	INDEX	AXISCTR	
0503	REF	2	LAST 1454	17,3000	3 3105 0	CA	INDEXES	
0504				17,3001	0 0004 0	INHINT		
0505	REF	512	LAST 1452	17,3002	50 000 1	INDEX	A	
0506	REF	5	LAST 1454	17,3003	0 5753 0	TC	WRITEP -1	
0507				17,3004	0 0003 1	RELINT		
0508	REF	22	LAST 1454	17,3005	11'505 1	CCS	AXISCTR	
0509	REF	4	LAST 1452	17,3006	0 1477 1	TC	RETJADR	
0510	REF	1		17,3007	1 3236 1	TCF	CLOSEOUT	
0511	REF	7	LAST 1453	17,3010	4 1737 1	CS	ABSTJ	
0512	REF	2	LAST 1446	17,3011	6 3107 1	AD	+TJMINT6	14MS
0513				17,3012	0 0006 1	EXTEND		
0514	REF	1		17,3013	6 3032 0	BZMF	NOTMIN	
0515	REF	8	LAST 1454	17,3014	27'737 1	ADS	ABSTJ	
0516	REF	23	LAST 1454	17,3015	51'505 0	INDEX	AXISCTR	
0517	REF	10	LAST 1453	17,3016	11'525 0	CCS	TJU	
0518	REF	3	LAST 1454	17,3017	3 3107 1	CA	+TJMINT6	
0519				17,3020	1 3022 0	TCF	+2	
0520	REF	4	LAST 1454	17,3021	4 3107 0	CS	+TJMINT6	
0521	REF	24	LAST 1454	17,3022	51'505 0	INDEX	AXISCTR	
0522	REF	11	LAST 1454	17,3023	55'525 0	TS	TJU	
0523	REF	4	LAST 1443	17,3024	11'500 1	CCS	SENSETYP	ENSURE MIN-IMPULSE NOT AGAINST TRANS
0524	REF	2	LAST 1454	17,3025	1 3031 1	TCF	NOTMIN -1	
0525				17,3026	0 0006 1	EXTEND		
0526	REF	4	LAST 381	17,3027	00 004 0	READ	LOSCALAR	
0527	REF	171	LAST 1453	17,3030	7 4753 0	MASK	ONE	
0528	REF	11	LAST 1452	17,3031	55'743 1	TS	NUMBERT	
0529	REF	3	LAST 1454	17,3032	0 3173 1	TC	SELCTSUB	
0530	REF	25	LAST 1454	17,3033	51'505 0	INDEX	AXISCTR	
0531	REF	3	LAST 1454	17,3034	3 3105 0	CA	INDEXES	
0532				17,3035	0 0004 0	INHINT		

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0533	REF	5	LAST 1437	17,3036	55'471 0	TS	T6FURTHA +1
0534	REF	8	LAST 1454	17,3037	3 1741 1	CA	PGLYTEMP
0535	REF	6	LAST 1455	17,3040	51'471 1	INDEX	T6FURTHA +1
0536	REF	6	LAST 1454	17,3041	0 5754 1	TC	WRITEP

0537	REF	9	LAST 1454	17,3042	3 1737 0	CA	ABSTJ
0538	REF	7	LAST 1455	17,3043	55'470 1	TS	T6FURTHA
0539	REF	2	LAST 1437	17,3044	0 3114 0	TC	JTLST

IN OR BANK BY NOW

0540				17,3045	0 0003 1	RELINT	
------	--	--	--	---------	----------	--------	--

0541	REF	300	LAST 1450	17,3046	3 4755 1	CA	ZERO
0542	REF	26	LAST 1454	17,3047	51'505 0	INDEX	AXISCTR
0543	REF	7	LAST 1452	17,3050	55'535 1	TS	SKIPU

0544	REF	44	LAST 1389	17,3051	4 6245 0	FEEDBACK CS	THREE
0545	REF	12	LAST 1454	17,3052	6 1743 0	AD	NUMBERT
0546				17,3053	0 0006 1	EXTEND	
0547				17,3054	6 3057 0	BZMF	+3

0548	REF	99	LAST 1453	17,3055	3 4752 0	CA	TWO
0549				17,3056	1 3060 0	TCF	+2
0550	REF	172	LAST 1454	17,3057	3 4753 1	CA	ONE
0551	REF	27	LAST 1455	17,3060	51'505 0	INDEX	AXISCTR
0552	REF	2	LAST 133	17,3061	55'522 1	TS	NO.UJETS
0553	REF	3	LAST 1452	17,3062	1 3005 0	TCF	LOOPER

0554	REF	301	LAST 1455	17,3063	3 4755 1	XTRANS	CA ZERO
0555	REF	12	LAST 1454	17,3064	55'525 0	TS	TJU
0556	REF	3	LAST 1445	17,3065	55'526 0	TS	TJV
0557	REF	42	LAST 1452	17,3066	3 4751 0	CA	FOUR
0558				17,3067	0 0004 0	INHINT	
0559	REF	8	LAST 1455	17,3070	57'535 0	XCH	SKIPU
0560				17,3071	0 0006 1	EXTEND	
0561				17,3072	1 3074 0	BZF	+2
0562	REF	1		17,3073	0 5757 1	TC	WRITEU -1
0563	REF	43	LAST 1455	17,3074	3 4751 0	CA	FOUR
0564	REF	2	LAST 1412	17,3075	57'536 0	XCH	SKIPV
0565				17,3076	0 0003 1	RELINT	

0566				17,3077	0 0006 1	EXTEND	
0567	REF	2	LAST 1454	17,3100	1 3236 1	BZF	CLOSEOUT
0568				17,3101	0 0004 0	INHINT	
0569	REF	1		17,3102	0 5770 1	TC	WRITEV -1
0570				17,3103	0 0003 1	RELINT	

0571	REF	3	LAST 1455	17,3104	1 3236 1	TCF	CLOSEOUT
0572				17,3105	00004 0	INDEXES	DEC 4
0573				17,3106	00015 0	DEC	13
0574				17,3107	00026 0	+TJMINT6	DEC 22

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0575		17,3110	77417 0	-150MS	DEC	-240	
0576		17,3111	00600 1	BIT8,9	OCT	00600	
0577		17,3112	00266 0	SCLNORM	OCT	266	
0578	REF 1	17,3113	02671 0	TJLAWADR	GENADR TJLAW +3		RETURN ADDRESS FOR RCS ATTITUDE CONTROL

A0579 THE JET LIST:
A0580 THIS IS A WAITLIST FOR T6RUPTS.

A0581 CALLED BY:
A0582 CA TJ TIME WHEN NEXT JETS WILL BE WRITTEN
A0583 TS T6FURTHA
A0584 CA INDEX AXIS TO BE WRITTEN AT IJ (FROM NOW)
A0585 TS T6FURTHA +1
A0586 TC JTLST

A0587 EXAMPLE- U-AXIS AUTOPILOT WILL WRITE ITS ROTATION CODE OF
A0588 JETS INTO CHANNEL 5. IF IT DESIRES TO TURN OFF THIS POLICY WITHIN
A0589 150MS AND THEN FIRE NEXTU, A CALL TO JTLST IS MADE WITH T6FURTHA
A0590 CONTAINING THE TIME TO TURN OFF THE POLICY. T6FURTHA +1 THE INDEX
A0591 OF THE U-AXIS(4), AND NEXTU WILL CONTAIN THE "U-TRANS" POLICY OR ZERO.

A0592 THE LIST IS EXACTLY 3 LONG. (THIS LEADS TO SKIP LOGIC AND 150MS LIMIT)
A0593 THE INPUT IS THE LAST MEMBER OF THE LIST

A0594 RETURNS BY:
A0595 + TC Q

A0596 DEFINITIONS: (OUTPUT)
A0597 TIME6 TIME OF NEXT RUPT
A0598 T6NEXT DELTA TIME TO NEXT RUPT
A0599 T6FURTHA DELTA TIME FROM 2ND TO LAST RUPT
A0600 NXT6ADR AXIS INDEX Q - P-AXIS
A0601 T6NEXT +1 AXIS INDEX 4 - U-AXIS
A0602 T6FURTHA +1 AXIS INDEX 13 - V-AXIS

0603	REF 8	LAST 1455	17,3114	4 1470 1	JTLST	CS	T6FURTHA
0604	REF 5	LAST 1412	17,3115	6 0031 0		AD	TIME6
0605			17,3116	0 0006 1		EXTEND	
0606	REF 1		17,3117	6 3131 1		BZMF	MIDORLST TIME6 - T IS IN A

0607	REF 4	LAST 1412	17,3120	23'465 1		LXCH	NXT6ADR
0608	REF 9	LAST 1412	17,3121	53'467 1		DXCH	T6NEXT
0609	REF 9	LAST 1456	17,3122	53'471 0		DXCH	T6FURTHA
0610	REF 6	LAST 1456	17,3123	54 031 1		TS	TIME6
0611	REF 5	LAST 1456	17,3124	23'465 1		LXCH	NXT6ADR

0612	REF 51	LAST 1446	17,3125	3 4735 1	TURNON	CA	BIT15
0613			17,3126	0 0006 1		EXTEND	
0614	REF 25	LAST 1434	17,3127	05 013 0		WOR	CHAN13
0615	REF 409	LAST 1451	17,3130	0 0002 0		TC	Q

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0616 REF 10 LAST 1456 17,3131 6 1466 1 MIDORLST AD T6NEXT
0617 17,3132 0 0006 1 EXTEND
0618 REF 1 17,3133 6 3142 0 BZMF LASTCHG TIME6 + T6NEXT - T IS IN A

0619 REF 11 LAST 1457 17,3134 23 467 0 LXCH T6NEXT +1
0620 REF 10 LAST 1456 17,3135 53 471 0 DXCH T6FURTHA
0621 17,3136 0 0006 1 EXTEND
0622 REF 7 LAST 1456 17,3137 60 031 0 SU TIME6
0623 REF 12 LAST 1457 17,3140 53 467 1 DXCH T6NEXT

0624 REF 410 LAST 1456 17,3141 0 0002 0 TC Q

0625 REF 513 LAST 1454 17,3142 4 0000 0 LASTCHG CS A
0626 REF 30 LAST 1395 17,3143 6 4754 0 AD NEG0
0627 REF 11 LAST 1457 17,3144 55 470 1 TS T6FURTHA

0628 REF 411 LAST 1457 17,3145 0 0002 0 TC Q

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R0629 ROT-TOUV IS ENTERED WITH THE Q-COMPONENT OF THE QUANTITY TO BE TRANSFORMED IN A AND THE R-COMPONENT IN L.
R0631 ROT-TOUV TRANSFORMS THE QUANTITY INTO THE NON-ORTHOGONAL U-V AXIS SYSTEM. IN THE U-V SYSTEM NO CROSS-COUPPLING IS
R0633 PRODUCED FROM RCS JET FIRINGS. AT THE COMPLETION OF ROT-TOUV, THE U-COMPONENT OF THE TRANSFORMED QUANTITY IS IN
R0635 A AND THE V-COMPONENT IS IN L.

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0636 REF 1 17,3146 23 740 0 ROT-TOUV LXCH ROTEMP2 (R) IS PUT INTO ROTEMP2
0637 17,3147 0 0006 1 EXTEND
0638 REF 2 LAST 134 17,3150 7 1627 1 MP COEFFQ
0639 REF 2 LAST 1457 17,3151 57 740 0 XCH ROTEMP2 (R) GOES TO A AND COEFFQ.(Q) TO ROTEMP2
0640 17,3152 0 0006 1 EXTEND
0641 REF 1 17,3153 7 1630 1 MP COEFFR
0642 REF 282 LAST 1454 17,3154 54 001 1 TS L COEFFR.(R) IS PUT INTO L
0643 REF 3 LAST 1457 17,3155 6 1740 0 AD ROTEMP2
0644 REF 1 17,3156 55 737 1 TS ROTEMP1 COEFFQ.(Q)+COEFFR.(R) IS PUT IN ROTEMP1
0645 17,3157 1 3163 1 TCF +4
0646 REF 514 LAST 1457 17,3160 50 000 1 INDEX A COEFFQ.(Q) + COEFFR.(R) HAS OVERFLOWED
0647 REF 8 LAST 1420 17,3161 4 4734 1 CS LIMITS AND IS LIMITED TO POSMAX OR NEGMAX
0648 REF 2 LAST 1457 17,3162 55 737 1 TS ROTEMP1
0649 REF 4 LAST 1457 17,3163 4 1740 1 CS ROTEMP2
0650 REF 283 LAST 1457 17,3164 6 0001 0 AD L -COEFFQ.(Q) + COEFFR.(R) IS NOW IN A
0651 17,3165 54 007 1 TS 7
0652 17,3166 1 3171 1 TCF +3
0653 REF 515 LAST 1457 17,3167 50 000 1 INDEX A -COEFFQ.(Q) + COEFFR.(R) HAS OVERFLOWED
0654 REF 9 LAST 1457 17,3170 4 4734 1 CS LIMITS AND IS LIMITED TO POSMAX OR NEGMAX
0655 REF 3 LAST 1457 17,3171 23 737 0 LXCH ROTEMP1 COEFFQ.(Q) + COEFFR.(R) IS PUT INTO L
0656 REF 412 LAST 1457 17,3172 0 0002 0 TC Q
0657 REF 9 LAST 1453 17,3173 51 744 1 SELCTSUB INDEX ROTINDEX
0658 REF 1 17,3174 3 3225 1 CA ALLJETS
0659 REF 13 LAST 1455 17,3175 51 743 0 INDEX NUMBERT
0660 REF 1 17,3176 7 3231 0 MASK TYPEPOLY
0661 REF 9 LAST 1455 17,3177 55 741 0 TS POLYTEMP

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0662	REF	7	LAST	212	17,3200	7	1262	1	MASK	CH5MASK		
0663	REF	516	LAST	1457	17,3201	10	000	0	CCS	A		
0664					17,3202	1	3204	0	TCF	+2		
0665	REF	413	LAST	1457	17,3203	0	0002	0	TC	Q		
0666	REF	45	LAST	1455	17,3204	3	6245	1	CA	THREE		
0667	REF	14	LAST	1457	17,3205	55	743	1	TS	NUMBERT		
0668	REF	10	LAST	1457	17,3206	51	744	1	INDEX	ROTINDEX		
0669	REF	2	LAST	1457	17,3207	3	3225	1	CA	ALLJETS		
0670	REF	15	LAST	1458	17,3210	51	743	0	INDEX	NUMBERT		
0671	REF	2	LAST	1457	17,3211	7	3231	0	MASK	TYPEPOLY		
0672	REF	10	LAST	1457	17,3212	55	741	0	TS	POLYTEMP		
0673	REF	8	LAST	1458	17,3213	7	1262	1	MASK	CH5MASK		
0674					17,3214	0	0006	1	EXTEND			
0675	REF	1			17,3215	1	3203	1	BZF	FAILLOOP -2		
0676	REF	16	LAST	1458	17,3216	11	743	1	CCS	NUMBERT		
0677	REF	2	LAST	1458	17,3217	1	3205	1	TCF	FAILLOOP		
0678	REF	28	LAST	1455	17,3220	51	505	0	INDEX	AXISCTR		
0679	REF	13	LAST	1455	17,3221	55	525	0	TS	TJU		
0680	REF	51	LAST	1443	17,3222	0	5567	0	TC	ALARM		
0681					17,3223	0	2004	1	OCT	02004		
0682	REF	3	LAST	1453	17,3224	1	2777	0	TCF	NOROTAT		
0683					17,3225	0	0110	1	ALLJETS OCT	00110	-U	6 13
0684					17,3226	0	0022	1	OCT	00022	-V	2 9
0685					17,3227	0	0204	1	OCT	00204	+U	5 14
0686					17,3230	0	0041	1	OCT	00041	+V	1 10
0687					17,3231	0	0125	1	TYPEPOLY OCT	00125	-X	1 5 9 13
0688					17,3232	0	0252	1	OCT	00252	+X	2 6 10 14
0689					17,3233	0	0146	1	OCT	00146	A	2 5 10 13
0690					17,3234	0	0231	1	OCT	00231	B	1 6 9 14
0691					17,3235	0	0377	1	OCT	00377	ALL	1 2 5 6 9 10 13 14

R0692 THE FOLLOWING SETS THE INTERRUPT FLIP-FLOP AS SOON AS POSSIBLE, WHICH PERMITS A RETURN TO THE INTERRUPTED JOB.

0694	REF	1			17,3236	3	3240	1	CLOSEOUT CA	ADRRUPT		
0695	REF	1			17,3237	0	7754	0	TC	MAKERUPT		
0696	REF	1			17,3240	0	3241	0	ADRRUPT	ADRES	ENDJASK	
0697	REF	5	LAST	1428	17,3241	53	754	1	ENDJASK	DXCH	DAPARUPT	
0698	REF	13	LAST	1428	17,3242	52	011	0	DXCH	ARUPT		
0699	REF	2	LAST	1428	17,3243	53	756	0	DXCH	DAPBQRPT		
0700	REF	4	LAST	1428	17,3244	56	017	1	XCH	BRUPT		
0701	REF	414	LAST	1458	17,3245	22	002	0	LXCH	Q		
0702	REF	10	LAST	1429	17,3246	3	4735	1	CAF	NEGMAX		
0703	REF	4	LAST	1428	17,3247	53	760	0	DXCH	DAPZRUPT		
0704	REF	2	LAST	1428	17,3250	52	016	1	DXCH	ZRUPT		
0705	REF	1			17,3251	1	5272	1	TCF	NOQRSM		

NEGATIVE DAPZRUPT SIGNALS JASK IS OVER.

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0706				7754		BLOCK 3
0707	REF	4	LAST 1302	6000		SETLOC FFTAG6
0708				7754		BANK
0709	REF	1				COUNT* \$\$/DAP
0710				7754	0 0006 1	MAKERUPT EXTEND
0711	REF	2	LAST 1458	7755	07 754 0	EDRUPT MAKERUPT

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R0001 PROGRAM DESCRIPTION

R0002 DESIGNED BY: R. D. GOSS AND P. S. WEISSMAN

R0003 CODED BY: P. S. WEISSMAN 28 FEBRUARY 1968

R0004 TJETLAW IS CALLED AS A SUBROUTINE WHEN THE LEM IS NOT DUCKED AND THE AUTOPILOT IS IN THE AUTOMATIC OR
 R0005 ATTITUDE-HOLD MODE TO CALCULATE THE JET-FIRING-TIME (TJET) REQUIRED FOR THE AXIS INDICATED BY AXISCTR:

R0008 -1 INDICATES THE P-AXIS

R0009 +0 INDICATES THE U-AXIS

R0010 +1 INDICATES THE V-AXIS.

R0011 THE REGISTERS E AND EDOT CONTAIN THE APPROPRIATE ATTITUDE ERROR AND ERROR RATE AND SENSETYP SHOWS WHETHER
 R0013 UNBALANCED COUPLES ARE PREFERRED. TJETLAW ALSO USES VARIOUS FUNCTIONS OF ACCELERATION AND DEADBAND WHICH ARE
 R0015 COMPUTED IN THE 1/ACCONT SECTION OF 1/ACCS AND ARE STORED IN SUCH AN ORDER THAT THEY CAN BE CONVENIENTLY
 R0017 ACCESSED BY INDEXING.

R0018 THE SIGN OF THE REQUIRED ROTATION IS CARRIED THROUGH TJETLAW AS ROTSENSE AND IS FINALLY APPLIED TO TJET JUST
 R0020 PREVIOUS TO ITS STORAGE IN THE LOCATION CORRESPONDING TO THE AXIS (TJP, TJU OR TJV). THE NUMBER OF JETS THAT
 R0022 TJETLAW ASSUMES WILL BE USED IS INDICATED BY THE SETTING OF NUMBERT FOR THE U- OR V-AXIS. TWO JETS ARE ALWAYS
 R0024 ASSUMED FOR THE P-AXIS ALTHOUGH FOUR JETS WILL BE FIRED WHEN FIREFCT IS MORE NEGATIVE THAN -4.0 DEGREES
 R0026 (FIREFCT IS THE DISTANCE TO A SWITCH CURVE IN THE PHASE PLANE) AND A LONG FIRING IS CALLED FOR.

R0028 IN ORDER TO AVOID SCALING DIFFICULTIES, SIMPLE ALGORITHMS TAGGED RUFLAW1, -2 AND -3 ARE RESORTED TO WHEN THE
 R0030 ERROR AND/OR ERROR RATE ARE LARGE.

R0031 CALLING SEQUENCE:

R0032 TC TJETLAW (MUST BE IN JASK)

R0033 OR

R0034 INHINT (MUST BE IN JASK)

R0035 TC IBNKCALL

R0036 CADR TJETLAW

R0037 RELINT

R0038 EXIT: RETURN TO Q.

R0039 INPUT:

R0040 FROM THE CALLER: E, EDOT, AXISCTR, SENSETYP, TJP, -U, -V.

R0041 FROM 1/ACCONT: 48 ERASABLES BEGINNING AT BLOCKTOP (INCLUDING FLAT, ZONEBLIN AND ACCSWU, -V).

R0043 OUTPUT:

R0044 TJP, -U OR -V, NUMBERT (DAPTEMP5), FIREFCT (DAPTEMP3).

R0045 DEBRIS:

R0046 A, L, Q, E, EDOT, DAPTEMP1-6, DAPTREG1-4.

R0047 ALARM: NONE

0048 17,3252

0049 REF 4 LAST 1442 17,2000

0050 17,3252

0051 REF 13 LAST 1438 E6,1524

BANK 17

SETLOC DAPS2

BANK

EBANK= TJP

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0052 REF 1 COUNT* \$\$/DAPTJ

0053 17,3252 0 0006 1 TJETLAW EXTEND SAVE Q FOR RETURN.

0054 REF 1 17,3253 23 745 0 QXCH HOL9Q

R0055 SET INDEXERS TO CORRESPOND TO THE AXIS AND TO THE SIGN OF EDOT

0056 REF 29 LAST 1458 17,3254 51 505 0 INDEX AXISCTR AXISDIFF(-1)=NO OF LOCATIONS BER P AND U
 0057 REF 2 LAST 1449 17,3255 3 3722 0 CAF AXISDIFF AXISDIFF(0) = 0
 0058 REF 1 17,3256 55 746 1 TS ADRSDIF1 AXISDIFF(+1)=NO OF LOCATIONS BET V AND U

0059 REF 3 LAST 1452 17,3257 31 427 1 CAE EDOT IF EDOT NEGATIVE, PICK UP SET OF VALUES
 0060 17,3260 0 0006 1 EXTEND THAT ALLOW USE OF SAME CODING AS FOR
 0061 REF 1 17,3261 6 3266 0 BZMF NEGEDOT POSITIVE EDOT.
 0062 REF 2 LAST 1461 17,3262 31 746 0 CAE ADRSDIF1 SET A SECOND INDEXER WHICH MAY BE
 0063 REF 1 17,3263 55 744 0 TS ADRSDIF2 MODIFIED BY A DECISION FOR MAX JETS.
 0064 REF 1 17,3264 3 3724 0 CAF SENSOR FOR POSITIVE EDOT. ROTSENSE IS
 0065 REF 1 17,3265 1 3276 0 TCF SETSENSE INITIALIZED POSITIVE.

0066 REF 9 LAST 1452 17,3266 4 1752 1 NEGEDOT CS E IN ORDER FOR NEG EDOT CASE TO USE CODING
 0067 REF 10 LAST 1461 17,3267 55 752 1 TS E OF POS EDOT, MUST MODIFY AS FOLLOWS:
 0068 REF 4 LAST 1461 17,3270 4 1427 0 CS EDOT 1. COMPLEMENT E AND EDOT.
 0069 REF 5 LAST 1461 17,3271 55 427 0 TS EDOT 2. SET SENSE OF ROTATION TO NEGATIVE
 0070 REF 62 LAST 1444 17,3272 3 4753 1 CAF BIT1 (REVERSED LATER IF NECESSARY).
 0071 REF 3 LAST 1461 17,3273 27 746 1 ADS ADRSDIF1 3. INCREMENT INDEXERS BY ONE SO THAT
 0072 REF 2 LAST 1461 17,3274 55 744 0 TS ADRSDIF2 THE PROPER PARAMETERS ARE ACCESSED.
 0073 REF 2 LAST 1461 17,3275 4 3724 1 CS SENSOR
 0074 REF 1 17,3276 55 740 1 SETSENSE TS ROTSENSE

R0075 TEST MAGNITUDE OF E (ATTITUDE ERROR, SINGLE-PRECISION, SCALED AT PI RADIANS):

R0077 IF GREATER THAN (OR EQUAL TO) PI/16 RADIANS, GO TO THE SIMPLIFIED TJET ROUTINE.

R0079 IF LESS THAN PI/16 RADIANS, RESCALE TO PI/4.

0080 REF 11 LAST 1461 17,3277 31 752 0 CAE E PICK UP ATTITUDE ERROR FOR THIS AXIS
 0081 17,3300 0 0006 1 EXTEND
 0082 REF 49 LAST 1444 17,3301 7 4747 0 MP BIT5 SHIFT RIGHT TEN BITS; IF A-REGISTER IS
 0083 REF 517 LAST 1458 17,3302 10 000 0 CCS A ZERO, RESCALE AND TEST EDOT.
 0084 REF 1 17,3303 1 3664 1 TCF RUFLAW2
 0085 REF 1 17,3304 1 3306 0 TCF SCALEE
 0086 REF 1 17,3305 1 3630 0 TCF RUFLAW1
 0087 REF 56 LAST 1444 17,3306 3 4737 0 SCALEE CAF BIT13 ERROR IS IN L SCALED AT PI/16. RESCALE
 0088 17,3307 0 0006 1 EXTEND IT TO PI/4 AND SAVE IT.
 0089 REF 284 LAST 1457 17,3310 7 0001 1 MP L
 0090 REF 12 LAST 1461 17,3311 55 752 1 TS E

R0091 TEST MAGNITUDE OF EDOT (ERROR RATE SCALED AT PI/4 RADIANS/SECOND)

R0092 IF GREATER THAN (OR EQUAL TO) PI/32 RADIANS/SECOND, GO TO THE SIMPLIFIED TJET ROUTINE.

R0094 IF LESS THAN PI/32 RADIANS/SECOND, THEN RESCALE TO PI/32 RADIANS/SECOND.

0096 REF 6 LAST 1461 17,3312 31 427 1 CAE EDOT PICK UP SINGLE-PRECISION ERROR RATE

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0097 17,3313 0 0006 1 EXTEND FOR THIS AXIS=
 0098 REF 57 LAST 1431 17,3314 7 4750 0 MP BIT4 SHIFT RIGHT ELEVEN BITS, IF THE A-REG IS
 0099 17,3315 0 0006 1 EXTEND ZERO, THEN RESCALE AND USE FINELAW.
 0100 REF 1 17,3316 1 3320 1 BZF SCALEDOT
 0101 REF 1 17,3317 1 3672 0 TCF RUFLAW3
 R0102 *** FINELAW STARTS HERE ***

0103 REF 7 LAST 1461 17,3320 23 427 1 SCALEDOT LXCH EDOT EDOT IS SCALED AT PI/32 RADIANS/SECOND.
 0104 REF 8 LAST 1462 17,3321 31 427 1 CAE EDOT COMPUTE (EDOT)(EDOT)
 0105 17,3322 0 0006 1 EXTEND
 0106 17,3323 7 0000 0 SQUARE PRODUCT SCALED AT PI(2)/2(10) RAD/SEC.
 0107 17,3324 0 0006 1 EXTEND
 0108 REF 57 LAST 1461 17,3325 7 4737 1 MP BIT13 SHIFT RIGHT TWO BITS TO RESCALE EDOTSQ
 0109 REF 1 17,3326 55 737 1 TS EDOTSQ TO PI(2)/2(8) RAD(2)/SEC(2).
 0110 REF 13 LAST 1461 17,3327 11 752 1 ERRTEST CCS E DOES BIG ERROR (THREE DEG BEYOND THE
 0111 REF 1 17,3330 6 3725 1 AD -3DEG DEADBAND) REQUIRE MAXIMUM JETS?
 0112 17,3331 1 3333 0 TCF +2
 0113 REF 2 LAST 1462 17,3332 6 3725 1 AD -3DEG
 0114 17,3333 0 0006 1 EXTEND
 0115 REF 4 LAST 1461 17,3334 5 1746 0 INDEX ADRSDIF1
 0116 REF 1 17,3335 61 601 1 SU FIREDB
 0117 17,3336 0 0006 1 EXTEND
 0118 REF 1 17,3337 6 3344 1 BZMF SENSTEST IF NOT: ARE UNBALANCED JETS PREFERRED
 0119 REF 100 LAST 1455 17,3340 3 4752 0 MAXJETS CAF TWO IF YES: INCREMENT ADDRESS LOCATOR AND
 0120 REF 3 LAST 1461 17,3341 27 744 0 ADS ADRSDIF2 SET SWITCH FOR JET SELECT LOGIC TO 4.
 0121 REF 44 LAST 1455 17,3342 3 4751 0 CAF FOUR (ALWAYS DO THIS FOR P-AXIS)
 0122 REF 1 17,3343 1 3347 0 TCF TJCALC
 0123 REF 5 LAST 1454 17,3344 11 500 1 SENSTEST CCS SENSETYP DOES TRANSLATION PREFER MIN JETS.
 0124 REF 2 LAST 1462 17,3345 1 3347 0 TCF TJCALC YES. USE MIN-JET PARAMETERS.
 0125 REF 1 17,3346 1 3340 1 TCF MAXJETS NO. GET MAX-JET PARAMETERS.
 0126 REF 17 LAST 1458 17,3347 55 743 1 TJCALC TS NUMBERT SET TO +0,1,4 FOR (U,V-AXES) JET SELECT.

R0127 BEGINNING OF TJET CALCULATIONS:

0128 REF 2 LAST 1462 17,3350 4 1737 1 CS EDOTSQ SCALED AT PI(2)/2(8).
 0129 17,3351 0 0006 1 EXTEND
 0130 REF 4 LAST 1462 17,3352 5 1744 1 INDEX ADRSDIF2
 0131 REF 8 LAST 134 17,3353 7 1567 0 MP 1/ANET1 .5/ACC SCALED AT 2(6)/PI SEC(2)/RADIAN.
 0132 REF 5 LAST 1462 17,3354 51 746 0 INDEX ADRSDIF1
 0133 REF 2 LAST 1462 17,3355 6 1601 1 AD FIREDB DEADBAND SCALED AT PI/4 RADIAN.
 0134 17,3356 0 0006 1 EXTEND
 0135 REF 14 LAST 1462 17,3357 61 752 0 SU E ATTITUDE ERROR SCALED AT PI/4 RADIAN.
 0136 REF 2 LAST 1438 17,3360 55 741 0 TS FIREFCT -E-.5(EDOTSQ)/ACC-DB AT PI/4 RADIAN.
 0137 17,3361 0 0006 1 EXTEND
 0138 REF 1 17,3362 6 3542 1 BZMF ZON1,2,3
 0139 REF 6 LAST 1462 17,3363 51 746 0 ZONE4,5 INDEX ADRSDIF1
 0140 REF 1 17,3364 31 573 1 CAE 1/ACOST .5/ACC SCALED AT 2(6)/PI WHERE

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0141			17,3365	0 0006 1	EXTEND	ACC = MAX(AMIN, AOS-).
0142	REF	3 LAST 1462	17,3366	7 1737 1	MP EDOTSQ	SCALED AT PI/2(8).
0143	REF	15 LAST 1462	17,3367	6 1752 0	AD E	SCALED AT PI/4
0144	REF	7 LAST 1462	17,3370	51 746 0	INDEX ADRSDIF1	
0145	REF	1	17,3371	6 1603 0	AD COASTDB	SCALED AT PI/4 POS. FOR NEG. INTERCEPT.
0146			17,3372	0 0006 1	EXTEND	TEST E+.5(EDOTSQ)/ACC+DB AT PI/4 Radian.
0147	REF	1	17,3373	6 3426 1	BZMF ZONE5	IF FUNCTION NEGATIVE, FIND TJET.
A0148						IF FUNCTION POSITIVE, IN ZONE 4.

R0149 ZONE 4 IS THE COAST REGION. HOWEVER, IF THE JETS ARE ON AND DRIVING TOWARD

R0151 A. THE AXIS WITHIN + OR - (DB + FLAT) FOR DRIFTING FLIGHT, OR

R0152 B. THE USUAL TARGET PARABOLA FOR POWERED FLIGHT

R0153 THEN THE THRUSTERS ARE KEPT ON.

0154	REF	30 LAST 1461	17,3374	51 505 0	ZONE4	INDEX AXISCTR	IS THE CURRENT VALUE IN TJET NON-ZERO
0155	REF	1	17,3375	4 1525 0		CS TJETU	WITH SENSE OPPOSITE TO EDOT,
0156			17,3376	0 0006 1		EXTEND	(I.E., ARE JETS ON AND FIRING TOWARD
0157	REF	2 LAST 1461	17,3377	7 1740 1		MP ROTSENSE	THE DESIRABLE STATE).
0158			17,3400	0 0006 1		EXTEND	
0159	REF	1	17,3401	6 3422 0		BZMF COASTTJ	NO. COAST.
0160	REF	1	17,3402	11 555 1	JETSON	CCS FLAT	YES. IS THIS DRIFTING OR POWERED FLIGHT
0161	REF	1	17,3403	1 3414 1		TCF DRIFT/ON	DRIFTING. GO MAKE FURTHER TEST.
0162	REF	3 LAST 1462	17,3404	4 1741 0		CS FIREFCT	POWERED (OR ULLAGE). CAN TARGET PARABOLA
0163	REF	8 LAST 1463	17,3405	51 746 0		INDEX ADRSDIF1	BE REACHED FROM THIS POINT IN THE
0164	REF	1	17,3406	6 1605 0		AD AXISDIST	PHASE PLANE
0165			17,3407	0 0006 1		EXTEND	
0166	REF	2 LAST 1463	17,3410	6 3422 0		BZMF COASTTJ	NO. SET TJET = 0.
0167	REF	1	17,3411	0 3526 0		TC Z123COMP	YES. CALCULATE TJET AS THOUGH IN ZONE 1
0168	REF	4 LAST 1463	17,3412	31 741 1		CAE FIREFCT	AFTER COMPUTING THE REQUIRED
0169	REF	1	17,3413	1 3562 1		TCF ZONE1	PARAMETERS.
0170	REF	9 LAST 1463	17,3414	51 746 0	DRIFT/ON	INDEX ADRSDIF1	CAN TARGET STRIP OF AXIS BE REACHED FROM
0171	REF	3 LAST 1462	17,3415	4 1601 0		CS FIRED8	THIS POINT IN THE PHASE PLANE
0172			17,3416	6 0000 1		DOUBLE	
0173	REF	5 LAST 1463	17,3417	6 1741 1		AD FIREFCT	
0174			17,3420	0 0006 1		EXTEND	
0175			17,3421	6 3424 0		BZMF +3	
0176	REF	302 LAST 1455	17,3422	3 4755 1	COASTTJ	CAF ZERO	NO. SET TJET = 0.
0177	REF	1	17,3423	1 3466 1		TCF RETURN TJ	
0178	REF	2 LAST 1463	17,3424	0 3526 0		TC Z123COMP	YES. CALCULATE TJET AS THOUGH IN ZONE 2
0179	REF	1	17,3425	1 3547 0		TCF ZONE2,3	OR 3 AFTER COMPUTING REQUIRED VALUES.
0180	REF	285 LAST 1461	17,3426	54 001 1	ZONE5	TS L	TEMPORARILY STORE FUNCTION IN L.
0181	REF	3 LAST 1463	17,3427	11 740 1		CCS ROTSENSE	MODIFY ADRSDIF2 FOR ACCESSING 1/ANET2
0182			17,3430	1 3434 0		TCF +4	AND ACCFCTZ5, WHICH MUST BE PICKED UP
0183	REF	21 LAST 1404	17,3431	0 5705 0		TC CASHOLE	FROM THE NEXT LOWER REGISTER IF THE
0184	REF	101 LAST 1462	17,3432	4 4752 1		CS TWO	(ACTUAL) ERROR RATE IS NEGATIVE.

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0185	REF	5	LAST 1462	17,3433	27'744 0	ADS	ADRSDIF2	
0186	REF	286	LAST 1463	17,3434	30'001 0	CAE	L	
0187				17,3435	0'0006 1	EXTEND		
0188	REF	6	LAST 1464	17,3436	5'1744 1	INDEX	ADRSDIF2	TTOAXIS AND HH ARE THE PARAMETERS UPON
0189	REF	1		17,3437	7'1576 0	MP	ACCFCTZ5	WHICH THE APPROXIMATIONS TO TJET ARE
0190				17,3440	20'001 1	DDOUBL		BASED.
0191				17,3441	20'001 1	DDOUBL		
0192	REF	1		17,3442	53'750 0	DXCH	HH	DOUBLE PRECISION H SCALED AT 8 SEC(2).
0193	REF	7	LAST 1464	17,3443	51'744 1	INDEX	ADRSDIF2	
0194	REF	2	LAST 1449	17,3444	31'570 1	CAE	1/ANET2	SCALED AT 2(7)/PI SEC(2)/RAD.
0195				17,3445	0'0006 1	EXTEND		
0196	REF	9	LAST 1462	17,3446	7'1427 0	MP	EDOT	SCALED AT PI/2(5)
0197	REF	1		17,3447	55'742 0	TS	TTOAXIS	SCALED AT 4 SEC.
R0198	TEST WHETHER TJET GREATER THAN 50 MSEC.							
0199				17,3450	0'0006 1	EXTEND		
0200	REF	1		17,3451	7'3734 0	MP	-.05AT2	H - .05 TTOAXIS - .00125 G.T. ZERO
0201	REF	2	LAST 1464	17,3452	6'1747 1	AD	HH	(SCALED AT 8 SEC(2)).
0202	REF	8	LAST 1308	17,3453	6'7746 0	AD	NEG2	
0203				17,3454	0'0006 1	EXTEND		
0204	REF	1		17,3455	6'3503 1	BZMF	FORMULA1	
R0205	TEST WHETHER TJET GREATER THAN 150 MSEC.							
0206	REF	2	LAST 1464	17,3456	31'742 1	CAE	TTOAXIS	
0207				17,3457	0'0006 1	EXTEND		
0208	REF	1		17,3460	7'3735 1	MP	-.15AT2	H - .15 TTOAXIS - .01125 G.T. ZERO
0209	REF	3	LAST 1464	17,3461	6'1747 1	AD	HH	(SCALED AT 8 SEC(2))
0210	REF	1		17,3462	6'3726 1	AD	-.0112A8	
0211				17,3463	0'0006 1	EXTEND		
0212	REF	1		17,3464	6'3513 0	BZMF	FORMULA2	
R0213	IF TJET GREATER THAN 150 MSEC, ASSIGN IT VALUE OF 250 MSEC, SINCE THIS							
R0214	IS ENOUGH TO ASSURE NO SKIP NEXT CSP (100 MSEC).							
0215	REF	31	LAST 1336	17,3465	3'4741 1	FULLTIME CAF	BIT11	250 MSEC SCALED AT 4 SEC.
R0216	RETURN TO CALLING PROGRAM WITH JET TIME SCALED AS TIME6 AND SIGNED.							
0217				17,3466	0'0006 1	RETURN TJ	EXTEND	
0218	REF	4	LAST 1463	17,3467	7'1740 1	MP	ROTSENSE	ALL BRANCHES TERMINATE HERE WITH TJET
0219	REF	31	LAST 1463	17,3470	51'505 0	INDEX	AXISCTR	(SCALED AT 4 SEC) IN THE ACCUMULATOR.
0220	REF	2	LAST 1463	17,3471	55'525 0	TS	TJETU	ROTSENSE APPLIES SIGN AND CHANGES SCALE.
0221				17,3472	0'0006 1	EXTEND		
0222	REF	32	LAST 1464	17,3473	5'1505 0	INDEX	AXISCTR	
0223	REF	2	LAST 134	17,3474	7'1547 1	MP	ACCSWU	SET SWITCH FOR JET SELECT IF ROTATION IS
0224	REF	287	LAST 1464	17,3475	30'001 0	CAE	L	
0225				17,3476	0'0006 1	EXTEND		IN A SENSE FOR WHICH 1/ACCS HAS FORCED
0226				17,3477	6'3502 0	BZMF	+3	A MAX-JET CALCULATION.
0227	REF	45	LAST 1462	17,3500	3'4751 0	CAF	FOUR	

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0228 REF 18 LAST 1462 17,3501 55'743 1
 0229 REF 2 LAST 1461 17,3502 0'1745 0

TS NUMBERT
 TC HOLDQ

RETURN VIA SAVED Q.

R0230 TJET = H/(.025 + TTOAXIS) FOR TJET LESS THAN 50 MSEC.

0231 REF 1 17,3503 4 3733 1
 0232 REF 3 LAST 1464 17,3504 6 1742 1
 0233 REF 4 LAST 1464 17,3505 53'750 0
 0234 17,3506 0 0006 1
 0235 REF 5 LAST 1465 17,3507 11'747 0
 0236 17,3510 0 0006 1
 0237 REF 83 LAST 1423 17,3511 7 4736 0
 0238 REF 1 17,3512 1 3623 1

FORMULA1 CS -.025AT4
 AD TTOAXIS
 DXCH HH
 EXTEND
 DV HH
 EXTEND
 MP BIT14
 TCF CHKMINTJ

.025 SEC SCALED AT 4.
 SCALED AT 4 SECONDS.
 STORE DENOMINATOR IN FIRST WORD OF H,
 WHICH NEED NOT BE PRESERVED. PICK UP
 DP H AND DIVIDE BY DENOMINATOR.
 RESCALE TJET FROM 2 TO USUAL 4 SEC.
 CHECK THAT TJET IS NOT LESS THAN MINIMUM

R0239 TJET = (H + .00375)/(0.1 + TTOAXIS) FOR TJET GREATER THAN 50 MSEC.

0240 17,3513 0 0006 1
 0241 REF 1 17,3514 3 3737 1
 0242 REF 6 LAST 1465 17,3515 21'750 0
 A0243
 0244 REF 4 LAST 1465 17,3516 31'742 1
 0245 REF 1 17,3517 6 3727 0
 0246 REF 7 LAST 1465 17,3520 53'750 0
 0247 17,3521 0 0006 1
 0248 REF 8 LAST 1465 17,3522 11'747 0
 0249 17,3523 0 0006 1
 0250 REF 84 LAST 1465 17,3524 7 4736 0
 0251 REF 2 LAST 1463 17,3525 1 3466 1

FORMULA2 EXTEND
 DCA .00375A8
 DAS HH
 CAE TTOAXIS
 AD .1AT4
 DXCH HH
 EXTEND
 DV HH
 EXTEND
 MP BIT14
 TCF RETURN TJ

.00375 SEC(2) SCALED AT 8.
 STORE NUMERATOR IN DP H, WHICH NEED NOT
 BE PRESERVED.
 SCALED AT 4 SEC.
 0.1 SEC SCALED AT 4.
 STORE DENOMINATOR IN FIRST WORD OF H,
 WHICH NEED NOT BE PRESERVED. PICK UP
 DP NUMERATOR AND DIVIDE BY DENOMINATOR
 RESCALE TJET FROM 2 TO USUAL 4 SEC.
 END SUBROUTINE.

R0252 SUBROUTINIZED COMPUTATIONS REQUIRED FOR ALL ENTRIES INTO CODING FOR ZONES 1, 2, AND 3.

R0254 REACHED BY TC FROM 3 POINTS IN TJETLAW.

0255 REF 5 LAST 1464 17,3526 4 1740 1
 0256 REF 6 LAST 1465 17,3527 55'740 1
 0257 REF 10 LAST 1464 17,3530 31'427 1
 0258 17,3531 0 0006 1
 0259 REF 8 LAST 1464 17,3532 5 1744 1
 0260 REF 9 LAST 1462 17,3533 7 1567 0
 0261 REF 5 LAST 1465 17,3534 55'742 0
 0262 REF 1 17,3535 6 3740 1
 0263 17,3536 0 0006 1
 0264 17,3537 6 3541 1
 0265 REF 1 17,3540 1 3465 1
 0266 17,3541 0 0002 0

Z123COMP CS ROTSENSE
 TS ROTSENSE
 CAE EDOY
 EXTEND
 INDEX ADRSDIF2
 MP 1/ANET1
 TS TTOAXIS
 AD TJMAX
 EXTEND
 BZMF +2
 TCF FULLTIME
 RETURN

USED IN RETURN TJ SECTION TO RESCALE TJET
 AS TIME 6 AND GIVE IT PROPER SIGN.
 SCALED AT PI/2(5) RAD/SEC.
 SCALED AT 2(7)/PI SEC(2)/RAD.
 STORE TIME TO AXIS SCALED AT 4 SECONDS.
 IS TIME TO AXIS LESS THAN 150 MSEC.
 NO. FIRE JETS. DO NOT CALCULATE TJET.
 YES. GO ON TO FIND TJET

0267 REF 3 LAST 1463 17,3542 0 3526 0

ZON1,2,3 TC Z123COMP

SUBROUTINIZED PREPARATION FOR ZONE 1,2,3.

R0268 IF THE (NEG) DISTANCE BEYOND PARABOLA IS LESS THAN FLAT, USE SPECIAL
 R0269 LOGIC TO ACQUIRE MINIMUM IMPULSE LIMIT CYCLE. DURING POWERED FLIGHT

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R0270 OR ULLAGE. FLAT = 0

0271	REF	6	LAST 1463	17,3543	31'741 1	CAE	FIREFCT	SCALED AT PI/4 RAD.
0272	REF	2	LAST 1463	17,3544	6 1555 0	AD	FLAT	
0273				17,3545	0 0006 1	EXTEND		
0274	REF	2	LAST 1463	17,3546	6 3562 0	BZMF	ZONE1	NOT IN SPECIAL ZONES.

R0275 FIRE FOR AXIS OR, IF CLOSE, FIRE MINIMUM IMPULSE. IF ON AXIS, COAST.

0276	REF	1		17,3547	4 1556 1	ZONE2,3	CS	ZONE3 LIM	HEIGHT OF MIN-IMPULSE ZONE SET BY 1/ACCS
0277	REF	6	LAST 1465	17,3550	6 1742 1		AD	TTOAXIS	35 MSEC IN DRIFTING FLIGHT
0278				17,3551	0 0006 1		EXTEND		ZERO WHEN TRYING TO ENTER GTS CONTROL.
0279	REF	1		17,3552	6 3555 1		BZMF	ZONE3	
0280	REF	7	LAST 1466	17,3553	31'742 1	ZONE2	CAE	TTOAXIS	FIRE TO AXIS.
0281	REF	3	LAST 1465	17,3554	1 3466 1		TCF	RETURN TJ	
0282	REF	11	LAST 1465	17,3555	11'427 0	ZONE3	CCS	EDOT	CHECK IF EDOT IS ZERO.
0283	REF	64	LAST 1445	17,3556	3 4746 0		CAF	BIT6	FIRE A ONE-JET MINIMUM IMPULSE.
0284	REF	4	LAST 1466	17,3557	1 3466 1		TCF	RETURN TJ	TJET = +0.
0285	REF	22	LAST 1463	17,3560	0 5705 0		TC	CCSHOLE	CANNOT BE BECAUSE NEG EDOT COMPLEMENTED.
0286	REF	5	LAST 1466	17,3561	1 3466 1		TCF	RETURN TJ	TJET = +0.

0287				17,3562	0 0006 1	ZONE1	EXTEND		
0288	REF	10	LAST 1463	17,3563	5 1746 0		INDEX	ADRSDIF1	
0289	REF	2	LAST 1463	17,3564	61'605 0		SU	AXISDIST	SCALED AT PI/4 RAD.
0290				17,3565	0 0006 1		EXTEND		
0291	REF	9	LAST 1465	17,3566	5 1744 1		INDEX	ADRSDIF2	
0292	REF	1		17,3567	7 1575 0		MP	ACCFTZ1	SCALED AT 2(7)/PI-SEC(2)/RAD.
0293				17,3570	20 001 1		DDOUBL		
0294				17,3571	20 001 1		DDOUBL		
0295	REF	9	LAST 1465	17,3572	53'750 0		DXCH	HH	DOUBLE PRECISION H SCALED AT 8 SEC(2).

R0296 TEST WHETHER TOTAL TIME REQUIRED GREATER THAN 150 MSEC:

R0297				2					
R0298				IS .5(.150 - TTOAXIS)	- H	NEGATIVE (SCALED AT 8 SECONDS)			

0299	REF	8	LAST 1466	17,3573	31'742 1	CAE	TTOAXIS	TTOAXIS SCALED AT 4 SECONDS.
0300	REF	2	LAST 1465	17,3574	6 3740 1	AD	-TJMAX	-.150 SECOND SCALED AT 4.
0301				17,3575	0 0006 1	EXTEND		
0302				17,3576	7 0000 0	SQUARE		
0303				17,3577	0 0006 1	EXTEND		
0304	REF	10	LAST 1466	17,3600	61'747 1	SU	HH	HIGH WORD OF H SCALED AT 8 SEC(2).
0305				17,3601	0 0006 1	EXTEND		
0306	REF	2	LAST 1465	17,3602	6 3465 0	BZMF	FULLTIME	YES. NEED NOT CALCULATE TJET.

R0307 TEST WHETHER TIME BEYOND AXIS GREATER THAN 50 MSEC TO DETERMINE WHICH APPROXIMATION TO USE.

0309	REF	11	LAST 1466	17,3603	31'747 1	CAE	HH	
0310	REF	9	LAST 1464	17,3604	6 7746 0	AD	NEG2	
0311				17,3605	0 0006 1	EXTEND		
0312	REF	1		17,3606	6 3616 0	BZMF	FORMULA3	

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R0313 TJET = H/0.1 + TTUAXIS + .0375 FOR APPROXIMATION OVER MORE THAN 50 MSEC.

0315	REF	1		17,3607	3 5730 0	CAF	.1AT2	STORE .1 SEC SCALED AT 2 FOR DIVISION.
0316	REF	12	LAST 1466	17,3610	53 750 0	DXCH	HH	DP H SCALED AT 8 SEC(2) NEED NOT BE
0317				17,3611	0 0006 1	EXTEND		PRESERVED.
0318	REF	13	LAST 1467	17,3612	11 747 0	DV	HH	QUOTIENT SCALED AT 4 SECONDS.
0319	REF	9	LAST 1466	17,3613	6 1742 1	AD	TTUAXIS	SCALED AT 4 SEC.
0320	REF	1		17,3614	6 3731 1	AD	.0375AT4	.0375 SEC SCALED AT 4.
0321	REF	6	LAST 1466	17,3615	1 3466 1	TCF	RETURN TJ	END COMPUTATION.

R0322 TJET = H/.025 + TTUAXIS FOR APPROXIMATION OVER LESS THAN 50 MSEC.

0323	REF	1		17,3616	4 3732 0	FORMULA3 CS	-.025AT2	STORE +.025 SEC SCALED AT 2 FOR DIVISION
0324	REF	14	LAST 1467	17,3617	53 750 0	DXCH	HH	PICK UP DP H AT 8, WHICH NEED NOT BE
0325				17,3620	0 0006 1	EXTEND		PRESERVED.
0326	REF	15	LAST 1467	17,3621	11 747 0	DV	HH	QUOTIENT SCALED AT 4 SECONDS.
0327	REF	10	LAST 1467	17,3622	6 1742 1	AD	TTUAXIS	SCALED AT 4 SEC.

R0328 IF COMPUTED JET TIME IS LESS THAN TJMIN, TJET IS SET TO ZERO.

R0329 MINIMUM IMPULSES REQUIRED IN ZONE 3 ARE NOT SUBJECT TO THIS CONSTRAINT, NATURALLY.

0331	REF	1		17,3623	6 3742 0	CHKMINTJ AD	-TJMIN	IS COMPUTED TIME LESS THAN THE MINIMUM.
0332				17,3624	0 0006 1	EXTEND		
0333	REF	3	LAST 1463	17,3625	6 3422 0	BZMF	CUASTTJ	YES, SET TIME TO ZERO.
0334	REF	1		17,3626	6 3741 0	AD	TJMIN	NO, RESTORE COMPUTED TIME.
0335	REF	7	LAST 1467	17,3627	1 3466 1	TCF	RETURN TJ	END COMPUTATION.

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P0336 *** ROUGHLAW ***

R0337 BEFORE ENTRY TO RUFLAW:

R0338 1. INDEXERS ADRSDIF1 AND ADRSDIF2 ARE SET ON BASIS OF AXIS, AND SIGN OF EDOT.

R0340 2. IF EDOT WAS NEGATIVE, E AND EDOT ARE ROTATED INTO UPPER HALF-PLANE AND ROTSENSE IS MADE NEGATIVE.

R0342 3. E IS SCALED AT PI RADIANS AND EDOT AT PI/4 RAD/SEC.

R0343 (EXCEPT THE RUFLAW3 ENTRY WHEN E IS AT PI/4)

R0344 RUFLAW1: ERROR MORE NEGATIVE THAN PI/16 RAD. FIRE TO A RATE OF 6.5 DEG/SEC (IF JET TIME EXCEEDS 20 MSEC.).

R0346 RUFLAW2: ERROR MORE POSITIVE THAN PI/16 RAD. FIRE TO AN OPPOSING RATE OF 6.5 DEG/SEC.

R0348 RUFLAW3: ERROR RATE GREATER THAN PI/32 RAD/SEC AND ERROR WITHIN BOUNDS. COAST IF BELOW FIREFACT, FIRE IF ABOVE

0350	REF 1	17,3630	4 3743 0	RUFLAW1	CS	RUF RATE	DECREMENT EDOT BY .1444 RAD/SEC AT PI/4
0351	REF 12 LAST 1466	17,3631	27'427-0	ADS	EDOT		WHICH IS THE TARGET RATE
0352		17,3632	0 0006-1	EXTEND			
0353	REF 1	17,3633	6 3654 0	BZMF	SMALRATE		BRANCH IF RATE LESS THAN TARGET.
0354	REF 1	17,3634	0 3712-0	TC	RUFSETUP		REVERSE ROTSENSE AND INDICATE MAX JETS.
0355	REF 13 LAST 1468	17,3635	31'427-1	CAE	EDOT		PICK UP DESIRED RATE CHANGE.

0356		17,3636	0 0006-1	RUFLAW12	EXTEND		COMPUTE TJET
0357	REF 10 LAST 1466	17,3637	5 1744-1	INDEX	ADRSDIF2		=(DESIRED RATE CHANGE)/(2-JET ACCEL.)
0358	REF 10 LAST 1465	17,3640	7 1571 1	MP	1/ANET1 +2		
0359	REF 3 LAST 994	17,3641	6 7741-1	AD	-1/8		IF TJET, SCALED AT 32 SEC, EXCEEDS
0360		17,3642	0 0006-1	EXTEND			4 SECONDS, SET TJET TO TJMAX.
0361		17,3643	6 3645-0	BZMF	+2		
0362	REF 3 LAST 1466	17,3644	1 3465-1	TCF	FULLTIME		
03621		17,3645	0 0006-1	EXTEND			
03622	REF 4 LAST 1468	17,3646	1 3465-1	BZF	FULLTIME		
0363	REF 41 LAST 1437	17,3647	6 4740 0	AD	BIT12		RESTORE COMPUTED TJET TO ACCUMULATOR.
0364	REF 518 LAST 1461	17,3650	20 001-1	DAS	A		
0365	REF 519 LAST 1468	17,3651	20 001-1	DAS	A		
0366	REF 520 LAST 1468	17,3652	20 001-1	DAS	A		RESCALED TJET AT 4 SECONDS.
0367	REF 2 LAST 1465	17,3653	1 3623-1	TCF	CHKMINTJ		RETURN AS FROM FINELAW.

0368	REF 2 LAST 1468	17,3654	0 3714 0	SMALRATE	TC	RUFSETUP +2	SET NUMBERT AND FIREFACT FOR MAXIMUM JETS
0369	REF 7 LAST 1465	17,3655	11'740-1	CCS	ROTSSENSE		
0370	REF 173 LAST 1455	17,3656	3 4753-1	CAF	ONE		MODIFY INDEXER TO POINT TO 1/ANET
0371		17,3657	1 3661-1	TCF	+2		CORRESPONDING TO THE PROPER SENSE.
0372	REF 13 LAST 1286	17,3660	3 7747-1	CAF	NEGONE		
0373	REF 11 LAST 1468	17,3661	27'744 0	ADS	ADRSDIF2		

0374	REF 14 LAST 1468	17,3662	4 1427-0	CS	EDOT		(.144 AT PI/4 - EDOT)=DESIRED RATE CHNG.
0375	REF 1	17,3663	1 3636-0	TCF	RUFLAW12		

0376	REF 3 LAST 1468	17,3664	0 3712 0	RUFLAW2	TC	RUFSETUP	REVERSE ROTSENSE AND INDICATE MAX JETS.
0377	REF 2 LAST 1468	17,3665	3 3743-1	CAF	RUF RATE		
0378	REF 15 LAST 1468	17,3666	6 1427-1	AD	EDOT		(.144 AT PI/4 + EDOT)=DESIRED RATE CHNG.
0379	REF 521 LAST 1468	17,3667	54 000-0	TS	A		IF OVERFLOW SKIP, FIRE FOR FULL TIME.
0380	REF 2 LAST 1468	17,3670	1 3636-0	TCF	RUFLAW12		OTHERWISE, COMPUTE JET TIME.
0381	REF 5 LAST 1468	17,3671	1 3465-1	TCF	FULLTIME		

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0382	REF	4	LAST 1468	17,3672	0 3712 0	RUFLAW3	TC	RUFSETUP	EXECUTE COMMON RUFLAW SUBROUTINE.
0383	REF	11	LAST 1466	17,3673	51 1746 0		INDEX	ADRSDIF1	
0384	REF	4	LAST 1463	17,3674	4 1601 0		CS	FIRED8	CALCULATE DISTANCE FROM SWITCH CURVE
0385	REF	16	LAST 1463	17,3675	6 1752 0		AD	E	$1/ANET1*EDOT*EDOT + E - FIRED8 = 0$
0386				17,3676	0 0006 1		EXTEND		SCALED AT 4-PI-RADIANS
0387	REF	32	LAST 1464	17,3677	7 4741 0		MP	BIT11	
0388	REF	16	LAST 1468	17,3700	57 427 1		XCH	EDOT	
0389				17,3701	0 0006 1		EXTEND		
0390				17,3702	7 0000 0		SQUARE		
0391				17,3703	0 0006 1		EXTEND		
0392	REF	12	LAST 1469	17,3704	5 1746 0		INDEX	ADRSDIF1	
0393	REF	11	LAST 1468	17,3705	7 1571 1		MP	$1/ANET1 + 2$	
0394	REF	17	LAST 1469	17,3706	6 1427 1		AD	EDOT	
0395				17,3707	0 0006 1		EXTEND		
0396	REF	4	LAST 1467	17,3710	6 3422 0		BZMF	COASTTJ	COAST IF BELOW IT.
0397	REF	6	LAST 1468	17,3711	1 3465 1		TCF	FULLTIME	FIRE FOR FULL PERIOD IF ABOVE IT.

R0398 SUBROUTINE USED IN ALL ENTRIES TO ROUGHLAW.

0399	REF	8	LAST 1468	17,3712	4 1740 1	RUFSETUP	CS	ROTSENSE	REVERSE ROTSENSE WHEN ENTER HERE.
0400	REF	9	LAST 1469	17,3713	55 740 1		TS	ROTSENSE	
0401	REF	46	LAST 1464	17,3714	3 4751 0	+2	CAF	FOUR	REQUIRE MAXIMUM (2) JETS IN U,V-AXES.
0402	REF	19	LAST 1465	17,3715	55 743 1		TS	NUMBERT	
0403	REF	11	LAST 1458	17,3716	3 4735 1		CAF	NEGMAX	SUGGEST MAXIMUM (4) JETS IN P-AXIS.
0404	REF	7	LAST 1466	17,3717	55 741 0		TS	FIREFCT	
0405	REF	415	LAST 1458	17,3720	0 0002 0		TC	Q	

R0406 CONSTANTS FOR TJETLAW

0407				17,3721	77757 1		DEC	-16	AXISDIFF(INDEX) = NUMBER OF REGISTERS
0408				17,3722	00000 1	AXISDIFF	DEC	+0	BETWEEN STORED 1/ACCS PARAMETERS FOR
0409				17,3723	00020 0		DEC	16	THE INDEXED AXIS AND THE U-AXIS.
0410				17,3724	14400 0	SENSOR	OCT	14400	RATIO OF TJET SCALING WITHIN TJETLAW
A0411									(4 SEC) TO SCALING FOR T6 (10.24 SEC).
0412				17,3725	75673 1	-3DEG	DEC	-.06667	-3.0 DEGREES SCALED AT 45.
0413				17,3726	77750 0	-.0112A8	DEC	-.00141	-.01125 SEC(2) SCALED AT 8.
0414				17,3727	00632 0	.1AT4	DEC	.025	0.1 SECOND SCALED AT 4.
0415				17,3730	01463 1	.1AT2	DEC	.05	0.1 SEC SCALED AT 2.
0416				17,3731	00232 1	.0375AT4	DEC	.00938	.0375 SEC SCALED AT 4.
0417				17,3732	77462 1	-.025AT2	DEC	-.0125	-.025 SEC SCALED AT 2.
0418				17,3733	77631 0	-.025AT4	DEC	-.00625	
0419				17,3734	77145 1	-.05AT2	DEC	-.025	
0420				17,3735	75462 0	-.15AT2	DEC	-.075	
0421				17,3736	00007 0	.00375A8	2DEC	.00375	B-3
0421				17,3737	25605 0				
0422				17,3740	76631 1	-TJMAX	DEC	-.0475	LARGEST CALCULATED TIME. .150 SEC AT 4.
0423				17,3741	00122 0	TJMIN	DEC	.005	SMALLEST ALLOWABLE TIME. .020 SEC AT 4.
0424				17,3742	77655 1	-TJMIN	DEC	-.005	
0425				17,3743	04476 0	RUFRATE	DEC	.1444	CORRESPONDS TO TARGET RATE OF 6.5 DEG/S.

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0001	REF	3	LAST 1455	E6,1522		EBANK= NO.UJETS	
0002				16,3641		BANK 16	
0003	REF	3	LAST 1421	16,2000		SETLOC DAPS1	
0004				16,3641		BANK	
0005	REF	1				COUNT* \$\$/DAP	
0006	REF	102	LAST 1463	16,3641	3 4752 0	RATELOOP	CA TWO
0007	REF	3	LAST 133	16,3642	55'744 0		TS DAPTEMP6
00071				16,3643	6 0000 1		DOUBLE
00072	REF	416	LAST 1469	16,3644	54 002 1		TS Q
0008	REF	4	LAST 1470	16,3645	51'744 1		INDEX DAPTEMP6
0009	REF	14	LAST 1460	16,3646	11'524 1		CCS TJP
0010				16,3647	1 3651 1		TCF +2
0011	REF	1		16,3650	1 3670 1		TCF LOOPRATE
0012	REF	1		16,3651	6 3731 1		AD -100MST6
0013				16,3652	0 0006 1		EXTEND
0014	REF	1		16,3653	6 3707 1		BZMF SMALLTJU
0015	REF	5	LAST 1470	16,3654	51'744 1		INDEX DAPTEMP6
0016	REF	15	LAST 1470	16,3655	11'524 1		CCS TJP
0017	REF	2	LAST 1470	16,3656	3 3731 1		CA -100MST6
0018				16,3657	1 3661 1		TCF +2
0019	REF	3	LAST 1470	16,3660	4 3731 0		CS -100MST6
0020	REF	6	LAST 1470	16,3661	51'744 1		INDEX DAPTEMP6
0021	REF	16	LAST 1470	16,3662	27'524 1		ADS TJP
0022	REF	7	LAST 1470	16,3663	51'744 1		INDEX DAPTEMP6
0023	REF	17	LAST 1470	16,3664	11'524 1		CCS TJP
0024	REF	1		16,3665	4 3615 1		CS -100MS 0.1 AT 1
0025				16,3666	1 3670 1		TCF +2
0026	REF	2	LAST 1470	16,3667	3 3615 0		CA -100MS
0027				16,3670	0 0006 1	LOOPRATE	EXTEND
0028	REF	8	LAST 1470	16,3671	5 1744 1		INDEX DAPTEMP6
0029	REF	3	LAST 1437	16,3672	7 1521 1		MP NO.PJETS
0030	REF	288	LAST 1464	16,3673	3 0001 0		CA L
0031	REF	9	LAST 1470	16,3674	51'744 1		INDEX DAPTEMP6
00311	REF	29	LAST 1451	16,3675	55'737 1		TS DAPTEMP1 SIGNED TORQUE AT 1 JET-SEC FOR FILTER
00312				16,3676	0 0006 1		EXTEND
00313	REF	51	LAST 1410	16,3677	7 4742 0		MP BIT10 RESCALE TO 32; ONE BIT ABOUT 2 JET-MSEC
00314				16,3700	0 0006 1		EXTEND
00315	REF	1		16,3701	6 3732 1		BZMF NEGTORE
00316	REF	417	LAST 1470	16,3702	50 002 0	STORTORK	INDEX Q INCREMENT DOWNLIST REGISTER.
00317	REF	7	LAST 133	16,3703	27'513 0		ADS DOWNTORK NOTE: NOT INITIALIZED; OVERFLOWS.
0032	REF	10	LAST 1470	16,3704	11'744 0		CCS DAPTEMP6
0033	REF	2	LAST 1428	16,3705	1 3642 0		TCF RATELOOP +1
0034	REF	1		16,3706	1 3716 0		TCF ROTORQUE
0035	REF	303	LAST 1463	16,3707	3 4755 1	SMALLTJU	CA ZERO
0036	REF	11	LAST 1470	16,3710	51'744 1		INDEX DAPTEMP6
0037	REF	18	LAST 1470	16,3711	57'524 0		XCH TJP
0038				16,3712	0 0006 1		EXTEND

L KALMAN FILTER

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0039	REF	4	LAST 1099	16,3713	7 4760 0	MP	ELEVEN	10.24 PLUS
0040	REF	289	LAST 1470	16,3714	3 0001 0	CA	L	
0041	REF	2	LAST 1470	16,3715	1 3670 1	TCF	LOOPRATE	
0042	REF	11	LAST 1451	16,3716	3 1740 0	CA	DAPTEMP2	
0043	REF	7	LAST 1447	16,3717	6 1741 1	AD	DAPTEMP3	
0044				16,3720	0 0006 1	EXTEND		
0045	REF	1		16,3721	7 1532 0	MP	1JACCR	
0046	REF	3	LAST 1427	16,3722	55 1747 0	TS	JETRATER	
0047	REF	8	LAST 1471	16,3723	4 1741 0	CS	DAPTEMP3	
0048	REF	12	LAST 1471	16,3724	6 1740 0	AD	DAPTEMP2	
0049				16,3725	0 0006 1	EXTEND		
0050	REF	1		16,3726	7 1531 0	MP	1JACCQ	
0051	REF	3	LAST 1426	16,3727	55 1746 1	TS	JETRATER	
0052	REF	1		16,3730	1 2316 0	TCF	BACKP	
0053				16,3731	77537 0	DEC	-160	
0054								
0055				16,3732	4 0000 0	COM		
0056	REF	418	LAST 1470	16,3733	24 002 0	INCR	Q	
0057	REF	1		16,3734	1 3702 0	TCF	STORTORK	

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0001 21,3077 BANK 21
 0002 REF 1 E6,1450 EBANK= QDIFF
 0003 REF 1 21,2000 SETLOC DAPS4
 0004 21,3077 BANK

00045 REF 1 COUNT* \$\$/DAPGT

R0005 CONTROL REACHES THIS POINT UNDER EITHER OF THE FOLLOWING TWO CONDITIONS ONCE THE DESCENT ENGINE AND THE DIGITAL
 R0007 AUTOPILOT ARE BOTH ON:

R0008 A) THE TRIM GIMBAL CONTROL LAW WAS ON DURING THE PREVIOUS Q,R-AXIS TIMES INTERRUPT (OR THE DAPIDLER
 R0010 INITIALIZATION WAS SET FOR TRIM GIMBAL CONTROL AND THIS IS THE FIRST PASS). OR
 R0012 B) THE Q,R-AXES RCS AUTOPILOT DETERMINED THAT THE VEHICLE WAS ENTERING (OR HAD JUST ENTERED) A COAST
 R0014 ZONE WITH A SMALL OFFSET ANGULAR ACCELERATION.

R0015 GTS IS THE ENTRY TO THE GIMBAL TRIM SYSTEM FOR CONTROLLING ATTITUDE ERRORS AND RATES AS WELL AS ACCELERATIONS.

0018 REF 14 LAST 1468 21,3077 3 7747 1 GTS CAF NEGONE MAKE THE NEXT PASS THROUGH THE DAP BE
 0019 REF 6 LAST 1452 21,3100 55'632 0 TS COTROLER THROUGH RCS CONTROL,
 0020 REF 47 LAST 1469 21,3101 3 4751 0 CAF FOUR AND ENSURE THAT IT IS NOT A SKIP.
 0021 REF 9 LAST 1455 21,3102 55'535 1 TS SKIPU
 0022 REF 3 LAST 1455 21,3103 55'536 1 TS SKIPV

00225 REF 103 LAST 1470 21,3104 3 4752 0 CAF TWO
 0023 REF 5 LAST 1450 21,3105 55'633 1 TS INGTS SET INDICATOR OF GTS CONTROL POSITIVE.
 0024 REF 7 LAST 1429 21,3106 55'632 0 TS QGIMTIMR SET TIMERS TO 200 MSEC TO AVOID BOTH
 0025 REF 5 LAST 1429 21,3107 55'634 0 TS RGIMTIMR RUNAWAY AND INTERFERENCE BY NULLING.

R0026 THE DRIVE SETTING ALGORITHM

R0027 DEL = SGN(OMEGA + ALPHA*ABS(ALPHA)/(2*K))

R0028 2 1/2 2 3/2
 R0030 NEGUSUM = ERROR*K + ALPHA*(DEL*OMEGA + ALPHA/(3*K)) + DEL*K (DEL*OMEGA + ALPHA/(2*K))

R0032 DRIVE = -SGN(NEGUSUM)

0033 REF 27 LAST 1305 21,3110 3 0021 1 CA SR SAVE THE SR. SHIFT IT LEFT TO CORRECT
 0034 REF 522 LAST 1468 21,3111 6 0000 1 AD A FOR THE RIGHT SHIFT DUE TO EDITING.
 0035 REF 1 21,3112 55'505 1 TS SAVESR

0036 REF 104 LAST 1472 21,3113 3 4752 0 GTSGO+DN CAF TWO SET INDEXER FOR R-AXIS CALCULATIONS.
 0037 REF 1 21,3114 1 3116 0 TCF GOQTRIM +1

0038 REF 304 LAST 1470 21,3115 3 4755 1 GOQTRIM CAF ZERO SET INDEXER FOR Q-AXIS CALCULATIONS
 0039 REF 1 21,3116 55'750 0 TS QRCNTR

0040 REF 2 LAST 1472 21,3117 51'750 1 INDEX QRCNTR AOS SCALED AT PI/2
 0041 REF 23 LAST 1441 21,3120 3 1537 1 CA AOSQ
 0042 21,3121 0 0006 1 EXTEND
 0043 REF 54 LAST 1444 21,3122 7 4752 1 MP BIT2 RESCALE AOS TO PI/4

ROYAL + BUSINESS FORMS INCORPORATED
nation new hampshire 14116C

0057
0058 REF 5 LAST 1473
0059 REF 1
0060 REF 291 LAST 1473
0061
0062

21,3167 0 0000 1
21,3170 11*741 0
21,3171 57*746 0
21,3172 3 0001 0
21,3173 11 007 0
21,3174 0 0000 1

EXTEND
OV
ACH
CA
EXCH
EXTEND

HIGH ORDER OF COUNTER.
SHIFT OF THE REMAINDER.
ZERO LOW-ORDER DIVIDEND.

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0086	REF	6	LAST 1473	21,3175	11'741 0	DV	KCENTRAL	
0087	REF	2	LAST 1473	21,3176	57'747 1	XCH	A2CNTRAL +1	QUOTIENT STORED AT 16*PI , D.P.
0088	REF	1		21,3177	1 3203 1	TCF	HAVEQUOT	
0089	REF	40	LAST 1422	21,3200	3 4733 1	HUGEQUOT CA	POS MAX	
0090	REF	292	LAST 1473	21,3201	54 001 1	TS	L	
0091	REF	3	LAST 1474	21,3202	53'747 0	DXCH	A2CNTRAL	LIMITED QUOTIENT STORED AT 16*PI, D.P.
0092	REF	2	LAST 1473	21,3203	3 1743 0	HAVEQUOT CA	WCENTRAL	
0093				21,3204	0 0006 1	EXTEND		
0094	REF	36	LAST 1446	21,3205	7 4743 1	MP	BIT9	RESCALE OMEGA AT 16*PI IN D.P.
0095	REF	1		21,3206	53'743 1	DXCH	K2CNTRAL	LOWER WORD OVERLAYS OMEGA IN WCENTRAL
0096				21,3207	0 0006 1	EXTEND		
0097	REF	2	LAST 1474	21,3210	3 1743 0	DCA	K2CNTRAL	
0098	REF	1		21,3211	53'752 1	DXCH	FUNCTION	
0099	REF	3	LAST 1473	21,3212	3 1744 1	CA	ACENTRAL	GET ALPHA*ABS(ALPHA)/(2*K)
0100				21,3213	0 0006 1	EXTEND		
0101				21,3214	6 3220 1	BZMF	+4	
0102				21,3215	0 0006 1	EXTEND		
0103	REF	4	LAST 1474	21,3216	3 1747 1	DCA	A2CNTRAL	
0104				21,3217	1 3222 1	TCF	+3	
0105				21,3220	0 0006 1	EXTEND		
0106	REF	5	LAST 1474	21,3221	4 1747 0	DCS	A2CNTRAL	
0107	REF	2	LAST 1474	21,3222	21'752 1	DAS	FUNCTION	OMEGA + ALPHA*ABS(ALPHA)/(2*K) AT 16*PI
0108	REF	3	LAST 1474	21,3223	11'751 1	CCS	FUNCTION	DEL = +1 FOR FUNCT1 GREATER THAN ZERO.
0109	REF	1		21,3224	1 3230 1	TCF	POSFNCT1	OTHERWISE DEL = -1
0110				21,3225	1 3227 1	TCF	+2	
0111	REF	1		21,3226	1 3232 0	TCF	NEGFNCT1	
0112	REF	4	LAST 1474	21,3227	11'752 1	CCS	FUNCTION +1	USE LOW ORDER WORD SINCE HIGH IS ZERO
0113	REF	63	LAST 1461	21,3230	3 4753 1	POSFNCT1 CAF	BIT1	
0114				21,3231	1 3233 1	TCF	+2	
0115	REF	64	LAST 1474	21,3232	4 4753 0	NEGFNCT1 CS	BIT1	
0116	REF	1		21,3233	55'745 1	TS	DEL	
0117	REF	2	LAST 1474	21,3234	11'745 1	CCS	DEL	REPLACE OMEGA BY DEL*OMEGA
0118	REF	1		21,3235	1 3247 1	TCF	FUNCT2	POSITIVE DEL VALUE. PROCEED.
0119	REF	1		21,3236	1 3240 0	TCF	DEFUNCT	
0120	REF	1		21,3237	1 3244 1	TCF	NEGFNCT2	
0121	REF	3	LAST 1474	21,3240	55'742 0	DEFUNCT TS	K2CNTRAL	
0122	REF	4	LAST 1474	21,3241	55'743 1	TS	K2CNTRAL +1	
0123	REF	2	LAST 1474	21,3242	1 3247 1	TCF	FUNCT2	

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0124				21,3243	65252 1	NEG1/3	DEC	- .33333	
0125				21,3244	0 0006 1	NEGFUNCT2	EXTEND		
0126	REF	5	LAST 1474	21,3245	4 1743 1		DCA	K2CNTRAL	
0127	REF	6	LAST 1475	21,3246	53 1743 1		DXCH	K2CNTRAL	
0128				21,3247	0 0006 1	FUNCT2	EXTEND		
0129	REF	6	LAST 1474	21,3250	3 1747 1		DCA	A2CNTRAL	
0130	REF	7	LAST 1475	21,3251	21 1743 1		DAS	K2CNTRAL	DEL*OMEGA + ALPHA(2)/(2*K) AT 16*PI,D.P.
0131	REF	7	LAST 1475	21,3252	3 1746 0	FUNCT3	CA	A2CNTRAL	
0132				21,3253	0 0006 1		EXTEND		
0133	REF	1		21,3254	7 3243 0		MP	NEG1/3	
0134	REF	8	LAST 1475	21,3255	53 1747 0		DXCH	A2CNTRAL	
0135	REF	293	LAST 1474	21,3256	3 0001 0		CA	L	
0136				21,3257	0 0006 1		EXTEND		
0137	REF	2	LAST 1475	21,3260	7 3243 0		MP	NEG1/3	
0138	REF	9	LAST 1475	21,3261	27 1747 0		ADS	A2CNTRAL +1	
0139	REF	294	LAST 1475	21,3262	54 001 1		TS	L	
0140				21,3263	1 3265 1		TCF	+2	A2CNTRAL NOW CONTAINS -ALPHA(2)/(6*K),
0141	REF	10	LAST 1475	21,3264	27 1746 1		ADS	A2CNTRAL	SCALED AT 16*PI, IN D.P.
0142				21,3265	0 0006 1		EXTEND		
0143	REF	8	LAST 1475	21,3266	3 1743 0		DCA	K2CNTRAL	DEL*OMEGA + ALPHA(2)/(3*K) IN A2CNTRAL,
0144	REF	11	LAST 1475	21,3267	21 1747 0		DAS	A2CNTRAL	SCALED AT 16*PI, D.P.
0145	REF	12	LAST 1475	21,3270	3 1746 0		CA	A2CNTRAL	
0146				21,3271	0 0006 1		EXTEND		
0147	REF	4	LAST 1474	21,3272	7 1744 0		MP	ACENTRAL	
0148	REF	4	LAST 1473	21,3273	21 1740 1		DAS	K2THETA	
0149	REF	13	LAST 1475	21,3274	3 1747 1		CA	A2CNTRAL +1	
0150				21,3275	0 0006 1		EXTEND		
0151	REF	5	LAST 1475	21,3276	7 1744 0		MP	ACENTRAL	ACENTRAL MAY NOW BE OVERLAID.
0152	REF	5	LAST 1475	21,3277	27 1740 1		ADS	K2THETA +1	
0153	REF	295	LAST 1475	21,3300	54 001 1		TS	L	
0154				21,3301	1 3303 0		TCF	+2	TWO TERMS OF NEGUSUM ACCUMULATED, SO FAR
0155	REF	6	LAST 1475	21,3302	27 1737 1		ADS	K2THETA	SCALED AT 4*PI(2), IN D.P.
0156	REF	9	LAST 1475	21,3303	3 1742 1	GETROOT	CA	K2CNTRAL	K*(DEL*OMEGA + ALPHA(2)/(2*K)) IS THE
0157				21,3304	0 0006 1		EXTEND		TERM FOR WHICH A SQUARE ROOT IS NEEDED.
0158	REF	7	LAST 1474	21,3305	7 1741 0		MP	KCENTRAL	K AT PI/2(8)
0159	REF	5	LAST 1474	21,3306	53 1752 1		DXCH	FUNCTION	
0160	REF	10	LAST 1475	21,3307	3 1743 0		CA	K2CNTRAL +1	
0161				21,3310	0 0006 1		EXTEND		
0162	REF	8	LAST 1475	21,3311	7 1741 0		MP	KCENTRAL	
0163	REF	6	LAST 1475	21,3312	27 1752 1		ADS	FUNCTION +1	
0164	REF	296	LAST 1475	21,3313	54 001 1		TS	L	
0165				21,3314	1 3316 1		TCF	+2	
0166	REF	7	LAST 1475	21,3315	27 1751 1		ADS	FUNCTION	DESIRED TERM IN FUNCTION, AT PI(2)/16

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0167	REF	3	LAST 1474	21,3316	11'745 1	CCS	DEL
0168	REF	1		21,3317	1 3524 0	TCF	RSTOFGTS
0169	REF	1		21,3320	1 3566 0	TCF	NEGUSUM
0170	REF	1		21,3321	1 3323 1	TCF	NEGATE
0171	REF	2	LAST 1476	21,3322	1 3566 0	TCF	NEGUSUM

0172				21,3323	0 0006 1	NEGATE	EXTEND
0173	REF	11	LAST 1475	21,3324	4 1743 1	DCS	K2CNTRAL
0174	REF	12	LAST 1476	21,3325	53'743 1	DXCH	K2CNTRAL
0175	REF	2	LAST 1476	21,3326	1 3524 0	TCF	RSTOFGTS

0176				16,3735		BANK	16
0177	REF	5	LAST 1428	E6.1501		EBANK=	NEGUQ
0178	REF	4	LAST 1470	16,2000		SETLOC	DAPS1
0179				16,3735		BANK	

R0180 THE WRCHN12 SUBROUTINE SETS BITS 9,10,11,12 OF CHANNEL 12 ON THE BASIS OF THE CONTENTS OF NEGUQ,NEGUR WHICH ARE
R0182 THE NEGATIVES OF THE DESIRED ACCELERATION CHANGES. ACOT+C12 SETS Q(R)ACCDOT TO REFLECT THE NEW DRIVES.

R0184 WARNING: ACOT+C12 AND WRCHN12 MUST BE CALLED WITH INTERRUPT INHIBITED.

0185				16,3735	07400 1	BGIM	OCTAL 07400
0186	REF	8	LAST 1300	0066		CHNL12	EQUALS ITEM6
0187	REF	6	LAST 1476	16,3736	4 1501 0	ACOT+C12	CS NEGUQ
0188				16,3737	0 0006 1	EXTEND	GIMBAL DRIVE REQUESTS.
0189	REF	4	LAST 132	16,3740	7 1507 0	MP	ACCDOTQ
0190	REF	4	LAST 1428	16,3741	23'510 1	LXCH	QACCDOT
0191	REF	3	LAST 1429	16,3742	4 1503 1	CS	NEGUR
0192				16,3743	0 0006 1	EXTEND	
0193	REF	1		16,3744	7 1511 1	MP	ACCDOTR
0194	REF	4	LAST 1429	16,3745	23'512 0	LXCH	RACCDOT
0195	REF	7	LAST 1476	16,3746	11'501 0	CCS	NEGUQ
0196	REF	52	LAST 1470	16,3747	3 4742 1	CAF	BIT10
0197				16,3750	1 3752 0	TCF	+2
0198	REF	37	LAST 1474	16,3751	3 4743 0	CAF	BIT9
0199	REF	1		16,3752	54 066 0	TS	CHNL12

0200	REF	4	LAST 1476	16,3753	11'503 1	CCS	NEGUR
0201	REF	42	LAST 1468	16,3754	3 4740 0	CAF	BIT12
0202				16,3755	1 3757 0	TCF	+2
0203	REF	33	LAST 1469	16,3756	3 4741 1	CAF	BIT11
0204	REF	2	LAST 1476	16,3757	26 066 0	ADS	CHNL12 (STORED RESULT NOT USED AT PRESENT)

0205	REF	1		16,3760	4 3735 1	CS	BGIM
0206				16,3761	0 0006 1	EXTEND	
0207	REF	71	LAST 1429	16,3762	02 012 0	RAND	CHAN12
0208	REF	3	LAST 1476	16,3763	6 0066 1	AD	CHNL12
0209				16,3764	0 0006 1	EXTEND	
0210	REF	72	LAST 1476	16,3765	01 012 0	WRITE	CHAN12

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00211

0212 REF 2 LAST 1428 16,3766 4 4747 0
0213 REF 52 LAST 1448 16,3767 7 1273 1
0214 REF 53 LAST 1477 16,3770 55*273 1

CS CALLGMBL
MASK RCSFLAGS
TS RCSFLAGS

TURN OFF REQUEST FOR ACDT+C12 EXECUTION.

0215 REF 419 LAST 1471 16,3771 0 0002 0

TC Q

RETURN TO CALLER.

0216 21,3327
0217 REF 3 LAST 1473 E6,1450
0218 REF 2 LAST 1472 21,2000
0219 21,3327

BANK 21
EBANK= QDIFF
SETLOC DAPS4
BANK

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PG220 SUBROUTINE TIMEGMBL: MOD 0, OCTOBER 1967, CRAIG WORK

R0221 TIMEGMBL COMPUTES THE DRIVE TIME NEEDED FOR THE TRIM GIMBAL TO POSITION THE DESCENT ENGINE NOZZLE SO AS TO NULL
 R0223 THE OFFSET ANGULAR ACCELERATION ABOUT THE Q (OR R) AXIS. INSTEAD OF USING AOSQ(R), TIMEGMBL USES .4*AOSQ(R),
 R0225 SCALED AT $\pi/8$. FOR EACH AXIS, THE DRIVE TIME IS COMPUTED AS $\text{ABS}(\text{ALPHA}/\text{ACCDOT})$. A ZERO
 R0227 ALPHA OR ACCDOT OR A ZERO QUOTIENT TURNS OFF THE GIMBAL DRIVE IMMEDIATELY. OTHERWISE, THE GIMBAL IS TURNED ON
 R0229 DRIVING IN THE CORRECT DIRECTION. THE Q(R)GIMTIMR IS SET TO TERMINATE THE DRIVE AND Q(R)ACCDOT
 R0231 IS STORED TO REFLECT THE NEW ACCELERATION DERIVATIVE. NEGUQ(R) WILL CONTAIN +1,+0,-1 FOR A Q(R)ACCDOT VALUE
 R0233 WHICH IS NEGATIVE, ZERO, OR POSITIVE.

R0234 INPUTS: AOSQ,AOSR, SCALED AT $\pi/2$, AND ACCDOTQ, ACCDOTR AT $\pi/2(7)$. $\pi/2(7)$.

R0236 OUTPUTS: NEW GIMBAL DRIVE BITS IN CHANNEL 12, NEGUQ, NEGUR, QACCDOT AND RACCDOT, THE LAST SCALED AT $\pi/2(7)$.
 R0238 Q(R)GIMTIMR WILL BE SET TO TIME AND TERMINATE GIMBAL DRIVE(S)

R0239 DEBRIS: A,L,Q, ITEMPS 2,3,6, RUPTREG2 AND ACDT+C12 DEBRIS.

R0240 EXITS: VIA TC Q.

R0241 ALARMS, ABORTS, : NONE

R0242 SUBROUTINES: ACDT+C12, IBNKCALL

R0243 WARNING: THIS SUBROUTINE WRITES INTO CHANNEL 12 AND USES THE ITEMPS. THEREFORE IT MAY ONLY BE CALLED WITH
 R0245 INTERRUPT INHIBITED.

R0246 ERASABLE STORAGE CONFIGURATION (NEEDED BY THE INDEXING METHODS):

A0247	NEGUQ	ERASE	+2	NEGATIVE OF Q-AXIS GIMBAL DRIVE
A0248	(SPWORD)	EQUALS	NEGUQ +1	ANY S.P. ERASABLE NUMBER, NOW THRSTCMD
A0249	NEGUR	EQUALS	NEGJO +2	NEGATIVE OF R-AXIS GIMBAL DRIVE

A0250	ACCDOTQ	ERASE	+2	Q-JERK TERM SCALED AT $\pi/2(7)$ RAD/SEC(3)
A0251	(SPWORD)	EQUALS	ACCDOTQ +1	ANY S.P. ERASABLE NUMBER NOW QACCDOT
A0252	ACCDOTR	EQUALS	ACCDOTQ +2	R-JERK TERM SCALED AT $\pi/2(7)$ RAD/SEC(3)
A0253				ACCDOTQ,ACCDOTR ARE MAGNITUDES.
A0254	AOSQ	ERASE	+4	Q-AXIS ACCL,D.P. AT $\pi/2$ R/SEC(2)
A0255	AOSR	EQUALS	AOSQ +2	R-AXIS ACCELERATION SCALED AT $\pi/2$ R/S2

0256	REF	9	LAST 1476	0066	QRNDXER	EQUALS	ITEMP6	
0257				21,3327	23146 0	OCT23146	OCTAL	23146
0258	REF	30	LAST 1375	0063	NZACCDOT	EQUALS	ITEMP3	DECIMAL .6

0259	REF	174	LAST 1468	21,3330	3 4753 1	TIMEGMBL	CAF	ONE	INITIALIZE ALLOWGTS.
0260	REF	3	LAST 1449	21,3331	55'502 0		TS	ALLOWGTS	

0261	REF	105	LAST 1472	21,3332	3 4752 0		CAF	TWO	SET UP LOOP FOR R AXIS.
0262	REF	420	LAST 1477	21,3333	22 002 0		LXCH	Q	SAVE RETURN ADDRESS.
0263	REF	25	LAST 1409	21,3334	22 071 1		LXCH	RUPTREG2	

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0264				21,3335	1 3337 1	TCF	+2	
0265	REF 305	LAST 1472		21,3336	3 4755 1	CAL	ZERO	NOW DO THE Q-AXIS
0266	REF 1			21,3337	54 066 0	TS	QRNDXER	
0267	REF 2	LAST 1479		21,3340	50 066 1	INDEX	QRNDXER	
0268	REF 5	LAST 1476		21,3341	3 1507 1	CA	ACCDOTQ	ACCDOT IS PRESUMED TO BE AT PI/2(7).
0269				21,3342	0 0006 1	EXTEND		
0270	REF 1			21,3343	6 3413 1	BZMF	TG OFF NOW	IS ACCDOT LESS THAN OR EQUAL TO 0?
0271	REF 1			21,3344	54 063 0	TS	NZACCDOT	NO. STORE NON-ZERO, POSITIVE ACCDOT.
0272	REF 3	LAST 1479		21,3345	50 066 1	ALPHATRY INDEX	QRNDXER	
0273	REF 24	LAST 1472		21,3346	4 1537 0	CS	AOSQ	
0274				21,3347	0 0006 1	EXTEND		
0275	REF 2	LAST 1479		21,3350	1 3413 0	BZF	TG OFF NOW	IS ALPHA ZERO?
0276	REF 421	LAST 1478		21,3351	54 002 1	TS	0	SAVE A COPY OF -AOS.
0277				21,3352	0 0006 1	EXTEND		NO. RESCALE FOR TIMEGMBL USE.
0278	REF 1			21,3353	7 3327 0	MP	OCT23146	OCTAL 23146 IS DECIMAL .6
0279	REF 422	LAST 1479		21,3354	6 0002 0	AD	0	-1.6*AOS AT PI/2 = -.4*AOS AT PI/8.
0280	REF 297	LAST 1475		21,3355	54 001 1	TS	L	WAS THERE OVERFLOW?
0281	REF 1			21,3356	1 3363 0	TCF	SETNEGU	NO. COMPUTE DRIVE TIME.
0282	REF 526	LAST 1473		21,3357	4 0000 0	CS	A	RECOVER -SGN(AOS) IN THE A REGISTER.
0283	REF 4	LAST 1479		21,3360	50 066 1	INDEX	QRNDXER	YES. START DRIVE WITHOUT WAITLIST.
0284	REF 8	LAST 1476		21,3361	57 501 1	XCH	NEGUQ	
0285	REF 1			21,3362	1 3417 1	TCF	NOTALLOW	KNOCK DOWN THE ALLOWGTS FLAG.
0286				21,3363	0 0006 1	SETNEGU	EXTEND	
0287	REF 1			21,3364	6 3371 1	BZMF	POSALPH	
0288				21,3365	4 0000 0	COM		
0289	REF 27	LAST 1376		21,3366	54 062 1	TS	ITEMP2	STORE -ABS(.4*AOS) SCALED AT PI/8.
0290	REF 65	LAST 1474		21,3367	4 4753 0	CS	BIT1	
0291	REF 2	LAST 1479		21,3370	1 3373 1	TCF	POSALPH +2	
0292	REF 28	LAST 1479		21,3371	54 062 1	POSALPH TS	ITEMP2	STORE -ABS(.4*AOS) SCALED AT PI/8.
0293	REF 66	LAST 1479		21,3372	3 4753 1	CA	BIT1	
0294	REF 5	LAST 1479		21,3373	50 066 1	+2 INDEX	QRNDXER	SGN(AOS) INTO NEGU
0295	REF 9	LAST 1479		21,3374	55 501 0	TS	NEGUQ	STORE SGN(ALPHA) AS NEGU
0296	REF 2	LAST 1479		21,3375	3 0063 1	CA	NZACCDOT	
0297				21,3376	0 0006 1	EXTEND		
0298	REF 43	LAST 1476		21,3377	7 4740 1	MP	BIT2	2*ACCDOT, SCALED AT PI/8.
0299	REF 29	LAST 1479		21,3400	6 0062 0	AD	ITEMP2	-ABS(ALPHA) + 2*ACCDOT, AT PI/8.
0300				21,3401	0 0006 1	EXTEND		
0301	REF 2	LAST 1479		21,3402	6 3417 0	BZMF	NOTALLOW	IS DRIVE TIME MORE THAN TWO SECONDS?
0302	REF 30	LAST 1479		21,3403	4 0062 1	CS	ITEMP2	NO. COMPUTE DRIVE TIME.
0303				21,3404	0 0006 1	EXTEND		ABS(ALPHA) AT PI/8.
0304	REF 1			21,3405	7 3440 0	MP	OCT00240	DECIMAL 10/1024
0305				21,3406	0 0006 1	EXTEND		QUOTIENT IS DRIVE TIME AT WAITLIST.
0306	REF 3	LAST 1479		21,3407	10 063 0	OV	NZACCDOT	ABS(ALPHA)/ACCDOT AT 2(14)/100

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0307				21,3410	0 0006 1	EXTEND		
0308	REF	3	LAST 1479	21,3411	1 3413 0	BZF	TGOFFNOW	DRIVE TIME MUST BE GREATER THAN ZERO.
0309	REF	1		21,3412	1 3425 0	TCF	DRIVEON	
0310	REF	306	LAST 1479	21,3413	3 4755 1	TGOFFNOW	CAF	ZERO
0311	REF	6	LAST 1479	21,3414	50 066 1	INDEX	QRNDXER	TURN OFF GIMBAL NOW.
0312	REF	10	LAST 1479	21,3415	55 501 0	TS	NEGUQ	
0313	REF	1		21,3416	1 3427 1	TCF	DONEYET	
0314	REF	4	LAST 829	21,3417	3 6010 0	NOTALLOW	CAF	DCTBI
0315	REF	7	LAST 1480	21,3420	50 066 1	INDEX	QRNDXER	
0316	REF	8	LAST 1472	21,3421	55 632 0	TS	QGIMTIMR	
0317	REF	307	LAST 1480	21,3422	3 4755 1	CAF	ZERO	DRIVE TIME IS MORE THAN 2 SECONDS, SO
0318	REF	4	LAST 1478	21,3423	55 502 0	TS	ALLOWGTS	DO NOT PERMIT FURTHER GTS ATTITUDE-RATE
AC319								CONTROL UNTIL AOSTASK APPROVES.
0320	REF	2	LAST 1480	21,3424	1 3427 1	TCF	DONEYET	NO WAITLIST CALL IS MADE.
0321	REF	8	LAST 1480	21,3425	50 066 1	DRIVEON	INDEX	QRNDXER
0322	REF	9	LAST 1480	21,3426	55 632 0	TS	QGIMTIMR	CHOOSE Q OR R AXIS.
0323	REF	9	LAST 1480	21,3427	10 066 0	DONEYET	CCS	QRNDXER
0324	REF	1		21,3430	1 3336 0	TCF	TIMQGMBL	
0325	REF	18	LAST 1362	21,3431	52 073 1	DXCH	RUPTREG3	PROTECT IBNKCALL ERASABLES. ACOT+C12
0326	REF	31	LAST 1479	21,3432	52 063 0	DXCH	ITEMP2	LEAVES ITEMPS2,3 ALONE.
0327	REF	61	LAST 1452	21,3433	0 4674 0	TC	IBNKCALL	TURN OF CHANNEL BITS, SET Q(R)ACCDOTS.
0328	REF	2	LAST 1428	21,3434	35736 0	CADR	ACOT+C12	
0329	REF	32	LAST 1480	21,3435	52 063 0	DXCH	ITEMP2	RESTORE ERASABLES FOR IBNKCALL.
0330	REF	19	LAST 1480	21,3436	52 073 1	DXCH	RUPTREG3	
0331	REF	26	LAST 1478	21,3437	0 0071 1	TC	RUPTREG2	RETURN TO CALLER.
0332				21,3440	00240 1	OCT00240	OCTAL	00240
								DECIMAL 10/1024

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R0333 THE FOLLOWING SECTION IS A CONTINUATION OF THE TRIM GIMBAL CONTROL FROM THE LAST GTS ENTRY. THE QUANTITY NEGUSUM
R0335 IS COMPUTED FOR EACH AXIS (Q,R). $.707 * \text{DEL} * \text{FUNCTION}(3/2) + K2\text{THETA} = \text{NEGUSUM}$. NEW DRIVES ARE ENTERED TO CH 12.

R0337 THE SUBROUTINE GTSORT ACCEPTS A DOUBLE PRECISION VALUE IN FUNCTION. FUNCTION +1 AND RETURNS A SINGLE-PRECISION
R0339 SQUARE ROOT OF THE FOURTEEN MOST SIGNIFICANT BITS OF THE ARGUMENT. ALSO, THE CELL SHFTFLAG CONTAINS A BINARY
R0341 EXPONENT S, SUCH THAT THE SQUARE ROOT (RETURNED IN THE A REGISTER) MUST BE SHIFTED RIGHT (MULTIPLIED BY 2 TO THE
R0343 POWER (-S)) IN ORDER TO BE THE TRUE SQUARE ROOT OF THE FOURTEEN MOST SIGNIFICANT BITS OF FUNCTION, FUNCTION +1.
R0345 SQUARE ROOT ERROR IS NOT MORE THAN 2 IN THE 14TH SIGNIFICANT BIT. CELLS CLOBBED ARE A.L,SHFTFLAG,ININDEX,
R0347 HALFARG,SCRATCH,SR,FUNCTION, FUNCTION +1. GTSORT IS CALLED BY TC GTSORT AND RETURNS VIA TC Q OR TC FUNCTION +1.
R0349 ZERO OR NEGATIVE ARGUMENTS YIELD ZERO FOR SQUARE ROOTS.

0350	REF	8	LAST 1475	21,3441	11'751 1	GTSORT	CCS	FUNCTION	
0351	REF	1		21,3442	1 3460 1		TCF	GOODARG	FUNCTION IS POSITIVE. TAKE SQUARE ROOT.
0352				21,3443	1 3445 0		TCF	+2	HIGH ORDER WORD IS ZERO. TRY THE LOWER.
0353	REF	1		21,3444	1 3451 0		TCF	ZEROUT	NEGATIVE. USE ZERO FOR 1/2 POWER.
0354	REF	9	LAST 1481	21,3445	3 1752 0		CA	FUNCTION +1	
0355				21,3446	0 0006 1		EXTEND		
0356	REF	2	LAST 1481	21,3447	6 3451 1		BZMF	ZEROUT	
0357	REF	1		21,3450	1 3454 0		TCF	ZEROHIGH	PROCEED.
0358	REF	308	LAST 1480	21,3451	3 4755 1	ZEROUT	CA	ZERO	
0359	REF	1		21,3452	55'741 0		TS	SHFTFLAG	
0360	REF	423	LAST 1479	21,3453	0 0002 0		TC	Q	
0361	REF	10	LAST 1481	21,3454	57'751 0	ZEROHIGH	XCH	FUNCTION	14 MOST SIGNIFICANT BITS ARE IN THE
0362	REF	11	LAST 1481	21,3455	57'752 0		XCH	FUNCTION +1	LOWER WORD. EXCHANGE THEM.
0363	REF	24	LAST 1374	21,3456	3 4757 0		CA	SEVEN	
0364	REF	2	LAST 1481	21,3457	1 3461 0		TCF	GOODARG +1	
0365	REF	309	LAST 1481	21,3460	3 4755 1	GOODARG	CA	ZERO	
0366	REF	2	LAST 1481	21,3461	55'741 0		TS	SHFTFLAG	
0367	REF	1		21,3462	3 5751 1		CA	TWELVE	INITIALIZE THE SCALING LOOP.
0368	REF	1		21,3463	55'744 0		TS	ININDEX	
0369	REF	1		21,3464	1 3473 0		TCF	SCALLOOP	
0370	REF	12	LAST 1481	21,3465	3 1751 0	SCALSTRT	CA	FUNCTION	
0371	REF	1		21,3466	1 3507 1		TCF	SCALDONE	
0372	REF	10	LAST 1466	21,3467	3 7746 0	MULBUSH	CA	NEG2	IF ARG IS NOT LESS THAN 1/4, INDEX IS
0373	REF	2	LAST 1481	21,3470	27'744 0		ADS	ININDEX	ZERO, INDICATING NO SHIFT NEEDED.
0374				21,3471	0 0006 1		EXTEND		BRANCH IF ARG IS NOT LESS THAN 1/4.
0375	REF	1		21,3472	6 3465 0		BZMF	SCALSTRT	OTHERWISE COMPARE ARG WITH A REFERENCE
A0376									WHICH IS 4 TIMES LARGER THAN THE LAST.
0377	REF	13	LAST 1481	21,3473	4 1751 1	SCALLOOP	CS	FUNCTION	
0378	REF	3	LAST 1481	21,3474	51'744 1		INDEX	ININDEX	
0379	REF	52	LAST 1456	21,3475	6 4735 1		AD	BIT15	REFERENCE MAGNITUDE LESS OR EQUAL TO 1/4
0380				21,3476	0 0006 1		EXTEND		
0381	REF	1		21,3477	6 3467 1		BZMF	MULBUSH	IF ARG IS NOT LESS THAN REFERENCE, GO
A0382									AROUND THE MULBERRY BUSH ONCE MORE.

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0383 REF 4 LAST 1481 21,3500 51'744 1
0384 REF 53 LAST 1481 21,3501 3 4735 1
0385 REF 1 21,3502 57'747 1
0386 21,3503 0 0006 1
0387 REF 14 LAST 1481 21,3504 3 1752 0
0388 21,3505 0 0006 1
0389 REF 2 LAST 1482 21,3506 11'747 0
A0390

INDEX ININDEX
CA BIT15
XCH HALFARG
EXTEND
DCA FUNCTION
EXTEND
DV HALFARG

THIS IS THE SCALE MAGNITUDE
2*(-ININDEX) IS THE SHIFT DIVISOR.
RESCALE ARGUMENT.

ININDEX AND SHFTFLAG PRESERVE INFO FOR

RESCALING AFTER ROOT PROCESS.

A0391
0392 21,3507 0 0006 1 SCALDONE
0393 REF 15 LAST 1482 21,3510 23'752 0
0394 21,3511 0 0006 1
0395 REF 86 LAST 1473 21,3512 7 4736 0
0396 REF 3 LAST 1482 21,3513 55'747 0
0397 REF 58 LAST 1462 21,3514 7 4737 1
0398 REF 527 LAST 1479 21,3515 10 000 0
0399 REF 1 21,3516 3 3634 0
0400 REF 1 21,3517 6 3632 0

EXTEND
QXCH FUNCTION +1
EXTEND
MP BIT14
TS HALFARG
MASK BIT13
CCS A
CA OCT11276
AD R00THALF

SAVE Q FOR RETURN

INITIAL GUESS IS ROOT 1/2 OR POSMAX

0401 REF 1 21,3520 0 3636 1
0402 REF 2 LAST 1482 21,3521 0 3636 1
0403 REF 3 LAST 1482 21,3522 0 3636 1

TC ROOTCYCL
TC ROOTCYCL
TC ROOTCYCL

0404 REF 16 LAST 1482 21,3523 0 1752 0

TC FUNCTION +1

0405 *****

0407 REF 1 21,3524 0 3441 0 RSTOFGTS
0408 REF 13 LAST 1476 21,3525 57'742 1 PRODUCT
0409 21,3526 0 0006 1
0410 REF 14 LAST 1482 21,3527 7 1742 0
0411 REF 15 LAST 1482 21,3530 53'743 1
0412 21,3531 0 0006 1
0413 REF 298 LAST 1479 21,3532 7 0001 1
0414 REF 16 LAST 1432 21,3533 27'742 1
0415 REF 299 LAST 1482 21,3534 54 001 1
0416 21,3535 1 3537 1
0417 REF 17 LAST 1482 21,3536 27'742 0
A0418

TC GTSQRT
XCH K2CNTRAL
EXTEND
MP K2CNTRAL
DXCH K2CNTRAL
EXTEND
MP L
ADS K2CNTRAL +1
TS L
TCF +2
ADS K2CNTRAL

THE PRODUCT OF
 $\frac{1}{2}$ $\frac{2}{2}$ $\frac{1}{2}$
K * (DEL*OMEGA + ALPHA / (2*K))
AND
 $\frac{2}{2}$
DEL*(DEL*OMEGA + ALPHA / (2*K)) NOW IN
K2CNTRAL

0419 REF 5 LAST 1482 21,3537 3 1744 1 DOSHIFT
0420 21,3540 0 0006 1
0421 REF 87 LAST 1482 21,3541 7 4736 0
0422 REF 3 LAST 1481 21,3542 27'741 0
0423 21,3543 0 0006 1
0424 REF 1 21,3544 1 3563 0
0425 REF 4 LAST 1482 21,3545 51'741 1
0426 REF 54 LAST 1482 21,3546 3 4735 1

CA ININDEX
EXTEND
MP BIT14
ADS SHFTFLAG
EXTEND
BZF ADDITIN
INDEX SHFTFLAG
CA BIT15

MULTIPLY IN THE FACTOR 2(-S), RETURNED
BY THE GTSQRT SUBROUTINE

L TRIM GIMBAL CONTROL SYSTEM

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0427	REF 18	LAST 1482	21,3547	57'742 1	XCH	K2CNTRAL	
0428			21,3550	0 0006 1	EXTEND		
0429	REF 19	LAST 1483	21,3551	7 1742 0	MP	K2CNTRAL	
0430	REF 7	LAST 1475	21,3552	21'740 1	DAS	K2THETA	
0431	REF 20	LAST 1483	21,3553	57'742 1	XCH	K2CNTRAL	
0432			21,3554	0 0006 1	EXTEND		
0433	REF 21	LAST 1483	21,3555	7 1743 1	MP	K2CNTRAL +1	
0434	REF 8	LAST 1483	21,3556	27'740 1	ADS	K2THETA +1	
0435	REF 300	LAST 1482	21,3557	54 001 1	TS	L	
0436			21,3560	1 3562 1	TCF	+2	
0437	REF 9	LAST 1483	21,3561	27'737 1	ADS	K2THETA	
0438	REF 3	LAST 1476	21,3562	1 3566 0	TCF	NEGUSUM	
0439			21,3563	0 0006 1	ADDITIN	EXTEND	
0440	REF 22	LAST 1483	21,3564	3 1743 0	DCA	K2CNTRAL	
0441	REF 10	LAST 1483	21,3565	21'740 1	DAS	K2THETA	NOW ADD IN THE K2THETA TERM.
0442	REF 11	LAST 1483	21,3566	11'737 1	NEGUSUM	CCS	K2THETA
0443	REF 1		21,3567	1 3573 1	TCF	NEGDRIVE	TEST SIGN OF HIGH ORDER PART.
0444			21,3570	1 3572 0	TCF	+2	
0445	REF 2	LAST 1473	21,3571	1 3575 1	TCF	POSDRIVE	
0446	REF 12	LAST 1483	21,3572	11'740 1	CCS	K2THETA +1	SIGN TEST FOR LOW ORDER PART.
0447	REF 67	LAST 1479	21,3573	3 4753 1	NEGDRIVE	CA	BIT1
0448			21,3574	1 3576 1	TCF	+2	STOP GIMBAL DRIVE FOR A ZERO NEGUSUM.
0449	REF 68	LAST 1483	21,3575	4 4753 0	POSDRIVE	CS	BIT1
0450	REF 301	LAST 1483	21,3576	54 001 1	TS	L	SAVE FOR DRIVE REVERSAL TEST.
0451	REF 6	LAST 1473	21,3577	51'750 1	INDEX	QRCNTR	
0452	REF 11	LAST 1480	21,3600	57'501 1	XCH	NEGUQ	
0453			21,3601	0 0006 1	EXTEND		
0454	REF 302	LAST 1483	21,3602	7 0001 1	MP	L	MULTIPLY OLD NEGU AND NEW NEGU.
0455	REF 303	LAST 1483	21,3603	10 001 1	CCS	L	
0456	REF 1		21,3604	1 3621 0	TCF	LCUPE	NON-ZERO GIMBAL DRIVE BEING CONTINUED.
0457	REF 1		21,3605	1 3616 1	TCF	ZEROLOUP	NO REVERSAL PROBLEM HERE.
0458	REF 1		21,3606	1 3610 1	TCF	REVERSAL	NON-ZERO GIMBAL DRIVE BEING REVERSED.
0459	REF 2	LAST 1483	21,3607	1 3616 1	TCF	ZEROLOUP	NO REVERSAL PROBLEM HERE.
0460	REF 7	LAST 1483	21,3610	51'750 1	REVERSAL	INDEX	QRCNTR
0461	REF 5	LAST 1475	21,3611	55'510 0	TS	QACCDT	A ZERO-DRIVE PAUSE IS NEEDED HERE. ZERO
0462	REF 8	LAST 1483	21,3612	51'750 1	INDEX	QRCNTR	IS IN A REGISTER FROM CCS ON (-1).
0463	REF 1		21,3613	4 3630 0	CS	GMBLBITA	
0464			21,3614	0 0006 1	EXTEND		
0465	REF 73	LAST 1476	21,3615	03 012 1	WAND	CHAN12	
0466	REF 54	LAST 1477	21,3616	4 1273 1	ZEROLOUP	CS	RCSFLAGS
0467	REF 3	LAST 1477	21,3617	7 4747 0	MASK	CALLGMBL	SET UP REQUEST FOR ACDT+C12 CALL.
0468	REF 55	LAST 1483	21,3620	27'273 1	ADS	RCSFLAGS	

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0469	REF	9	LAST 1483	21,3621	11'750 0	LOUPE	CCS	QRCNTR	HAVE BOTH AXES BEEN PROCESSED?
0470	REF	2	LAST 1472	21,3622	1 3115 0		TCF	GOQTRNG	NO. DO Q AXIS NEXT.
0471	REF	2	LAST 1472	21,3623	3 1505 0		CA	SAVESR	RESTORE THE SR
0472	REF	28	LAST 1472	21,3624	54 021 0		TS	SR	
0473				21,3625	0 0006 1	GOCLOSE	EXTEND		TERMINATE THE JASK.
0474	REF	1		21,3626	3 3631 0		DCA	CLOSEADR	
0475				21,3627	52 006 0		DTCS		
0476	REF	25	LAST 1479	E6,1537			EBANK=	ADSQ	
0477	REF	4	LAST 1455	21,3630	03236 0	CLOSEADR	2CADR	CLOSEOUT	TERMINATE THE JASK.
0477				21,3631	36106 0				
R0478									
0479	REF	6	LAST 1431	5751		TWELVE	EQUALS	DCT14	
0480				21,3632	26501 1	ROOTHALF	DCTAL	26501	SQUARE ROOT OF 1/2
0481				21,3633	01400 1	GMBLBITA	DCTAL	01400	INDEXED WRT GMBLBITB DO NOT MOVE*****
0482				21,3634	11276 1	DCT11276	DCTAL	11276	POSMAX -- ROOTHALF
0483				21,3635	06000 1	GMBLBITB	DCTAL	06000	INDEXED WRT GMBLBITA DO NOT MOVE*****
R0484									
R0485									
R0486									
R0488									
R0490									
R0492									
R0493									
0495	REF	1		21,3636	55'746 1	ROOTCYCL	TS	SCRATCH	STORE X
0496	REF	29	LAST 1484	21,3637	54 021 0		TS	SR	X/2 NOW IN SR
0497	REF	4	LAST 1482	21,3640	3 1747 1		CA	HALFARG	ARG/2 IN THE A REG
0498				21,3641	22 007 0		ZL		PREPARE FOR DIVISION
0499				21,3642	0 0006 1		EXTEND		
0500	REF	2	LAST 1484	21,3643	11'746 1		DV	SCRATCH	(ARG/X)/2
0501	REF	30	LAST 1484	21,3644	6 0021 1		AD	SR	(X + ARG/X)/2 IN THE A REG
0502	REF	424	LAST 1481	21,3645	0 0002 0		TC	Q	

R0503

L AOSTASK AND AOSJOB

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R0001 PROGRAM NAME: 1/ACCS

R0002 PROGRAM WRITTEN BY: BOB COVELLI AND MIKE HOUSTON

R0003 *LAST MODIFICATION: FEB.14,1969 BY G.KALAN

R0004 PROGRAM DESCRIPTION:

R0005 1/ACCS PROVIDES THE INTERFACE BETWEEN THE GUIDANCE PROGRAMS AND THE DIGITAL AUTOPILOT. WHENEVER THERE IS A
R0007 CHANGE IN THE MASS OF THE VEHICLE, IN THE DEADBAND SELECTED, IN THE VEHICLE CONFIGURATION (ASCENT-DESCENT-
R0009 DOCKED), AND DURING A FRESH START OR A RESTART, 1/ACCS IS CALLED TO COMMUNICATE THE DATA CHANGES TO THE DAP.

R0011 THE INPUTS TO 1/ACCS ARE MASS, ACCELERATION (ABDELV), DEADBAND (DB), OFFSET ACCELERATIONS (AOSQ AND AOSR),
R0013 STAGE VERIFY BIT (CHAN30,BIT2), DOCKED BIT (DAPBOOLS,BIT3), DRIFT BIT (DAPBOOLS,BIT8), USEQRJTS (DAPBOOLS,
R0015 BIT14), AND SURFACE FLAG (FLAGWRD8,BIT8), AND CH5MASK.

R0016 1/ACCS COMPUTES THE JET ACCELERATIONS (1JACC, 1JACCQ, 1JACCR) AS FUNCTIONS OF MASS. 1JACCU AND 1JACCV ARE
R0018 FORMED BY RESOLVING 1JACCQ AND 1JACCR. IN THE DESCENT CASE, THE DESCENT ENGINE MOMENT ARM (L,PVT-C6) IS ALSO
R0020 COMPUTED AS A FUNCTION OF MASS. THE RATE OF CHANGE OF ACCELERATION DUE TO ROTATION OF THE GIMBAL (ACCDOTQ,
R0022 ACCDOTR) IS ALSO COMPUTED IN THE DESCENT CASE.

R0023 AFTER THE ABOVE COMPUTATIONS, THE PROGRAM 1/ACCONT COMPUTES THE RECIPROCAL NET ACCELERATIONS ABOUT THE P, U,
R0025 AND V AXES (2 JETS FOR P AXIS, BOTH 1 AND 2 JETS FOR U AND V AXES), AND THE RECIPROCAL COAST ACCELERATIONS ABOUT
R0027 THE P, U, AND V AXES. THE ACCELERATION FUNCTIONS (ACCFCTZ1 AND ACCFCTZ5) ARE ALSO COMPUTED FOR THESE AXES. THE
R0029 FIRE AND COAST DEADBANDS AND AXISDIST ARE COMPUTED FOR EACH AXIS. FLAT AND ZONE3LIM, THE WIDTH AND HEIGHT OF THE
R0031 MINIMUM IMPULSE ZONE, ARE COMPUTED. 1/ACCONT ALSO SETS ACCSWJ AND ACCSWV, WHICH INDICATE WHEN 1 JET ACCELERATION
R0033 IS NOT SUFFICIENT TO PRODUCE MINIMUM ACCELERATION. AT THE COMPLETION OF 1/ACCS, THE ACCSOKAY BIT IS SET.

R0035 SUBROUTINES CALLED:

R0036 TIMEGMBL

R0037 MAKECADR

R0038 ROT45DEG

R0039 CALLING SEQUENCE:

A0040

A0041

TC BANKCALL

CADR 1/ACCS

(1/ACCS MUST BE CALL BY BANKCALL

R0042 NORMAL EXIT: VIA BANKJUMP ALARM AND ABORT EXIT MODES: NONE.

R0043 INPUT/OUTPUT: SEE PROGRAM DESCRIPTION

R0044 DEBRIS:

R0045 ALL OF THE EXECUTIVE TEMPORARY REGISTERS, EXCEPT FIXLOC AND OVFINO, AND THE CORE SET AREA FROM MPAC TO BANKSET.

R0047 RESTRICTIONS:

R0048 1/ACCS MUST BE CALLED BY BANKCALL

R0049 EBANK IS SET TO 6, BUT NOT RESTORED.

L AOSTASK AND AOSJOB

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0050				20,2447			BANK 20	
0051	REF 5	LAST 1414	20,2000				SETLOC DAPS3	
0052			20,2447				BANK	
0053	REF 3	LAST 43 TO 44:	3	4*			COUNT* 33/DAPAD	
0054	REF 26	LAST 1484	E6,1537				EBANK= AOSQ	
0055	ENTRY IS THROUGH 1/ACCJOB OR 1/ACCSET WHEN 1/ACCS IS TO BE DONE AS A SEPARATE NOVAC JOB.							
0057	IT IS POSSIBLE FOR MORE THAN ONE OF THESE JOBS TO BE SET UP CONCURRENTLY. HOWEVER, SINCE THERE IS NO CHECK OF							
0059	NEWJOB, A SECOND MANIFESTATION CANNOT BE STARTED UNTIL THE FIRST IS COMPLETED.							
0061	REF 310	LAST 1481	20,2447	3 4755 1	1/ACCSET	CAF	ZERO	ENTRY FROM FRESH START/RESTART CODING.
0062	REF 27	LAST 1486	20,2450	55'537 0		TS	AOSQ	NULL THE OFFSET ESTIMATES FOR 1/ACCS.
0063	REF 10	LAST 1427	20,2451	55'541 1		TS	AOSR	
0064	REF 6	LAST 1427	20,2452	55'424 0		TS	ALPHAQ	NULL THE OFFSET ESTIMATES FOR DOWNLIST
0065	REF 5	LAST 1427	20,2453	55'425 1		TS	ALPHAR	
0066	REF 323	LAST 1402	20,2454	0 4616 1	1/ACCJOB	TC	BANKCALL	1/ACCS ASSUMES ENTRY VIA BANKCALL.
0067	REF 2	LAST 863	20,2455	40461 0		CADR	1/ACCS +2	SKIP EBANK SETTING.
0068	REF 159	LAST 1392	20,2456	0 5155 0		TC	ENDOFJOB	
0069	REF 10	LAST 1408	20,2457	3 5015 0	1/ACCS	CA	EBANK6	***** EBANK SET BUT NOT RESTORED *****
0070	REF 86	LAST 1409	20,2460	54 003 0		TS	EBANK	
0071	REF 16	LAST 1377	20,2461	0 4645 1		TC	MAKECADR	SAVE RETURN SO THAT BUF2 MAY BE USED
0072	REF 1		20,2462	54 117 1		TS	ACCRETRN	
0073	DETERMINE MASS OF THE LEM.							
0074	REF 65	LAST 1453	20,2463	3 0111 0		CA	DAPBOOLS	IS CSM DOCKED
0075	REF 11	LAST 1452	20,2464	7 4737 1		MASK	CSMDOCKD	
0076	REF 1		20,2465	54 157 0		TS	DOCKTEMP	STORE RECORD OF STATE IN TEMP (MPAC +3).
0077	REF 528	LAST 1482	20,2466	10 000 0		CCS	A	
0078	REF 5	LAST 314	20,2467	4 1332 0		CS	CSMASS	DOCKED: LEMMASS = MASS - CSMASS
0079	REF 14	LAST 860	20,2470	6 1244 1		AD	MASS	LEM ALONE: LEMMASS = MASS
0080	REF 11	LAST 314	20,2471	55'331 0		TS	LEMASS	
0081	ON THE BASIS OF APSFLAG:							
0082	SET THE P-AXIS RATE COMMAND LIMIT FOR 2-JET/4-JET CONTROL							
0083	SET MPAC, WHICH INDICATES THE PROPER SET OF COEFFICIENTS FOR THE LEM-ALONE F(MASS) CALCULATIONS							
0085	ENSURE THAT THE LEM MASS VALUE IS WITHIN THE ACCEPTABLE RANGE							
0085			20,2472	0 0004 0		INHINT		
0086	REF 24	LAST 1453	20,2473	30 106 0		CAE	FLGWRD10	DETERMINE WHETHER STAGED.
0087	REF 16	LAST 1453	20,2474	7 4737 1		MASK	APSFLBIT	
0088			20,2475	0 0006 1		EXTEND		
0089	REF 1		20,2476	1 2522 1		BZF	DPSFLITE	

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0090	REF	41	LAST 1474	20,2477	4 4733 0	CS	POS MAX	ASCENT (OR ON LUNAR SURFACE)
0091	REF	3	LAST 1435	20,2500	55 475 1	TS	-2JET LIM	ALWAYS 2 JETS FOR P-AXIS RATE COMMAND
0092	REF	7	LAST 1484	20,2501	3 5751 1	CAF	UCT14	INITIALIZE INDEX AT 12.
0093	REF	875	LAST 1402	20,2502	54 154 0	TS	MPAC	
0094	REF	12	LAST 1486	20,2503	4 1331 0	CS	LEM MASS	CHECK IF MASS TOO HIGH. CATCH STAGING.
0095	REF	3	LAST 212	20,2504	6 1400 1	AD	H I ASCENT	
0096				20,2505	0 0006 1	EXTEND		
0097	REF	1		20,2506	6 2513 1	BZMF	MASS FIX	
0098	REF	13	LAST 1487	20,2507	4 1331 0	CS	LEM MASS	CHECK IF MASS TOO LOW. THIS LIMITS THE
0099	REF	1		20,2510	6 2001 1	AD	LO ASCENT	DECREMENTING BY MASS MON.
0100				20,2511	0 0006 1	EXTEND		
0101	REF	1		20,2512	6 2540 1	BZMF	F(MASS)	
0102	REF	14	LAST 1487	20,2513	27 331 0	MASS FIX	ADS	LEM MASS
0103				20,2514	22 007 0	ZL		STORE THE VIOLATED LIMIT AS LEM MASS.
0104	REF	2	LAST 1486	20,2515	10 157 0	CCS	DOCK TEMP	ALSO CORRECT TOTAL MASS, ZEROING THE
0105	REF	6	LAST 1486	20,2516	31 332 1	CAE	CS MASS	LOW ORDER WORD.
0106	REF	15	LAST 1487	20,2517	6 1331 1	AD	LEM MASS	DOCKED: MASS = LEM MASS + CS MASS
0107	REF	15	LAST 1486	20,2520	53 245 1	DXCH	MASS	LEM ALONE: MASS = LEM MASS
0108	REF	2	LAST 1487	20,2521	1 2540 0	TCF	F(MASS)	
0109	REF	53	LAST 1476	20,2522	4 4742 0	DPS FLITE	CS	BIT 10
0110	REF	4	LAST 1487	20,2523	55 475 1	TS	-2JET LIM	FOUR JETS FOR P-AXIS RATE COMMAND ERRORS
0111	REF	36	LAST 1440	20,2524	3 6242 0	CAF	SIX	EXCEEDING 1.4 DEG/SEC (SCALED AT 45)
0112	REF	876	LAST 1487	20,2525	54 154 0	TS	MPAC	INITIALIZE INDEX AT 6.
0113	REF	16	LAST 1487	20,2526	4 1331 0	CS	LEM MASS	CHECK IF MASS TOO HIGH. SHOULD NEVER
0114	REF	1		20,2527	6 2002 1	AD	H I DESCNT	OCCUR EXCEPT PERHAPS BEFORE THE PAD
0115				20,2530	0 0006 1	EXTEND		LOAD IS DONE.
0116	REF	2	LAST 1487	20,2531	6 2513 1	BZMF	MASS FIX	
0117	REF	17	LAST 1487	20,2532	4 1331 0	CS	LEM MASS	CHECK IF MASS TOO LOW. THIS LIMITS THE
0118	REF	1		20,2533	6 2003 0	AD	LO DESCNT	DECREMENTING BY MASS MON.
0119	REF	4	LAST 1487	20,2534	6 1400 1	AD	H I ASCENT	
0120				20,2535	0 0006 1	EXTEND		
0121	REF	3	LAST 1487	20,2536	6 2540 1	BZMF	F(MASS)	
0122	REF	3	LAST 1487	20,2537	1 2513 0	TCF	MASS FIX	
0123	COMPUTATION OF FUNCTIONS OF MASS							
0124				20,2540	0 0003 1	F(MASS)	RELINT	
0125	REF	3	LAST 1487	20,2541	10 157 0	CCS	DOCK TEMP	
0126	REF	1		20,2542	1 3105 1	TCF	DOCKED	DOCKED: USE SEPERATE COMPUTATION.
0127	REF	106	LAST 1478	20,2543	3 4752 0	CA	TWO	
0128	REF	877	LAST 1487	20,2544	54 155 1	STCTR	TS	MPAC +1
0129	REF	107	LAST 1487	20,2545	4 4752 1	CS	TWO	
0130	REF	378	LAST 1487	20,2546	26 154 0	ADS	MPAC	JX=10,8,6 OR 4,2,0 TO INDEX COEFS.
0131	REF	18	LAST 1487	20,2547	31 331 1	STCTR1	CAE	LEM MASS
01311	REF	879	LAST 1487	20,2550	50 154 1	INDEX	MPAC	
0132	REF	1		20,2551	6 3060 1	AD	INER CONC	
0133	REF	880	LAST 1487	20,2552	54 156 1	TS	MPAC +2	MASS + C

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0134			20,2553	0 0006	1	EXTEND	
0135	REF 881	LAST 1487	20,2554	5 0154	1	INDEX	MPAC
0136	REF 1		20,2555	3 3042	1	DCA	INERCONA
0137			20,2556	0 0006	1	EXTEND	
0138	REF 882	LAST 1488	20,2557	10 156	1	DV	MPAC +2
0139	REF 883	LAST 1488	20,2560	50 154	1	INDEX	MPAC
0140	REF 1		20,2561	6 3057	0	AD	INERCONB
0141	REF 884	LAST 1488	20,2562	50 155	0	INDEX	MPAC +1
0142	REF 8	LAST 1423	20,2563	55 530	1	TS	1JACC
							1JACC(J)=A(JX)/(MASS+C(JX) + B(JX)
							1JACC(-1)=L,PVT-CG SCALED AT 8 FEET
0143	REF 885	LAST 1488	20,2564	10 155	1	CCS	MPAC +1
0144	REF 1		20,2565	1 2544	1	TCF	STCTR
0145	REF 1		20,2566	1 2570	0	TCF	COMMEQS
0146	REF 1		20,2567	1 2667	0	TCF	LRSC

00147 COEFFQ AND COEFFR ARE COMPUTED IN THIS SECTION. THEY ARE USED TO RESOLVE Q-R COMPONENTS INTO NON-ORTHOGONAL
00149 U AND V COMPONENTS (SEE ROT-TDUV SECTION).

0150	REF 2	LAST 1471	20,2570	4 1532	0	COMMEQS	CS	1JACCR	
0151	REF 2	LAST 1471	20,2571	6 1531	1		AD	1JACCO	
0152			20,2572	0 0006	1		EXTEND		
0153	REF 1		20,2573	6 2617	0		BZMF	BIGIQ	
0154			20,2574	0 0006	1		EXTEND		EPSILON IS A MEASURE OF COUPLING AND IS
0155	REF 3	LAST 1488	20,2575	11 531	0		DV	1JACCO	DEFINED=1-IQ/IR FOR IR GREATER THAN IQ.
0156	REF 1		20,2576	54 155	1		TS	EPSILON	THE COMPUTED EXPRESSION IS EQUIVALENT
0157	REF 1		20,2577	6 3104	1		AD	-EPSMAX	
0158			20,2600	0 0006	1		EXTEND		
0159	REF 1		20,2601	6 2604	1		BZMF	GOODEPS1	
0160	REF 2	LAST 1438	20,2602	4 3104	0		CS	-EPSMAX	
0161	REF 2	LAST 1488	20,2603	54 155	1		TS	EPSILON	EPSILON IS LIMITED TO A MAX. OF .42265
0162	REF 3	LAST 1438	20,2604	3 0155	0	GOODEPS1	CA	EPSILON	
0163			20,2605	0 0006	1		EXTEND		
0164	REF 1		20,2606	7 3100	1		MP	0.35356	
0165	REF 1		20,2607	6 3102	1		AD	.7071	
0166	REF 2	LAST 1457	20,2610	55 620	1		TS	COEFFR	IN THIS CASE WHERE IR IS GREATER THAN
0167	REF 42	LAST 1487	20,2611	4 4733	0		CS	POS MAX	IQ, COEFFQ=-.707(1+.5EPSILON)(1-EPSILON)
0168	REF 4	LAST 1488	20,2612	6 0155	0		AD	EPSILON	AND COEFFR=.707(1+.5EPSILON)
0169			20,2613	0 0006	1		EXTEND		
0170	REF 3	LAST 1488	20,2614	7 1630	1		MP	COEFFR	
0171	REF 3	LAST 1457	20,2615	55 627	1		TS	COEFFQ	
0172	REF 1		20,2616	1 2642	1		TCF	JACCOV	
0173			20,2617	0 0006	1	BIGIQ	EXTEND		EPSILON IS DEFINED AS 1-IR/IQ FOR IQ
0174	REF 3	LAST 1488	20,2620	11 532	0		DV	1JACCR	GREATER THAN IR. -EPSILON IS COMPUTED
0175	REF 1		20,2621	54 155	1		TS	-EPSILON	RATHER THAN EPSILON FOR CONVENIENCE
0176	REF 2	LAST 1488	20,2622	4 0155	1		CS	-EPSILON	
0177	REF 3	LAST 1488	20,2623	6 3104	1		AD	-EPSMAX	
0178			20,2624	0 0006	1		EXTEND		
0179	REF 1		20,2625	6 2630	0		BZMF	GOODEPS2	
0180	REF 4	LAST 1488	20,2626	3 3104	1		CA	-EPSMAX	
0181	REF 3	LAST 1488	20,2627	54 155	1		TS	-EPSILON	EPSILON IS LIMITED TO A MAX. OF .42265

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0182	REF	4	LAST 1488	20,2630	3 0155 0	GOODEPS2	CA	-EPSILON	
0183				20,2631	0 0006 1		EXTEND		
0184	REF	2	LAST 1488	20,2632	7 3100 1		MP	0.35356	
0185	REF	1		20,2633	6 3103 0		AD	-.7071	
0186	REF	4	LAST 1488	20,2634	55 627 1		TS	COEFFQ	IN THIS CASE WHERE IQ IS GREATER THAN
0187	REF	5	LAST 1489	20,2635	4 0155 1		CS	-EPSILON	IR. COEFFQ=-.707(1+.5EPSILON) AND
0188	REF	12	LAST 1469	20,2636	6 4735 1		AD	NEGMX	COEFFR=.707(1+.5EPSILON)(1-EPSILON)
0189				20,2637	0 0006 1		EXTEND		
0190	REF	5	LAST 1489	20,2640	7 1627 1		MP	COEFFQ	
0191	REF	4	LAST 1488	20,2641	55 630 1		TS	COEFFR	
0192	REF	6	LAST 1489	20,2642	4 1627 1	JACCUV	CS	COEFFQ	
0193				20,2643	0 0006 1		EXTEND		
0194	REF	4	LAST 1488	20,2644	7 1531 0		MP	1JACCQ	1JACCQ IS SCALED AT PI/4
0195	REF	1		20,2645	55 533 1		TS	1JACCU	1JACCU USED AS TEMPORARY STORAGE
0196	REF	5	LAST 1489	20,2646	3 1630 0		CA	COEFFR	
0197				20,2647	0 0006 1		EXTEND		
0198	REF	4	LAST 1488	20,2650	7 1532 0		MP	1JACCR	
0199	REF	2	LAST 1489	20,2651	6 1533 0		AD	1JACCU	
0200				20,2652	0 0006 1		EXTEND		
0201	REF	88	LAST 1482	20,2653	7 4736 0		MP	BIT14	SCALING CHANGED FROM PI/4 TO PI/2
0202	REF	3	LAST 1489	20,2654	55 533 1		TS	1JACCU	
0203	REF	1		20,2655	55 534 0		TS	1JACCV	SCALED AT PI/2 RADIANS/SEC(2)
0204	REF	386	LAST 1488	20,2656	10 154 0		CCS	MPAC	COMPUTE L.PVT-CG IF IN DESCENT
0205	REF	311	LAST 1486	20,2657	3 4755 1		CAF	ZERO	ZERO SWITCHES AND GO TO 1/ACCONT IN
0206	REF	5	LAST 1480	20,2660	55 502 0		TS	ALLOWGTS	ASCENT
0207	REF	1		20,2661	1 3230 1		TCF	1/ACCONT -1	
0208	REF	108	LAST 1487	20,2662	4 4752 1		CS	TWO	
0209	REF	887	LAST 1489	20,2663	54 154 0		TS	MPAC	
0210	REF	175	LAST 1478	20,2664	4 4753 0		CS	ONE	
0211	REF	888	LAST 1489	20,2665	54 155 1		TS	MPAC +1	
0212	REF	1		20,2666	1 2547 1		TCF	STCTR1	
0213	THIS SECTION COMPUTES THE RATE OF CHANGE OF ACCELERATION DUE TO THE ROTATION OF THE GIMBALS. THE EQUATION IMPL								
0215	MENTED IN BOTH THE Y-X PLANE AND THE Z-X PLANE IS -- $D(\text{ALPHA})/DT = TL/I * D(\text{DELTA})/DT$, WHERE								
0217	T = ENGINE THRUST FORCE								
0218	L = PIVOT TO CG DISTANCE OF ENGINE								
0219	I = MOMENT OF INERTIA								
0220	REF	6	LAST 861	20,2667	31 246 0	LRESC	CAE	ABDELV	SCALED AT 2(13) CM/SEC(2)
0221				20,2670	0 0006 1		EXTEND		
0222	REF	16	LAST 1487	20,2671	7 1244 0		MP	MASS	SCALED AT B+16 KGS
0223	REF	1		20,2672	0 2776 0		TC	OVJVB	GET QUOTIENT WITH OVERFLOW PROTECTION
0224	REF	1		20,2673	03101 1		ADRES	GFACTM	
0225	MASS IS DIVIDED BY ACCELERATION OF GRAVITY IN ORDER TO MATCH THE UNITS OF IXX.IYY.IZZ. WHICH ARE SLUG-FT(2).								
0227	THE RATIO OF ACCELERATION FROM PIPAS TO ACCELERATION OF GRAVITY IS THE SAME IN METRIC OR ENGINEERING UNITS, SO								
0229	THAT IS UNCONVERTED. 2.20462 CONVERTS KG. TO LB. NOW T IS IN A SCALED AT 2(14).								
0231				20,2674	0 0006 1		EXTEND		
0232	REF	1		20,2675	7 1527 1		MP	L,PVT-CG	SCALED AT 8 FEET.

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0233			20,2676	0 0004 0		INHINT		
0234	REF 889	LAST 1489	20,2677	54 154 0		TS	MPAC	
0235			20,2700	0 0006 1		EXTEND		
0236	REF 5	LAST 1489	20,2701	7 1532 0		MP	1JACCR	
0237	REF 2	LAST 1489	20,2702	0 2776 0		TC	DVOVSUB	GET QUOTIENT WITH OVERFLOW PROTECTION
0238	REF 1		20,2703	02000 0		ADRES	TORKJET1	
0239	REF 2	LAST 1476	20,2704	55 511 1		TS	ACCDOTR	SCALED AT PI/2(7)
0240	REF 890	LAST 1490	20,2705	3 0154 1		CA	MPAC	
0241			20,2706	0 0006 1		EXTEND		
0242	REF 5	LAST 1489	20,2707	7 1531 0		MP	1JACCR	
0243	REF 3	LAST 1490	20,2710	0 2776 0		TC	DVOVSUB	GET QUOTIENT WITH OVERFLOW PROTECTION
0244	REF 2	LAST 1490	20,2711	02000 0		ADRES	TORKJET1	
0245	REF 6	LAST 1479	20,2712	55 507 0	SPSCONT	TS	ACCDOTQ	SCALED AT PI/2(7)
0246			20,2713	0 0006 1		EXTEND		
0247	REF 1		20,2714	7 3077 0		MP	DGBF	.3ACCDOTQ SCALED AT PI/2(8)
0248	REF 4	LAST 1473	20,2715	55 504 0		TS	KQ	
0249	REF 3	LAST 1490	20,2716	31 511 0		CAE	ACCDOTR	.3ACCDOTR AT PI/2(8)
0250			20,2717	0 0006 1		EXTEND		
0251	REF 2	LAST 1490	20,2720	7 3077 0		MP	DGBF	
0252	REF 1		20,2721	55 506 1		TS	KRDAP	
0253			20,2722	0 0006 1		EXTEND		NOW COMPUTE QACCDOT, RACCDOT, THE SIGNED
0254	REF 74	LAST 1483	20,2723	00 012 1		READ	CHAN12	JERK TERMS. STORE CHANNEL 12. WITH GIM
0255	REF 891	LAST 1490	20,2724	54 155 1		TS	MPAC +1	BAL DRIVE BITS 9 THROUGH 12. SET LOOP
0256	REF 55	LAST 1472	20,2725	3 4752 0		CAF	BIT2	INDEX TO COMPUTE RACCDOT, THEN QACCDOT.
0257	REF 1		20,2726	1 2730 0		TCF	LOOP3	
0258	REF 312	LAST 1489	20,2727	3 4755 1		CAF	ZERO	ACCDOTQ AND ACCDOTR ARE NOT NEGATIVE,
0259	REF 892	LAST 1490	20,2730	54 154 0	LOOP3	TS	MPAC	BECAUSE THEY ARE MAGNITUDES
0260	REF 893	LAST 1490	20,2731	3 0155 0		CA	MPAC +1	
0261	REF 394	LAST 1490	20,2732	50 154 1		INDEX	MPAC	MASK CHANNEL IMAGE FOR ANY GIMBAL MOTION
0262	REF 1		20,2733	7 3073 1		MASK	GIMBLBTS	
0263			20,2734	0 0006 1		EXTEND		
0264	REF 1		20,2735	1 2751 1		BZF	ZACCDOT	IF NONE, Q(R)ACCDOT IS ZERO.
0265	REF 895	LAST 1490	20,2736	3 0155 0		CA	MPAC +1	
0266	REF 896	LAST 1490	20,2737	50 154 1		INDEX	MPAC	GIMBAL IS MOVING. IS ROTATION POSITIVE.
0267	REF 2	LAST 1490	20,2740	7 3074 0		MASK	GIMBLBTS +1	
0268			20,2741	0 0006 1		EXTEND		
0269	REF 1		20,2742	1 2746 1		BZF	FRSTZERO	IF NOT POSITIVE, BRANCH
0270	REF 397	LAST 1490	20,2743	50 154 1		INDEX	MPAC	POSITIVE ROTATION, NEGATIVE Q(R)ACCDOT.
0271	REF 7	LAST 1490	20,2744	4 1507 0		CS	ACCDOTQ	
0272	REF 1		20,2745	1 2752 1		TCF	STACCDOT	
0273	REF 898	LAST 1490	20,2746	50 154 1	FRSTZERO	INDEX	MPAC	NEGATIVE ROTATION, POSITIVE Q(R)ACCDOT.
0274	REF 8	LAST 1490	20,2747	3 1507 1		CA	ACCDOTQ	
0275	REF 2	LAST 1490	20,2750	1 2752 1		TCF	STACCDOT	
0276	REF 313	LAST 1490	20,2751	3 4755 1	ZACCDOT	CAF	ZERO	
0277	REF 899	LAST 1490	20,2752	50 154 1	STACCDOT	INDEX	MPAC	
0278	REF 6	LAST 1483	20,2753	55 510 0		TS	QACCDOT	STORE Q(R)ACCDOT.
0279	REF 900	LAST 1490	20,2754	10 154 0		CCS	MPAC	
0280	REF 2	LAST 1490	20,2755	1 2727 0		TCF	LOOP3 -1	NOW DO QACCDOT.

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0281	REF	66	LAST 1486	20,2756	4 0111 1	CS	DAPBOOLS	IS GIMBAL USABLE?
0282	REF	6	LAST 1452	20,2757	7 4736 0	MASK	USEQRJTS	
0283				20,2760	0 0006 1	EXTEND		
0284	REF	1		20,2761	1 3706 1	BZF	DOWNGTS	NO. BE SURE THE GIMBAL SWITCHES ARE DOWN
0285	REF	5	LAST 1413	20,2762	4 1274 0	CS	T5ADR	YES. IS THE DAP RUNNING?
0286	REF	1		20,2763	6 3765 0	AD	PAXISADR	
0287				20,2764	0 0006 1	EXTEND		
0288				20,2765	1 2767 1	BZF	+2	
0289	REF	2	LAST 1491	20,2766	1 3706 1	TCF	DOWNGTS	NO. BE SURE THE GIMBAL SWITCHES ARE DOWN
0290	REF	6	LAST 1472	20,2767	11 633 1	CCS	INGTS	YES. IS GTS IN CONTROL?
0291	REF	1		20,2770	1 2773 1	TCF	DOCKTEST	YES. PROCEED WITH 1/ACCS.
0292	REF	62	LAST 1480	20,2771	0 4674 0	TC	IBNKCALL	NO. NULL OFFSET AND FIND ALLOWGTS
0293	REF	2	LAST 1450	20,2772	43330 0	CADR	TIMEGMBL	
0294	REF	4	LAST 1487	20,2773	10 157 0	DOCKTEST CCS	DOCKTEMP	BYPASS 1/ACCONT WHEN DOCKED.
0295	REF	1		20,2774	1 3671 0	TCF	1/ACCRET	
0296	REF	2	LAST 1489	20,2775	1 3231 0	TCF	1/ACCONT	

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P0297 SUBROUTINE: DVOVSUB

R0298 AUTHOR: C. WORK, MOD 0 12 JUNE 68

R0299 PURPOSE: THIS SUBROUTINE PROVIDES A SINGLE-PRECISION MACHINE LANGUAGE DIVISION OPERATION WHICH RETURNS
 R0301 (1) THE QUOTIENT, IF THE DIVISION WAS NORMAL.
 R0302 (2) NEGMAX, IF THE QUOTIENT WAS IMPROPER AND NEGATIVE.
 R0303 (3) POSMAX, IF THE QUOTIENT WAS IMPROPER AND POSITIVE OR IF THERE WAS A ZERO DIVISOR.
 R0305 THE CALLING PROGRAM IS PRESUMED TO BE A JOB IN THE F BANK WHICH CONTAINS DVOVSUB. E BANK MUST BE 6.
 R0307 THE DIVISOR FOR THIS ROUTINE MAY BE IN EITHER FIXED OR ERASABLE STORAGE. SIGN AGREEMENT IS
 R0309 ASSUMED BETWEEN THE TWO HALVES OF THE DIVIDEND. (THIS IS CERTAIN IF THE A AND L REGISTERS ARE THE RE-
 R0311 SULT OF A MULTIPLICATION OPERATION.)

R0312 CALL SEQUENCE:

A0313	L	TC	DVOVSUB
A0314	L +1	ADRES	(DIVISOR)
A0315	L +2	RETURN HERE,	WITH RESULT IN A,L

R0316 INPUT: DIVIDEND IN A,L (SIGN AGREEMENT ASSUMED). DIVISOR IN LOCATION DESIGNATED BY "ADRES".
 R0318 DIVISOR MAY BE IN THE DVOVSUB FBANK, FIXED-FIXED FBANK, EBANK 6, OR UNSWITCHED ERASABLE.

R0320 OUTPUT: QUOTIENT AND REMAINDER, OR POSMAX (NEGMAX), WHICHEVER IS APPROPRIATE.

R0322 DEBRIS: SCRATCHX, SCRATCHY, SCRATCHZ, A, L (NOTE: SCRATCHX, Y, Z ARE EQUATED TO MPAC +4, +5, AND +6.)

R0324 ABORTS OR ALARMS: NONE

R0325 EXITS: TO THE CALL POINT + 2.

R0326 SUBROUTINES CALLED: NONE.

0327	REF	1		20,2776	54 161 0	DVOVSUB	TS	SCRATCHY	SAVE UPPER HALF OF DIVIDEND
0328	REF	1		20,2777	54 160 1		TS	SCRATCHX	
0329	REF	425	LAST 1484	20,3000	50 002 0		INDEX	Q	OBTAIN ADDRESS OF DIVISOR.
0330				20,3001	3 0000 1		CA	0	
0331	REF	426	LAST 1492	20,3002	24 002 0		INCR	Q	STEP Q FOR PROPER RETURN SEQUENCE.
0332	REF	529	LAST 1486	20,3003	50 000 1		INDEX	A	
0333				20,3004	3 0000 1		CA	0	PICK UP THE DIVISOR.
0334				20,3005	0 0006 1		EXTEND		RETURN POSMAX FOR A ZERO DIVISOR.
0335	REF	1		20,3006	1 3035 0		BZF	MAXPLUS	
0336	REF	1		20,3007	54 162 0		TS	SCRATCHZ	STORE DIVISOR.
0337	REF	530	LAST 1492	20,3010	10 000 0		CCS	A	GET ABS(DIVISOR) IN THE A REGISTER.
0338	REF	69	LAST 1483	20,3011	6 4753 1		AD	BIT1	
0339	REF	1		20,3012	1 3014 0		TCF	ZEROPLUS	
0340	REF	70	LAST 1492	20,3013	6 4753 1		AD	BIT1	
0341	REF	2	LAST 1492	20,3014	56 161 1	ZEROPLUS	XCH	SCRATCHY	STORE ABS(DIVISOR). PICK UP TOP HALF OF
0342				20,3015	0 0006 1		EXTEND		DIVIDEND.
0343	REF	1		20,3016	6 3020 0		BZMF	GOODNEG	GET -ABS(DIVIDEND)

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0344	REF 531	LAST 1492	20,3017	4 0000 0	CS	A	
0345	REF 3	LAST 1492	20,3020	6 0161 1	GOODNEG	AD	SCRATCHY
0345			20,3021	0 0006 1	EXTEND		ABS(DIVISOR) - ABS(DIVIDEND)
0347	REF 1		20,3022	6 3027 1	BZMF	MAKEMAX	BRANCH IF DIVISION IS NOT PROPER.
0348	REF 2	LAST 1492	20,3023	3 0160 0	CA	SCRATCHX	RE-ESTABLISH THE DIVIDEND.
0349			20,3024	0 0006 1	EXTEND		
0350	REF 2	LAST 1492	20,3025	10 162 0	DV	SCRATCHZ	QUOTIENT IN THE A. REMAINDER IN L.
0351	REF 427	LAST 1492	20,3026	0 0002 0	TC	Q	RETURN TO CALLER.
0352	REF 3	LAST 1493	20,3027	10 160 1	MAKEMAX	CCS	SCRATCHX
0353	REF 3	LAST 1493	20,3030	10 162 0	CCS	SCRATCHZ	DETERMINE THE SIGN OF THE QUOTIENT.
0354	REF 2	LAST 1492	20,3031	1 3035 0	TCF	MAXPLUS	SCRATCHX AND SCRATCHZ ARE NON-ZERO.
0355	REF 4	LAST 1493	20,3032	10 162 0	CCS	SCRATCHZ	
0356	REF 13	LAST 1489	20,3033	3 4735 1	CAF	NEGMAX	+, - OR -, +
0357	REF 428	LAST 1493	20,3034	0 0002 0	TC	Q	
0358	REF 43	LAST 1488	20,3035	3 4733 1	MAXPLUS	CAF	POS MAX
0359	REF 429	LAST 1493	20,3036	0 0002 0	TC	Q	-, - OR +, +

R0360 COEFFICIENTS FOR THE JET ACCELERATION CURVE FITS

R0361 THE CURVE FITS ARE OF THE FORM -

R0362 $IJACC = A/(MASS + C) + B$

R0363 A IS SCALED AT PI/4 RAD/SEC**2 B+16KG. B IS SCALED AT PI/4 RAD/SEC**2, AND C IS SCALED AT B +16 KG.

R0365 THE CURVE FIT FOR L,PVT-CG IS OF THE SAME FORM, EXCEPT THAT A IS SCALED AT 8 FT B+16 KG. B IS SCALED AT 8 FT,

R0367 AND C IS SCALED AT B+16 KG.

0368			20,3037	01240 0	2DEC	+.0410511917	L	A	DESCENT	
0368			20,3040	22513 0						
0369			20,3041	00141 0	INERCONA	2DEC	+.0059347674	1JACCP	A	DESCENT
0369			20,3042	07416 0						
0370			20,3043	00030 1	2DEC	+.0014979264	1JACCQ	A	DESCENT	
0370			20,3044	21261 1						
0371			20,3045	00021 1	2DEC	+.0010451889	1JACCR	A	DESCENT	
0371			20,3046	03766 0						
0372			20,3047	00153 0	2DEC	+.0065443852	1JACCP	A	ASCENT	
0372			20,3050	07111 1						
0373			20,3051	00072 1	2DEC	+.0035784354	1JACCQ	A	ASCENT	
0373			20,3052	24103 0						
0374			20,3053	00135 0	2DEC	+.0056946631	1JACCR	A	ASCENT	
0374			20,3054	11511 1						
0375			20,3055	04754 0	DEC	+.155044	L	B	DESCENT	
0376			20,3056	77142 0	DEC	-.025233	L	C	DESCENT	

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0377	20,3057	00061 0	INERCONB	DEC	+0.002989	1JACCP	B	DESCENT
0378	20,3060	00217 0	INERCONC	DEC	+0.008721	1JACCP	C	DESCENT
0379	20,3061	00464 1		DFC	+0.018791	1JACCQ	B	DESCENT
0380	20,3062	75642 0		DEC	-0.068163	1JACCQ	C	DESCENT
0381	20,3063	00536 1		DEC	+0.021345	1JACCR	B	DESCENT
0382	20,3064	75705 1		DEC	-0.066027	1JACCR	C	DESCENT
0383	20,3065	00001 0		DEC	+0.000032	1JACCP	B	ASCENT
0384	20,3066	77616 0		DEC	-0.006923	1JACCP	C	ASCENT
0385	20,3067	05154 1		DEC	+0.162862	1JACCQ	B	ASCENT
0386	20,3070	00052 0		DEC	+0.002588	1JACCQ	C	ASCENT
0387	20,3071	00231 1		DEC	+0.009312	1JACCR	B	ASCENT
0388	20,3072	77174 0		DEC	-0.023608	1JACCR	C	ASCENT

0389	20,3073	01400 1	GIMBLBTS	OCTAL	01400			
0390	20,3074	01000 0		OCTAL	01000			
0391	20,3075	06000 1		OCTAL	06000			
0392	20,3076	04000 0		OCTAL	04000			
0393	20,3077	23146 0	DGBF	DEC	0.6			.3 SCALED AT 1/2
0394	20,3100	13241 1	0.35356	DEC	0.35356			.70711 SCALED AT 2
0395	20,3101	00337 0	GFACTM	OCT	337			979.24/2.20462 AT 8+15
0396	20,3102	26501 1	.7071	DEC	.70711			
0397	20,3103	51276 0	-.7071	DEC	-.70711			
0398	20,3104	62362 1	-EPSMAX	DEC	-.42265			

0399 CSM-DOCKED INERTIA COMPUTATIONS

0400	REF 176	LAST 1489	20,3105	3 4753 1	DOCKED	CA	ONE	COEFTR = 1 FOR INERTIA COEFFICIENTS
0401	REF 1		20,3106	54 160 1	SPSLOOP1	TS	COEFCTR	= 7 FOR CG COEFFICIENTS
0402	REF 177	LAST 1494	20,3107	3 4753 1		CA	ONE	MASSCTR = 1 FOR CSM
0403	REF 1		20,3110	54 161 0		TS	MASSCTR	= 0 FOR LEM
0404	REF 2	LAST 1494	20,3111	50 160 0		INDEX	COEFCTR	
0405	REF 1		20,3112	3 3212 0		CA	COEFF -1	COEFF -1 = C
0406			20,3113	0 0006 1		EXTEND		
0407	REF 19	LAST 1487	20,3114	7 1331 0		MP	LEMMASS	
0408			20,3115	0 0006 1		EXTEND		
0409	REF 7	LAST 1487	20,3116	7 1332 0		MP	CSMASS	LET X = CSMASS AND Y = LEMMASS
0410	REF 3	LAST 1494	20,3117	50 160 0		INDEX	COEFCTR	
0411	REF 2	LAST 1494	20,3120	6 3213 1		AD	COEFF	COEFF = F
0412	REF 901	LAST 1490	20,3121	54 154 0		TS	MPAC	MPAC = C X Y + F
0413			20,3122	1 3126 0		TCF	+4	
0414	REF 2	LAST 1494	20,3123	54 161 0	SPSLOOP2	TS	MASSCTR	LOOP TWICE THROUGH HERE TO OBTAIN
0415			20,3124	0 0005 1		EXTEND		MPAC = MPAC + (A X + D)X + (B Y + E)Y
0416	REF 4	LAST 1494	20,3125	26 160 1		DIM	COEFCTR	LOOP #1 LOOP #2
0417	REF 5	LAST 1494	20,3126	50 160 0		INDEX	COEFCTR	
0418	REF 3	LAST 1494	20,3127	3 3215 1		CA	COEFF +2	COEFF +2 = A OR B
0419			20,3130	0 0006 1		EXTEND		

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0420	REF	3	LAST 1494	20,3131	5 0161 1	INDEX	MASSCTR	
0421	REF	20	LAST 1494	20,3132	7 1331 0	MP	LEMMASS	
0422	REF	6	LAST 1494	20,3133	50 160 0	INDEX	COEFCTR	
0423	REF	4	LAST 1494	20,3134	6 3217 0	AD	COEFF +4	COEFF +4 = E OR D
0424				20,3135	0 0006 1	EXTEND		
0425	REF	4	LAST 1495	20,3136	5 0161 1	INDEX	MASSCTR	
0426	REF	21	LAST 1495	20,3137	7 1331 0	MP	LEMMASS	
0427	REF	902	LAST 1494	20,3140	25 154 0	ADS	MPAC	
0428	REF	5	LAST 1495	20,3141	10 161 0	CCS	MASSCTR	
0429	REF	1		20,3142	1 3123 0	TCF	SPSLOOP2	
0430	REF	7	LAST 1495	20,3143	10 160 1	CCS	COEFCTR	IF COEFCTR IS POS , EXIT FROM LOOP WITH
0431				20,3144	1 3153 1	TCF	+7	CG X DELDOT = MPAC X 4 PI RAD-CM/SEC
0432				20,3145	00000 1	TORQCONS	2DEC	0.51443 B-14 CORRESPONDS TO 500 LB-FT
0432				20,3146	20354 1			
0433	REF	903	LAST 1495	20,3147	3 0154 1	CA	MPAC	
0434	REF	904	LAST 1495	20,3150	54 155 1	TS	MPAC +1	INERTIA = (MPAC +1) X 2(38) KG-CM(2)
0435	REF	25	LAST 1481	20,3151	3 4757 0	CA	SEVEN	
0436	REF	1		20,3152	1 3106 1	TCF	SPSLOOP1	
0437	*REF	1		20,3153	3 3212 0	CA	1JACCCON	1JACC=1JACCCON/MASS
0438	*			20,3154	22 007 0	ZL		
0439	*REF	4	LAST 1490	20,3155	0 2776 0	TC	DVOVSUB	
0440	*REF	17	LAST 1489	20,3156	01244 1	ADRES	MASS	
0441	REF	9	LAST 1438	20,3157	55 530 1	TS	1JACC	SCALED AT PI/4
0442	REF	44	LAST 1493	20,3160	3 4732 1	CA	POSMAX	SET INVERSE JET ACCELERATIONS TO POSMAX,
0443	REF	2	LAST 1435	20,3161	55 551 0	TS	1/ANETP	WHICH CORRESPONDS TO ACCEL. OF 1.4 D/SS.
0444	REF	3	LAST 1464	20,3162	55 571 1	TS	1/ANET2 +1	
0445	REF	4	LAST 1495	20,3163	55 572 1	TS	1/ANET2 +2	
0446	REF	5	LAST 1495	20,3164	55 611 1	TS	1/ANET2 +17D	
0447	REF	6	LAST 1495	20,3165	55 612 1	TS	1/ANET2 +18D	
0448				20,3166	0 0006 1	EXTEND		
0449	REF	1		20,3167	3 3146 1	DCA	TORQCONS	
0450				20,3170	0 0006 1	EXTEND		
0451	REF	905	LAST 1495	20,3171	10 155 1	DV	MPAC +1	
0452				20,3172	0 0004 0	INHINT		
0453	REF	6	LAST 1490	20,3173	55 531 0	TS	1JACCQ	SCALED AT PI/4
0454	REF	6	LAST 1490	20,3174	55 532 0	TS	1JACCR	
0455	REF	2	LAST 1489	20,3175	3 3103 0	CA	-.7071	
0456	REF	7	LAST 1489	20,3176	55 627 1	TS	COEFFQ	COEFFQ AND COEFFR ARE CHOSEN TO MAKE U-
0457	REF	2	LAST 1488	20,3177	3 3102 1	CA	.7071	AND V-AXES ORTHOGONAL FOR DOCKED CASE
0458	REF	6	LAST 1489	20,3200	55 630 1	TS	COEFFR	
0459	REF	18	LAST 1495	20,3201	3 1244 1	CA	MASS	SCALED AT 2(16) KG
0460				20,3202	0 0006 1	EXTEND		
0461	REF	906	LAST 1495	20,3203	7 0154 0	MP	MPAC	SCALED AT 4 PI RAD-CM/SEC
0462				20,3204	0 0006 1	EXTEND		
0463	REF	7	LAST 1489	20,3205	7 1246 1	MP	ABDELV	SCALED AT 2(13) CM/SEC(2)
0464	REF	5	LAST 1495	20,3206	0 2776 0	TC	DVOVSUB	GET QUOTIENT WITH OVERFLOW PROTECTION

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0465	REF 907	LAST 1495	20,3207	00155 0	ADPES	MPAC +1	
0466	REF 4	LAST 1490	20,3210	55'511 1	TS	ACCDOTR	
0467	REF 1		20,3211	1 2712 0	TCF	SPSCONT	CONTINUE K, KSQ CALCULATIONS
0468	*		20,3212	00167 1	1JACCCON	DCT	00167
A0469							2 2
A0470							COEFFICIENTS FOR CURVE FIT OF THE FORM $Z = A X^2 + B Y^2 + C X Y + D X + E Y + F$
0471			20,3213	06176 1	COEFF	DEC	.19518
0472			20,3214	77650 1	DEC		-.00529
0473			20,3215	72260 0	DEC		-.17670
0474			20,3216	76637 1	DEC		-.03709
0475			20,3217	02167 0	DEC		.06974
0476			20,3220	00645 0	DEC		.02569
0477			20,3221	06335 1	DEC		.20096
0478			20,3222	04256 1	DEC		.13564
0479			20,3223	30163 0	DEC		.75704
0480			20,3224	64072 0	DEC		-.37142
0481			20,3225	53632 0	DEC		-.63117
0482			20,3226	15133 1	DEC		.41179

R0483 ASSIGNMENT OF TEMPORARIES FOR 1/ACCS (EXCLUDING 1/ACCONT)

A0484					MPAC, MPAC +1, MPAC +2 USED EXPLICITLY	
0485	REF 908	LAST 1496	0160		COEFCTR	EQUALS MPAC +4
0486	REF 909	LAST 1496	0161		MASSCTR	EQUALS MPAC +5
0487	REF 910	LAST 1496	0160		SCRATCHX	EQUALS MPAC +4
0488	REF 4	LAST 1493	0161		SCRATCHY	EQUALS SCRATCHX +1
0489	REF 5	LAST 1496	0162		SCRATCHZ	EQUALS SCRATCHX +2
0490	REF 911	LAST 1496	0157		DOCKTEMP	EQUALS MPAC +3
0491	REF 912	LAST 1496	0155		EPSILON	EQUALS MPAC +1
0492	REF 5	LAST 1488	0155		-EPSILON	EQUALS EPSILON
0493			20,3227	71777 0	DEC	-.18750

SCRATCH AREA FOR DVOVSUB ROUTINE.

RECORD OF CSMDOCKED BIT OF DAPBOOLS

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P0494

0495 20,3230 BANK 20
0496 REF 6 LAST 1486 20,2000 SETLOC DAPS3
0497 20,3230 BANK

0498 REF 28 LAST 1486 E6,1537 EBANK= ADSQ

0499 REF 4 LAST 1486 TO 1497: 369 373* COUNT* \$\$/DAPAD

0500 REF 7 LAST 1491 20,3230 55'633 1 -1 TS INGTS ZERO INGTS IN ASCENT
0501 REF 4 LAST 1407 20,3231 3 1346 1 1/ACCONT CA DB INITIALIZE DBVAL1,2,3
0502 20,3232 0 0006 1 EXTEND
0503 REF 59 LAST 1482 20,3233 7 4737 1 MP BIT13
0504 REF 304 LAST 1483 20,3234 54 001 1 TS L 0.25 DB
0505 REF 532 LAST 1493 20,3235 6 0000 1 AD A
0506 REF 1 20,3236 54 115 0 TS DBVAL3 0.50 DB
0507 REF 1 20,3237 4 1346 0 CS DBVAL1
0508 REF 305 LAST 1497 20,3240 6 0001 0 AD L
0509 REF 1 20,3241 54 114 1 TS DBVAL2 -.75 DB

0510 20,3242 0 0004 0 GETAOSUV INHINT
0511 REF 11 LAST 1486 20,3243 31'541 0 CAE ADSR COMPUTE AOSU AND AOSV BY ROTATING
0512 REF 306 LAST 1497 20,3244 54 001 1 TS L AOSQ AND ADSR.
0513 REF 29 LAST 1497 20,3245 31'537 1 CAE AOSQ
0514 REF 63 LAST 1491 20,3246 0 4674 0 TC IBNKCALL
0515 REF 4 LAST 1452 20,3247 37146 0 CADR ROT-TOUV
0516 REF 1 20,3250 53'544 1 DXCH AOSU

0517 20,3251 0 0003 1 RELINT
0518 REF 67 LAST 1491 20,3252 3 0111 0 CA DAPBOOLS
0519 REF 6 LAST 1453 20,3253 7 4744 0 MASK DRIFTBIT ZERO DURING ULLAGE AND POWERED FLIGHT.
0520 REF 533 LAST 1497 20,3254 10 000 0 CCS A IF DRIFTING FLIGHT,
0521 REF 178 LAST 1494 20,3255 3 4753 1 CA ONE SET DRIFTER TO 1
0522 REF 1 20,3256 54 116 0 TS DRIFTER SAVE TO TEST FOR DRIFTING FLIGHT LATER
0523 REF 6 LAST 1489 20,3257 6 1502 1 AD ALLOWGTS NON-ZERO IF DRIFT OR GTS NEAR
0524 REF 534 LAST 1497 20,3260 10 000 0 CCS A
0525 REF 1 20,3261 3 3763 0 CA FLATVAL DRIFTING FLIGHT. STORE .8 IN FLAT
0526 REF 1 20,3262 54 151 0 TS FLATEMP IN POWERED FLIGHT, STORE ZERO IN FLAT
0527 20,3263 0 0006 1 EXTEND
0528 REF 1 20,3264 1 3270 0 BZF DDPAXIS IF POWERED AND NO GTS. START P AXIS.
0529 REF 2 LAST 1497 20,3265 10 116 0 CCS DRIFTER OTHERWISE SET ZONE3LIM
0530 REF 1 20,3266 3 3762 1 CA ZONE3MAX 17.5 MS, SCALED AT 4 SECONDS.
0531 REF 1 20,3267 54 152 0 TS Z3TEM

0532 REF 10 LAST 1495 20,3270 3 1530 0 DDPAXIS CA 1JACC 1JACC AT PI/4 = 2JACC AT PI/2 =
0533 20,3271 6 4743 0 AD PIT9 ANET AT PI/2 = ANET/ACDAST AT 2(6).
0534 REF 38 LAST 1476 20,3272 54 157 0 TS FUNTEM 1 + ANET/ACDAST AT 2(6)
0535 REF 1

0536 REF 11 LAST 1497 20,3273 3 1530 0 CA 1JACC

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0537	REF	1		20,3274	0 3700 0	TC	INVERT	
0538				20,3275	0 0004 0	INHINT		P AXIS DATA MUST BE CONSISTENT
0539	REF	3	LAST 1495	20,3276	55'551 0	TS	1/ANETP	SCALED AT 2(7)/PI.
0540	REF	4	LAST 1498	20,3277	55'552 0	TS	1/ANETP +1	
0541	REF	39	LAST 1497	20,3300	4 4743 1	CS	BIT9	-1 AT 2(6)
0542				20,3301	0 0006 1	EXTEND		
0543	REF	5	LAST 1498	20,3302	7 1551 0	MP	1/ANETP	-1/ANET AT 2(13)/PI
0544				20,3303	0 0006 1	EXTEND		
0545	REF	2	LAST 1497	20,3304	10 157 0	DV	FUNTEM	-1/(ANET + ANET**2/ACOAST) AT 2(7)/PI
0546	REF	1		20,3305	55'557 0	TS	PACCFUN	
0547	REF	2	LAST 1498	20,3306	55'560 1	TS	PACCFUN +1	
0548	REF	1		20,3307	3 4733 1	CA	1/.03	NO ADS FOR P AXIS. ACOAST = AMIN
0549	REF	1		20,3310	55'553 1	TS	1/ACOSTP	
0550	REF	2	LAST 1498	20,3311	55'554 0	TS	1/ACOSTP +1	
0551				20,3312	0 0000 1	RELINT		
0552				20,3313	22 007 0	ZL		
0553	REF	3	LAST 1497	20,3314	10 116 0	CCS	DRIFTER	
0554	REF	2	LAST 1497	20,3315	53'544 1	DXCH	AOSU	ZERO AOSU,V IF IN DRIFT, JUST TO BE SURE
0555	REF	314	LAST 1490	20,3316	3 4755 1	UAXIS	CA	ZERO
0556	REF	1		20,3317	54 154 0	TS	UV	DO U AXIS COMPUTATIONS ZERO FOR U AXIS, ONE FOR V AXIS.
0557	REF	1		20,3320	54 163 1	BOTHAXES	TS	SIGNAOS
0558	REF	2	LAST 1498	20,3321	50 154 1	INDEX	UV	CODING COMMON TO U,V AXES
0559	REF	3	LAST 1498	20,3322	11'543 0	CCS	AOSU	PICK UP ABS(AOSU OR AOSV)
0560	REF	179	LAST 1497	20,3323	6 4753 1	AD	ONE	RESTORE TO PROPER VALUE
0561				20,3324	1 3327 0	TCF	+3	AND LEAVE SIGNAOS AT ZERO
0562	REF	180	LAST 1498	20,3325	6 4753 1	AD	ONE	NEGATIVE, RESTORE TO PROPER VALUE
0563	REF	2	LAST 1498	20,3326	24 163 0	INCR	SIGNAOS	AND SET SIGNAOS TO ONE TO SHOW ADS NEG
0564	REF	1		20,3327	54 162 0	TS	ABSAOS	SAVE ABS(AOS)
0565	REF	3	LAST 1498	20,3330	4 0163 1	CS	SIGNAOS	
0566	REF	1		20,3331	54 164 0	TS	-SIGNAOS	USED AS AN INDEX
0567	REF	2	LAST 1497	20,3332	3 1346 1	CA	DBVAL1	SET DB1, DB2 TO DBVAL1 (= DB)
0568	REF	1		20,3333	54 143 0	TS	DBB1	
0569	REF	1		20,3334	54 144 1	TS	DBB2	
0570	REF	2	LAST 1498	20,3335	3 0162 1	CA	ABSAOS	TEST MAGNITUDE OF ABS(AOS)
0571	REF	1		20,3336	6 3764 1	AD	-.03R/S2	
0572				20,3337	0 0006 1	EXTEND		
0573	REF	1		20,3340	6 3432 1	BZMF	NOTMUCH	ABS(AOS) LESS THAN AMIN
0574	REF	2	LAST 1497	20,3341	10 151 0	BIGAOS	CCS	FLATEMP
0575	REF	1		20,3342	1 3372 0	TCF	SKIPDB1	IF DRIFT OR GTS, DO NOT COMPUTE DB
0576	REF	3	LAST 1498	20,3343	3 1346 1	CA	DBVAL1	
0577	REF	2	LAST 1498	20,3344	50 164 1	INDEX	-SIGNAOS	

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0578	REF	2	LAST 1498	20,3345	26 144 1	ADS	DBB2	DB2(1) = 2 DB
0579	REF	4	LAST 1498	20,3346	50 163 0	INDEX	SIGNADS	
0580	REF	1		20,3347	54 145 0	TS	DBB4	DB4(3) = 1 DB
0581	REF	1		20,3350	3 3227 0	CA	-.1875	-.1875 PI/2 RAD/SEC(2) SCALED AT PI/2
0582	REF	3	LAST 1498	20,3351	6 0162 1	AD	ABSAOS	ABSAOS IS SCALED AT PI/2
0583				20,3352	0 0006 1	EXTEND		
0584				20,3353	6 3356 1	BZMF	+3	
0585	REF	2	LAST 1497	20,3354	4 0115 0	CS	DBVAL2	-.5 DB
0586	REF	1		20,3355	1 3365 0	TCF	DBONE	
0587	REF	4	LAST 1499	20,3356	4 0162 0	CS	ABSAOS	
0588				20,3357	6 0000 1	DOUBLE		
0589				20,3360	6 0000 1	DOUBLE		
0590	REF	89	LAST 1489	20,3361	6 4736 1	AD	BIT14	
0591				20,3362	6 0000 1	DOUBLE		1-8 ABSAOS. (8 IS 16/PI SCALED AT 2/PI)
0592				20,3363	0 0006 1	EXTEND		
0593	REF	5	LAST 1497	20,3364	7 1346 0	MP	DB	
0594	REF	5	LAST 1499	20,3365	50 163 0	INDEX	SIGNADS	DB1(2)=(1-8 ABSAOS) DB. IF ABSAOS IS
0595	REF	2	LAST 1498	20,3366	54 143 0	TS	DBB1	GREATER THAN .1875 THEN DB1(2)=-.5 DB
0596	REF	2	LAST 1497	20,3367	3 0114 0	CA	DBVAL2	
0597	REF	3	LAST 1498	20,3370	50 164 1	INDEX	-SIGNADS	
0598	REF	1		20,3371	54 146 0	TS	DBB3	DB3(4) = -.75 DB
0599	REF	5	LAST 1499	20,3372	3 0162 1	CA	ABSAOS	ABS(AOS) GREATER THAN AMIN, SO IT IS
0600				20,3373	0 0006 1	EXTEND		
0601	REF	44	LAST 1479	20,3374	7 4740 1	MP	BIT12	
0602	REF	6	LAST 1499	20,3375	6 0162 1	AD	ABSAOS	(9/8) ABSAOS.
0603	REF	2	LAST 1498	20,3376	0 3700 0	TC	INVERT	ALL RIGHT TO DIVIDE
0604	REF	4	LAST 1499	20,3377	50 164 1	INDEX	-SIGNADS	
0605	REF	1		20,3400	54 130 1	TS	1/ACOSTT +1	1/ACOSTPOS(NEG) = 1/ABS(AOS)
0606	REF	2	LAST 1498	20,3401	3 4733 1	CA	1/.03	
0607	REF	6	LAST 1499	20,3402	50 163 0	INDEX	SIGNADS	
0608	REF	2	LAST 1499	20,3403	54 127 1	TS	1/ACOSTT	1/ACOSTNEG(POS) = 1/AMIN
0609	REF	7	LAST 1499	20,3404	3 0162 1	CA	ABSAOS	
0610	REF	4	LAST 1489	20,3405	6 1533 0	AD	1JACCU	
0611	REF	5	LAST 1499	20,3406	6 1533 0	AD	1JACCU	2 JACC + ABS(AOS)
0612	REF	40	LAST 1498	20,3407	6 4743 0	AD	BIT9	MAXIMUM VALUE IN COMPUTATIONS
0613	REF	535	LAST 1497	20,3410	54 000 0	TS	A	TEST FOR OVERFLOW
0614	REF	1		20,3411	1 3456 1	TCF	SKIPDB2	NO OVERFLOW, DO NORMAL COMPUTATION
0615	REF	8	LAST 1499	20,3412	3 0162 1	CA	ABSAOS	RESCALE TO PI TO PREVENT OVERFLOW
0616				20,3413	0 0006 1	EXTEND		
0617	REF	90	LAST 1499	20,3414	7 4736 0	MP	BIT14	
0618	REF	6	LAST 1499	20,3415	6 1533 0	AD	1JACCU	1 JACC AT PI/2 = 2JACC AT PI
0619	REF	1		20,3416	54 157 0	TS	ANET	ANETPOS(NEG) MAX SCALED AT PI =
A0620								ANETPOS(NEG) MAX/ACOSTNEG(POS) AT 2(7)
0621	REF	43	LAST 1443	20,3417	6 4744 1	AD	BIT8	1 + ANETPOS/ACOSTNEG AT 2(7)
0622	REF	2	LAST 1499	20,3420	56 157 1	XCH	ANET	SAVE IN ANET, WHILE PICKING UP ANET
0623	REF	3	LAST 1499	20,3421	0 3700 0	TC	INVERT	
0624				20,3422	0 0006 1	EXTEND		

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0625	REF	91	LAST 1499	20,3423	7 4736 0		MP	BIT14	SCALE 1/ANET AT 2(7)/PI
0626	REF	1		20,3424	54 160 1		TS	1/ANET	
0627	REF	1		20,3425	3 3431 1		CA	ACCHERE	SET UP RETURN FROM COMPUTATION ROUTINE
0628	REF	1		20,3426	54 161 0		TS	ARET	
0629	REF	44	LAST 1499	20,3427	4 4744 0		CS	BIT8	-1 AT 2(7)
0630	REF	1		20,3430	1 3733 1		TCF	DOACCFUN	FINISH ACCFUN COMPUTATION
0631	REF	1		20,3431	1 3463 1	ACCHERE	TCF	ACCTHERE	
0632	REF	307	LAST 1497	20,3432	54 001 1	NOTMUCH	TS	L	ABS(AOS) LESS THAN AMIN. SAVE IN L
0633	REF	3	LAST 1499	20,3433	3 4733 1		CA	1/.03	ACOSTPOS.NEG = AMIN
0634	REF	3	LAST 1499	20,3434	54 127 1		TS	1/ACOSTT	
0635	REF	4	LAST 1500	20,3435	54 130 1		TS	1/ACOSTT +1	
0636	REF	3	LAST 1498	20,3436	10 151 0		CCS	FLATEMP	
0637	REF	2	LAST 1499	20,3437	1 3456 1		TCF	SKIPDB2	DO NOT COMPUTE DB IF DRIFT OR GTS
0638	REF	1		20,3440	3 4744 1		CA	.0125RS	AMIN/2
0639	REF	308	LAST 1500	20,3441	6 0001 0		AD	L	L HAS ABS(AOS) - AMIN
0640				20,3442	0 0006 1		EXTEND		RESULT IS ABS(AOS) - AMIN/2
0641	REF	1		20,3443	6 3453 0		BZMF	NOADS	ABS(AOS) LESS THAN AMIN/2
0642	REF	3	LAST 1499	20,3444	3 0115 1	SOMEADS	CA	DBVAL3	AMIN/2 LT ABS(AOS) LT AMIN
0643	REF	5	LAST 1499	20,3445	50 164 1		INDEX	-SIGNAOS	
0644	REF	2	LAST 1499	20,3446	54 146 0		TS	DBB3	DB3(4) = DB/2
0645	REF	536	LAST 1499	20,3447	6 0000 1		AD	A	
0646	REF	7	LAST 1499	20,3450	50 163 0		INDEX	SIGNAOS	
0647	REF	2	LAST 1499	20,3451	54 145 0		TS	DBB4	DB4(3) = DB
0648	REF	3	LAST 1500	20,3452	1 3456 1		TCF	SKIPDB2	
0649	REF	4	LAST 1498	20,3453	3 1346 1	NOADS	CA	DBVAL1	
0650	REF	3	LAST 1500	20,3454	54 146 0		TS	DBB3	DB3,4 = DB
0651	REF	3	LAST 1500	20,3455	54 145 0		TS	DBB4	
0652	REF	9	LAST 1499	20,3456	3 0162 1	SKIPDB2	CA	ABSADS	ANETPOS(NEG) MAX = 2 JACC + ABS(AOS)
0653	REF	7	LAST 1499	20,3457	6 1533 0		AD	1JACCU	
0654	REF	8	LAST 1500	20,3460	6 1533 0		AD	1JACCU	
0655	REF	3	LAST 1499	20,3461	54 157 0		TS	ANET	CONJUT OVERFLOW HERE
0656	REF	1		20,3462	0 3724 0	CL1/NET+	TC	DO1/NET+	COMPUTE 1/ANET, ACCFUN
0657	REF	6	LAST 1500	20,3463	50 164 1	ACCTHERE	INDEX	-SIGNAOS	
0658	REF	1		20,3464	54 134 0		TS	ZSTEM +2	STORE ACCFUN IN TEMPORARY BUFFER
0659	REF	2	LAST 1500	20,3465	3 0160 0		CA	1/ANET	
0660	REF	7	LAST 1500	20,3466	50 164 1		INDEX	-SIGNAOS	
0661	REF	1		20,3467	54 126 0		TS	1/ATEM2 +2	STORE 1/ANET IN TEMPORARY BUFFER
0662	REF	10	LAST 1500	20,3470	3 0162 1		CA	ABSADS	SEE IF OVERFLOW IN MIN CASE
0663	REF	9	LAST 1500	20,3471	6 1533 0		AD	1JACCU	

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0664	REF	41	LAST	1499	20,3472	6 4743 0	AD	BIT9	MAXIMUM POSSIBLE VALUE
0665	REF	537	LAST	1500	20,3473	54 000 0	TS	A	OVERFLOW POSSIBLE BUT REMOTE
0666					20,3474	1 3476 0	TCF	+2	
0667	REF	45	LAST	1495	20,3475	3 4733 1	CA	POS MAX	IF OVERFLOW, TRUNCATE TO PI/2
0668	REF	2	LAST	1498	20,3476	6 3764 1	AD	-.03R/S2	RESTORE TO CORRECT VALUE
0669	REF	4	LAST	1500	20,3477	54 157 0	TS	ANET	
0670	REF	2	LAST	1500	20,3500	0 3724 0	TC	DOI/NET+	COMPUTE 1/ANET, ACCFUN
0671	REF	8	LAST	1500	20,3501	50 164 1	INDEX	-SIGNAOS	STORE MIN VALUES JUST AS MAX VALUES
0672	REF	2	LAST	1500	20,3502	54 132 0	TS	Z5TEM	
0673	REF	3	LAST	1500	20,3503	3 0160 0	CA	1/ANET	
0674	REF	9	LAST	1501	20,3504	50 164 1	INDEX	-SIGNAOS	
0675	REF	2	LAST	1500	20,3505	54 124 1	TS	1/ATEM2	
0676	REF	11	LAST	1500	20,3506	4 0162 0	CS	ABSAOS	NOW DO NEG(POS) CASES
0677	REF	10	LAST	1500	20,3507	6 1533 0	AD	1JACCU	
0678	REF	11	LAST	1501	20,3510	6 1533 0	AD	1JACCU	ANETNEG(POS) MAX
0679	REF	1			20,3511	0 3712 0	TC	1/ANET-	COMPUTE 1/ANET, ACCFUN, AND ACCSW
0680	REF	8	LAST	1500	20,3512	50 163 0	INDEX	SIGNAOS	STORE NEG(POS) VALUES JUST AS POS(NEG)
0681	REF	1			20,3513	54 133 1	TS	Z1TEM +2	
0682	REF	309	LAST	1500	20,3514	54 001 1	TS	L	SAVE IN L FOR POSSIBLE FUTURE USE
0683	REF	4	LAST	1501	20,3515	3 0160 0	CA	1/ANET	
0684	REF	9	LAST	1501	20,3516	50 163 0	INDEX	SIGNAOS	
0685	REF	1			20,3517	54 125 0	TS	1/ATEM1 +2	
0686	REF	12	LAST	1501	20,3520	4 0162 0	CS	ABSAOS	
0687	REF	12	LAST	1501	20,3521	6 1533 0	AD	1JACCU	1/ANETNEG(POS) MIN
0688	REF	5	LAST	1501	20,3522	54 157 0	TS	ANET	
0689	REF	3	LAST	1501	20,3523	6 3764 1	AD	-.03R/S2	TEST FOR AMIN
0690					20,3524	0 0006 1	EXTEND		IF ANET LESS THAN AMIN, STORE MAX JET
0691	REF	1			20,3525	6 3742 1	BZMF	FIXMIN	VALUES FOR MIN JETS AND SET ACCSW
0692	REF	1			20,3526	0 3720 1	TC	1/NETMIN	OTHERWISE DO MIN JET COMPUTATIONS
0693	REF	10	LAST	1501	20,3527	50 163 0	INDEX	SIGNAOS	STORE VALUES
0694	REF	2	LAST	1501	20,3530	54 131 0	TS	Z1TEM	
0695	REF	5	LAST	1501	20,3531	3 0160 0	CA	1/ANET	
0696	REF	11	LAST	1501	20,3532	50 163 0	INDEX	SIGNAOS	
0697	REF	2	LAST	1501	20,3533	54 123 0	TS	1/ATEM1	
0698	REF	3	LAST	1498	20,3534	50 154 1	INDEX	UV	
0699	REF	1			20,3535	3 3770 1	CA	+UMASK	
0700	REF	9	LAST	1458	20,3536	7 1262 1	MASK	CHSMASK	TEST FOR +U (+V) JET FAILURES
0701					20,3537	0 0006 1	EXTEND		
0702	REF	1			20,3540	1 3545 1	BZF	FAIL-	
0703	REF	3	LAST	1501	20,3541	3 0124 0	CA	1/ATEM2	REPLACE FUNCTION VALUES DEPENDING ON THE
0704	REF	4	LAST	1501	20,3542	54 126 0	TS	1/ATEM2 +2	FAILED JET PAIR WITH CORRESPONDING ONE-
0705	REF	3	LAST	1501	20,3543	3 0132 1	CA	Z5TEM	JET (OR AMIN) FUNCTION VALUES
0706	REF	4	LAST	1501	20,3544	54 134 0	TS	Z5TEM +2	
0707	REF	4	LAST	1501	20,3545	50 154 1	INDEX	UV	FAIL-

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0708	REF	1		20,3546	3 3766 0	CA	-UMASK	
0709	REF	10	LAST 1501	20,3547	7 1262 1	MASK	CH5MASK	TEST FOR -U (-V) JET FAILURES
0710				20,3550	0 0006 1	EXTEND		
0711	REF	1		20,3551	1 3556 0	BZF	DBFUN	
0712	REF	3	LAST 1501	20,3552	3 0123 1	CA	1/ATEM1	REPLACE FUNCTION VALUES DEPENDING ON THE
0713	REF	4	LAST 1502	20,3553	54 125 0	TS	1/ATEM1 +2	FAILED JET PAIR WITH CORRESPONDING ONE-
0714	REF	3	LAST 1501	20,3554	3 0131 1	CA	ZITEM	JET (OR AMIN) FUNCTION VALUES
0715	REF	4	LAST 1502	20,3555	54 133 1	TS	ZITEM +2	
0716	REF	4	LAST 1500	20,3556	4 0146 0	DBFUN	CS	DBB3
0717	REF	3	LAST 1499	20,3557	6 0143 1	AD	DBB1	COMPUTE AXISDIST
0718	REF	4	LAST 1500	20,3560	6 0151 1	AD	FLATEMP	
0719	REF	1		20,3561	54 147 1	TS	AXDSTEM	
0720	REF	4	LAST 1500	20,3562	4 0145 0	CS	DBB4	
0721	REF	3	LAST 1499	20,3563	6 0144 0	AD	DBB2	
0722	REF	5	LAST 1502	20,3564	6 0151 1	AD	FLATEMP	
0723	REF	2	LAST 1502	20,3565	54 150 1	TS	AXDSTEM +1	
0724				20,3566	0 0004 0	INHINT		
0725	REF	5	LAST 1501	20,3567	10 154 0	CCS	UV	TEST FOR U OR V AXIS
0726	REF	1		20,3570	1 3612 0	TCF	STORV	V AXIS STORE V VALUES
0727	REF	1		20,3571	3 0122 0	CA	ACCSW	U AXIS STORE U VALUES
0728	REF	3	LAST 1464	20,3572	55 547 1	TS	ACCSWU	
0729	REF	1		20,3573	3 4320 1	CA	NINE	TRANSFER 10 WORDS VIA GENTRAN
0730	REF	3	LAST 1379	20,3574	0 5545 0	TC	GENTRAN +1	
0731	REF	5	LAST 1502	20,3575	00123 1	ADRES	1/ATEM1	TEMPORARY BUFFER
0732	REF	12	LAST 1469	20,3576	01567 1	ADRES	1/ANET1	THE REAL PLACE
0733				20,3577	0 0003 1	RELINT		
0734	REF	4	LAST 1502	20,3600	52 144 1	DXCH	DBB1	SAVE U DBS FOR LATER STORING
0735	REF	1		20,3601	52 136 1	DXCH	UDB1	
0736	REF	5	LAST 1502	20,3602	52 146 0	DXCH	DBB4	
0737	REF	1		20,3603	52 140 0	DXCH	UDB4	
0738	REF	3	LAST 1502	20,3604	52 150 1	DXCH	AXDSTEM	
0739	REF	1		20,3605	52 142 1	DXCH	UAXDIST	
0740	REF	181	LAST 1498	20,3606	3 4753 1	CA	ONE	NOW DO V AXIS
0741	REF	6	LAST 1502	20,3607	54 154 0	TS	UV	
0742	REF	315	LAST 1498	20,3610	3 4755 1	CA	ZERO	
0743	REF	1		20,3611	1 3320 1	TCF	BOTHAXES	AND DO IT AGAIN
0744	REF	2	LAST 1502	20,3612	3 0122 0	STORV	CA	ACCSW
0745	REF	1		20,3613	55 550 1	TS	ACCSWV	STORE V AXIS VALUES
0746	REF	2	LAST 1502	20,3614	3 4320 1	CA	NINE	
0747	REF	4	LAST 1502	20,3615	0 5545 0	TC	GENTRAN +1	

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0748	REF	6	LAST 1502	20,3616	00123 1	ADRES	1/ATEM1	TEMPORARY BUFFER
0749	REF	13	LAST 1502	20,3617	01607 1	ADRES	1/ANET1 +16D	THE REAL PLACE
A0750								
0751	REF	6	LAST 1502	20,3620	52 152 0	DXCH	FLATEMP	NOW STORE DEADBANDS FOR ALL AXES
0752	REF	3	LAST 1466	20,3621	53 556 1	DXCH	FLAT	FLAT AND ZONE3LIM
0753	REF	5	LAST 1500	20,3622	3 1346 1	CA	DBVAL1	COMPUTE P AXIS DEADBANDS
0754	REF	1		20,3623	55 561 0	TS	PDB1	
0755	REF	1		20,3624	55 562 0	TS	PDB2	
0756	REF	4	LAST 1503	20,3625	6 1555 0	AD	FLAT	
0757	REF	1		20,3626	55 564 0	TS	PDB3	
0758	REF	1		20,3627	55 563 1	TS	PDB4	
0759	REF	316	LAST 1502	20,3630	3 4755 1	CA	ZERO	
0760	REF	1		20,3631	55 565 1	TS	PAXDIST	
0761	REF	2	LAST 1503	20,3632	55 566 1	TS	PAXDIST +1	
0762	REF	5	LAST 1503	20,3633	11 555 1	CCS	FLAT	
0763	REF	1		20,3634	1 3652 1	TCF	DRFDB	DRIFT OR GTS - COMPUTE DBS
0764	REF	2	LAST 1502	20,3635	52 136 1	DXCH	UDB1	STORE U DEADBANDS
0765	REF	5	LAST 1469	20,3636	53 602 0	DXCH	FIRED8	CANNOT USE GENTRAN BECAUSE OF RELINT
0766	REF	2	LAST 1502	20,3637	52 140 0	DXCH	UDB4	
0767	REF	2	LAST 1463	20,3640	53 604 0	DXCH	COASTDB	
0768	REF	2	LAST 1502	20,3641	52 142 1	DXCH	UAXDIST	
0769	REF	3	LAST 1466	20,3642	53 606 1	DXCH	AXISDIST	
0770	REF	5	LAST 1502	20,3643	52 144 1	DXCH	DBB1	STORE V AXIS DEADBANDS
0771	REF	6	LAST 1503	20,3644	53 622 1	DXCH	FIRED8 +16D	COULD USE GENTRAN IF DESIRED
0772	REF	6	LAST 1502	20,3645	52 146 0	DXCH	DBB4	
0773	REF	3	LAST 1503	20,3646	53 624 1	DXCH	COASTDB +16D	
0774	REF	4	LAST 1502	20,3647	52 150 1	DXCH	AXDSTEM	
0775	REF	4	LAST 1503	20,3650	53 626 0	DXCH	AXISDIST +16D	
0776	REF	2	LAST 1491	20,3651	1 3672 0	TCF	1/ACCRET +1	ALL DONE
0777	REF	6	LAST 1503	20,3652	3 1346 1	CA	DBVAL1	DRIFT DEADBANDS
0778	REF	7	LAST 1503	20,3653	55 601 0	TS	FIRED8	
0779	REF	8	LAST 1503	20,3654	55 602 0	TS	FIRED8 +1	
0780	REF	9	LAST 1503	20,3655	55 621 1	TS	FIRED8 +16D	
0781	REF	10	LAST 1503	20,3656	55 622 1	TS	FIRED8 +17D	
0782	REF	6	LAST 1503	20,3657	6 1555 0	AD	FLAT	
0783	REF	4	LAST 1503	20,3660	55 603 1	TS	COASTDB	
0784	REF	5	LAST 1503	20,3661	55 604 0	TS	COASTDB +1	
0785	REF	6	LAST 1503	20,3662	55 623 0	TS	COASTDB +16D	
0786	REF	7	LAST 1503	20,3663	55 624 1	TS	COASTDB +17D	
0787	REF	317	LAST 1503	20,3664	3 4755 1	CA	ZERO	
0788	REF	5	LAST 1503	20,3665	55 605 1	TS	AXISDIST	
0789	REF	6	LAST 1503	20,3666	55 606 1	TS	AXISDIST +1	
0790	REF	7	LAST 1503	20,3667	55 625 0	TS	AXISDIST +16D	
0791	REF	8	LAST 1503	20,3670	55 626 0	TS	AXISDIST +17D	

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0792				20,3671	0 0004 0	1/ACCRET	INHINT		
0793	REF	68	LAST 1497	20,3672	4 0111 1		CS	DAPBOOLS	SET BIT TO INDICATE DATA GOOD.
0794	REF	3	LAST 1411	20,3673	7 4751 1		MASK	ACCSOKAY	
0795	REF	69	LAST 1504	20,3674	26 111 1		ADS	DAPBOOLS	
0796				20,3675	0 0002 1		RELINT		
0797	REF	2	LAST 1486	20,3676	3 0117 0		CA	ACCRETRN	
0798	REF	22	LAST 1370	20,3677	0 4640 1		TC	BANKJUMP	RETURN TO CALLER
0799	REF	1		20,3700	54 165 1	INVERT	TS	HOLD	ROUTINE TO INVERT -INPUT AT PI/2
0800	REF	42	LAST 1501	20,3701	3 4743 0		CA	BIT9	1 AT 2(6)
0801				20,3702	22 007 0		ZL		ZERO L FOR ACCURACY AND TO PREVENT OVFLD
0802				20,3703	0 0006 1		EXTEND		
0803	REF	2	LAST 1504	20,3704	10 165 1		DV	HOLD	
0804	REF	430	LAST 1493	20,3705	0 0002 0		TC	Q	RESULT AT 2(7)/PI
0805	REF	318	LAST 1503	20,3706	3 4755 1	DOWNGTS	CAF	ZERO	ZERO SWITCHES WHEN USEQRJTS BIT IS UP
0806	REF	7	LAST 1497	20,3707	55 502 0		TS	ALLOWGTS	OR DAP IS OFF.
0807	REF	8	LAST 1497	20,3710	55 633 1		TS	INGTS	
0808	REF	2	LAST 1491	20,3711	1 2773 1		TCF	DOCKTEST	
0809				20,3712	22 007 0	1/ANET-	ZL		
0810	REF	3	LAST 1502	20,3713	22 122 0		LXCH	ACCSW	ZERO ACCSW
0811	REF	6	LAST 1501	20,3714	54 157 0		TS	ANET	SAVE ANET
0812	REF	4	LAST 1501	20,3715	6 3764 1		AD	-.03R/S2	TEST FOR MIN VALUE
0813				20,3716	0 0006 1		EXTEND		
0814	REF	1		20,3717	6 3740 1		BZMF	NETNEG	ANET LESS THAN AMIN. SO FAKE IT
0815	REF	7	LAST 1504	20,3720	3 0157 1	1/NETMIN	CA	ANET	
0816				20,3721	0 0006 1		EXTEND		
0817	REF	10	LAST 1501	20,3722	5 0164 1		INDEX	-SIGNADS	
0818	REF	5	LAST 1500	20,3723	7 0130 1		MP	1/ACOSTT +1	ANETNEG(POS)/ACOSTPOS(NEG) AT 2(6)
A0819									THE FOLLOWING CODING IS VALID FOR BOTH POS OR NEG
A0820									VALUES OF ADS
0821	REF	43	LAST 1504	20,3724	6 4743 0	DO1/NET+	AD	BIT9	1 + ANET/ACOST AT 2(6)
0822	REF	8	LAST 1504	20,3725	56 157 1		XCH	ANET	SAVE AND PICK UP ANET
0823				20,3726	0 0006 1		EXTEND		
0824	REF	2	LAST 1500	20,3727	22 161 1		QXCH	ARET	SAVE RETURN
0825	REF	4	LAST 1499	20,3730	0 3700 0		TC	INVERT	
0826	REF	6	LAST 1501	20,3731	54 160 1		TS	1/ANET	1/ANET AT 2(7)/PI
0827	REF	44	LAST 1504	20,3732	4 4743 1		CS	BIT9	-1 AT 2(6)
0828				20,3733	0 0006 1	DOACCFUN	EXTEND		
0829	REF	7	LAST 1504	20,3734	7 0160 1		MP	1/ANET	-1/ANET AT 2(13)/PI
0830				20,3735	0 0006 1		EXTEND		
0831	REF	9	LAST 1504	20,3736	10 157 0		DV	ANET	ACCFUN AT 2(7)/PI
0832	REF	3	LAST 1504	20,3737	0 0161 1		TC	ARET	RETURN
0833	REF	5	LAST 1504	20,3740	4 3764 0	NETNEG	CS	-.03R/S2	ANET LESS THAN AMIN - SET EQUAL TO AMIN
0834	REF	10	LAST 1504	20,3741	54 157 0		TS	ANET	

L ADSTASK AND ADSJ03

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0835 REF 2 LAST 1501 20,3742 1 3721 1 TCF 1/NETMIN +1 CONTINUE AS IF NOTHING HAPPENED

0836	REF	12	LAST	1501	20,3743	10 163 1	FIXMIN	CCS	SIGNAOS	
0837	REF	109	LAST	1489	20,3744	3 4752 0		CA	TWO	IF AUS NEG, ACCSW = +1
0838	REF	15	LAST	1472	20,3745	6 7747 1		AD	NEGONE	IF ADS POS, ACCSW = -1
0839	REF	4	LAST	1504	20,3746	54 122 1		TS	ACCSW	
0840	REF	7	LAST	1502	20,3747	6 0154 1		AD	UV	IF ACCSW = +1, TEST FOR +U (+V) JET FAIL
0841	REF	538	LAST	1501	20,3750	50 000 1		INDEX	A	IF ACCSW = -1, TEST FOR -U (-V) JET FAIL
0842	REF	2	LAST	1502	20,3751	3 3767 1		CA	-UMASK +1	
0843	REF	11	LAST	1502	20,3752	7 1262 1		MASK	CH5MASK	
0844					20,3753	0 0006 1		EXTEND		
0845					20,3754	1 3760 1		BZF	+4	
0846	REF	6	LAST	1504	20,3755	4 3764 0		CS	-.03R/S2	JET FAILURE - CANNOT USE 2-JET VALUES
0847	REF	11	LAST	1504	20,3756	54 157 0		TS	ANET	ANET = AMIN
0848	REF	1			20,3757	1 3526 1		TCF	STMIN- -1	CALCULATE FUNCTIONS USING AMIN
0849	REF	310	LAST	1501	20,3760	3 0001 0		CA	L	L HAS ACCFUN
0850	REF	2	LAST	1505	20,3761	1 3527 0		TCF	STMIN-	STORE MAX VALUES FOR MIN JETS

A0851

ERASABLE ASSIGNMENTS FOR 1/ACCONT

0852	REF	5	LAST	134	E6,1551		1/ANETP	EQUALS	BLOCKTOP +2
0853	REF	6	LAST	1505	E6,1553		1/ACOSTP	EQUALS	BLOCKTOP +4
0854	REF	7	LAST	1505	E6,1557		PACCFUN	EQUALS	BLOCKTOP +80
0855	REF	8	LAST	1505	E6,1561		PDB1	EQUALS	BLOCKTOP +100
0856	REF	9	LAST	1505	E6,1562		PDB2	EQUALS	BLOCKTOP +110
0857	REF	10	LAST	1505	E6,1563		PDB4	EQUALS	BLOCKTOP +120
0858	REF	11	LAST	1505	E6,1564		PDB3	EQUALS	BLOCKTOP +130
0859	REF	12	LAST	1505	E6,1565		PAXDIST	EQUALS	BLOCKTOP +140

0860	REF	71	LAST	1264	0122		ACCSW	EQUALS	VBUF	EXECUTIVE TEMPORARIES
A0861										CANNOT DO CCS NEWJOB DURING 1/ACCS

0862	REF	5	LAST	1505	0123		1/ATEM1	EQUALS	ACCSW +1	TEMP BUFFER FOR U AND V AXES
0863	REF	7	LAST	1503	0124		1/ATEM2	EQUALS	1/ATEM1 +1	
0864	REF	8	LAST	1505	0127		1/ACOSTT	EQUALS	1/ATEM1 +4	
0865	REF	9	LAST	1505	0131		Z1TEM	EQUALS	1/ATEM1 +6	
0866	REF	10	LAST	1505	0132		Z5TEM	EQUALS	1/ATEM1 +7	

0867	REF	11	LAST	1505	0135		UDB1	EQUALS	1/ATEM1 +100	U AXIS DEADBAND BUFFER
0868	REF	12	LAST	1505	0136		UDB2	EQUALS	1/ATEM1 +110	
0869	REF	13	LAST	1505	0137		UDB4	EQUALS	1/ATEM1 +120	
0870	REF	14	LAST	1505	0140		UDB3	EQUALS	1/ATEM1 +130	
0871	REF	15	LAST	1505	0141		UAXDIST	EQUALS	1/ATEM1 +140	

0872	REF	16	LAST	1505	0143		DBB1	EQUALS	1/ATEM1 +160	TEMP DEADBAND BUFFER, ALSO V AXIS
0873	REF	17	LAST	1505	0144		DBB2	EQUALS	1/ATEM1 +170	
0874	REF	18	LAST	1505	0145		DBB4	EQUALS	1/ATEM1 +180	
0875	REF	19	LAST	1505	0146		DBB3	EQUALS	1/ATEM1 +190	
0876	REF	20	LAST	1505	0147		AXDSTEM	EQUALS	1/ATEM1 +200	

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0877	REF	21	LAST 1505	0151	FLATEMP	EQUALS 1/ATEM1 +22D
0878	REF	22	LAST 1505	0152	Z3TEM	EQUALS 1/ATEM1 +23D MUST FOLLOW FLATEMP
0879	REF	6	LAST 1499	1346	DBVAL1	EQUALS DB
0880	REF	5	LAST 604	0114	DBVAL2	EQUALS INTB15+
0881	REF	6	LAST 1506	0115	DBVAL3	EQUALS INTB15+ +1
0882	REF	7	LAST 1506	0116	DRIFTER	EQUALS INTB15+ +2
0883	REF	913	LAST 1496	0154	UV	EQUALS MPAC
0884	REF	914	LAST 1506	0157	ANET	EQUALS MPAC +3
0885	REF	915	LAST 1506	0157	FUNTEM	EQUALS MPAC +3
0886	REF	916	LAST 1506	0160	1/ANET	EQUALS MPAC +4
0887	REF	917	LAST 1506	0161	ARET	EQUALS MPAC +5
0888	REF	918	LAST 1506	0162	ABSAOS	EQUALS MPAC +6
0889	REF	919	LAST 1506	0163	SIGNAOS	EQUALS MPAC +7
0890	REF	920	LAST 1506	0164	-SIGNAOS	EQUALS MPAC +8D
0891	REF	921	LAST 1506	0165	HOLD	EQUALS MPAC +9D
0892	REF	63	LAST 1401	0117	ACCRETRN	EQUALS FIXLOC -1

0892			20,3762	00110 1	ZONE3MAX DEC	.004375	17.5 MS (35 MS FOR 1 JET) AT 4 SECONDS
0894			20,3753	00443 1	FLATVAL DEC	.01778	.8 AT PI/4 RAD
0895			20,3764	77377 1	-.03R/S2 OCT	77377	-PI/2(7) AT PI/2
0896	REF	45	LAST 1500	4744	.0125RS	EQUALS BIT8	PI/2(+8) AT PI/2
0897	REF	46	LAST 1501	4733	1/.03	EQUALS POSMAX	2(7)/PI AT 2(7)/PI
0898	REF	2	LAST 1413	20,3765	02213 0	PAXISADR GENADR PAXIS	

							THE FOLLOWING 4 CONSTANTS ARE JET FAILURE MASKS AND ARE INDEXED
A0899							
A0900							
0901			20,3766	00110 1	-UMASK OCT	00110	-U
0902			20,3767	00022 1	OCT	00022	-V
0903			20,3770	00204 1	+UMASK OCT	00204	+U
0904			20,3771	00041 1	OCT	00041	+V

L SPS BACK-UP RCS CONTROL

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P0001 PROGRAM NAME: SPSRCS

R0002 AUTHOR: EDGAR M. OSHIKA (AC ELECTRONICS)

R00021 MODIFIED: TO RETURN TO ALL AXES VIA Q BY P.S.WEISSMAN, OCT 7, 1968

R00022 *MODIFIED TO IMPROVE BENDING STABILITY BY G.KALAN,FEB.14.1969

R0003 FUNCTIONAL DESCRIPTION:

R0004 THIS PROGRAM CONTROLS THE FIRING OF ALL RCS JETS IN THE DUCKED CONFIGURATION ACCORDING TO THE FOLLOWING PHASE
R0006 PLANE LOGIC.

R0007 *1. JET SENSE TEST (SPSRCS)

R0008 *IF JETS ARE FIRING NEGATIVELY,SET OLDSENSE NEGATIVE AND CONTINUE

R0009 *IF JETS ARE FIRING POSITIVELY,SET OLDSENSE POSITIVE AND CONTINUE

R0010 *IF JETS ARE NOT FIRING,SET OLDSENSE TO ZERO AND GO TO OUTER RATE LIMIT TEST

R0012 *2. RATE DEAD BAND TEST

R0013 *IF JETS ARE FIRING NEGATIVELY AND RATE IS GREATER THAN TARGET RATE,LEAVE

R0014 *JETS ON AND GO TO INHIBITION LOGIC. OTHERWISE,CONTINUE.

R0015 *IF JETS ARE FIRING POSITIVELY AND RATE IS LESS THAN TARGET RATE,LEAVE

R0016 *JETS ON AND GO TO INHIBITION LOGIC. OTHERWISE,CONTINUE.

R0017 *3. OUTER RATE LIMIT TEST (SPSSTAPT)

R0018 *IF MAGNITUDE OF EDOT IS GREATER THAN 1.73 DEG/SEC SET JET FIRING TIME

R0019 * TO REDUCE RATE AND GO TO INHIBITION LOGIC. OTHERWISE,CONTINUE.

R0020 *4. COAST ZONE TEST

R0021 IF STATE (E,EDOT) IS BELOW LINE $E + 4 \times EDOT > -1.4 \text{ DEG}$ AND EDOT IS LESS THAN 1.30 DEG/SEC SET JET TIME POSI-
R0023 *TIVE AND CONTINUE. OTHERWISE,SET JET FIRING TIME TO ZERO AND CONTINUE.R0024 IF STATE IS ABOVE LINE $E + 4 \times EDOT > +1.4 \text{ DEG}$ AND EDOT IS GREATER THAN -1.30 DEG/SEC, SET JET TIME NEGATIVE

R0026 *AND CONTINUE. OTHERWISE,SET JET FIRING TIME TO ZERO AND CONTINUE.

R0027 *5. INHIBITION LOGIC

R0028 *IF OLDSENSE IS NON-ZERO:

R0029 * A) RETURN IF JET TIME HAS SAME SIGN AS OLDSENSE

R0030 * B) SET INHIBITION COUNTER*AND RETURN IF JET TIME IS ZERO

R0031 * C) SET INHIBITION COUNTER,*SET JET TIME TO ZERO AND RETURN IF SIGN

R0032 * OF JET TIME IS OPPOSITE TO THAT OF OLDSENSE

R0033 *IF OLDSENSE IS ZERO:

R0034 * A) RETURN IF INHIBITION COUNTER IS NOT POSITIVE

R0035 * B) SET JET TIME TO ZERO AND RETURN IF INHIBITION COUNTER IS POSITIVE

R0037 **NOTE: INHIBITION COUNTERS CAN BE SET TO 4 OR 10 FOR THE P,AND UV AXES,

R0038 *RESPECTIVELY,IN SPSPCS. THEY ARE DECREMENTED BY ONE AT THE BEGINNING OF

L SPS BACK-UP RCS CONTROL

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R0039 *EACH DAP PASS.

R0040 THE MINIMUM PULSE WIDTH OF THIS CONTROLLER IS DETERMINED BY THE REPETITION RATE AT WHICH THIS ROUTINE IS CALLED
 R0042 AND IS NOMINALLY 100 MS FOR ALL AXES IN DRIFTING FLIGHT. DURING POWERED FLIGHT THE MINIMUM IS 100 MS FOR THE
 R0044 P AXIS AND 200 MS FOR THE CONTROL OF THE U AND V AXES.

R0045 CALLING SEQUENCE:

R0046 * INHINT

R0047 TC IBNKCALL

R0048 CADR SPSRCS

R0049 EXIT:

R0050 TC Q

R0051 ALARM/ABORT MODE: NONE

R0052 SUBROUTINES CALLED: NONE

R0053 INPUT: E, EDOT

R0054 TJP, TJV, TJU

TJ MUST NOT BE NEGATIVE ZERO

R0055 OUTPUT: TJP, TJV, TJU

R0056 *

0057 * 21,3646
 0058 *REF 3 LAST 1477 21,2000
 0059 21,3646

BANK 21
 SETLOC DAPS4
 BANK

0060 REF 1

COUNT* \$\$/DAPBU

0061 REF 14 LAST 1458 E6,1525

EBANK= TJU

0062 * 21,3646 00632 0 RATELIM2

OCT 00632

1.125 DEG/SEC

0063 REF 28 LAST 1397 21,3647 3 4736 1 POSTHRST

CA HALF

0064 REF 33 LAST 1464 21,3650 51'505 0

NDX AXISCTR

0065 REF 15 LAST 1508 21,3651 55'525 0

TS TJU

0066 *REF 1 21,3652 11'745 1

CCS OLDSENSE

0067 *REF 1 21,3653 1 3673 1

TCF POSCHECK

JETS FIRING POSITIVELY

0068 *REF 1 21,3654 1 3676 1

TCF CTRCHECK

JETS OFF. CHECK INHIBITION CTR

0069 *REF 34 LAST 1508 21,3655 51'505 0

NEGCHECK

INDEX AXISCTR

JETS FIRING NEGATIVELY

0070 *REF 16 LAST 1508 21,3656 4'1525 0

CS TJU

0071 *REF 539 LAST 1505 21,3657 10'000 0

CCS A

0072 *REF 431 LAST 1504 21,3660 0'0002 0

TC 0

RETURN

0073 * 21,3661 1 3663 0

TCF +2

0074 * 21,3662 1 3663 0

TCF +1

JETS COMMANDED OFF. SET CTR AND RETURN

0075 *REF 35 LAST 1508 21,3663 51'505 0

SETCTR

INDEX AXISCTR

JET FIRING REVERSAL COMMANDED. SET CTR,

0076 *REF 1 21,3664 3 3705 0

CA UTIME

SET JET TIME TO ZERO AND RETURN

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0077	*REF	36	LAST	1508	21,3665	51'505 0	INDEX	AXISCTR	
0078	*REF	3	LAST	1428	21,3666	55'770 1	TS	UJETCTR	
0079	*REF	319	LAST	1504	21,3667	3 4755 1	CA	ZERO	
0080	*REF	37	LAST	1509	21,3670	51'505 0	INDEX	AXISCTR	
0081	*REF	17	LAST	1508	21,3671	55'525 0	TS	TJU	
0082	*REF	432	LAST	1508	21,3672	0 0002 0	TC	Q	
0083	*REF	38	LAST	1509	21,3673	51'505 0	INDEX	AXISCTR	
0084	*REF	18	LAST	1509	21,3674	3 1525 1	CA	TJU	
0085	*REF	1			21,3675	1 3657 1	TCF	NEGCHECK +2	
0086	*REF	39	LAST	1509	21,3676	51'505 0	INDEX	AXISCTR	CHECK JET INHIBITION COUNTER
0087	*REF	4	LAST	1509	21,3677	11'770 1	CCS	UJETCTR	
0088	*				21,3700	1 3702 0	TCF	+2	
0089	*REF	433	LAST	1509	21,3701	0 0002 0	TC	Q	CTR IS NOT POSITIVE. RETURN
0090	*REF	1			21,3702	1 3667 1	TCF	ZAPTJ	CTR IS POSITIVE. INHIBIT FIRINGS
0091	*REF	434	LAST	1509	21,3703	0 0002 0	TC	Q	CTR IS NOT POSITIVE. RETURN
0092	*				21,3704	00004 0	OCT	00004	
0093	*				21,3705	00012 1	OCT	00012	
0094	*				21,3706	00012 1	OCT	00012	
0095	*REF	3	LAST	133	E6,1745		OLDSENSE	EQUALS	DAPTREG1
0096	*REF	182	LAST	1502	21,3707	4 4752 0	NEGFIRES	CS	ONE
0097	*REF	2	LAST	1508	21,3710	55'745 1	TS	OLDSENSE	JETS FIRING NEGATIVELY
0098	*REF	18	LAST	1469	21,3711	3 1427 1	CA	EDDT	
0099	*				21,3712	1 3716 0	TCF	+4	
0100	*REF	183	LAST	1509	21,3713	3 4753 1	PLUSFIRE	CA	ONE
0101	*REF	3	LAST	1509	21,3714	55'745 1	TS	OLDSENSE	
0102	*REF	19	LAST	1509	21,3715	4 1427 0	CS	EDDT	RATE DEAD BAND TEST
0103	REF	540	LAST	1508	21,3716	22 000 1	LXCH	A	
0104	REF	70	LAST	1504	21,3717	4 0111 1	CS	DAPBOOLS	IF DRIFTBIT = 1, USE ZERO TARGET RATE
0105	REF	7	LAST	1497	21,3720	7 4744 0	MASK	DRIFTBIT	IF DRIFTBIT = 0, USE 0.10 RATE TARGET
0106	REF	541	LAST	1509	21,3721	10 000 0	CCS	A	
0107	REF	1			21,3722	3 4767 0	CA	RATEDBL	
0108	REF	311	LAST	1505	21,3723	6 0001 0	AD	L	
0109					21,3724	0 0006 1	EXTEND		
0110	*REF	1			21,3725	6 3735 0	BZMF	SPSSTART	
0111	REF	1			21,3726	1 3652 1	TCF	POSTHRST +3	
0112	*REF	40	LAST	1509	21,3727	51'505 0	SPSRCS	INDEX	AXISCTR
0113	*REF	19	LAST	1509	21,3730	11'525 0	CCS	TJU	JET SENSE TEST
0114	*REF	1			21,3731	1 3713 0	TCF	PLUSFIRE	JETS FIRING POSITIVELY
0115	*				21,3732	1 3734 0	TCF	+2	
0116	*REF	1			21,3733	1 3707 0	TCF	NEGFIRES	JETS FIRING NEGATIVELY
0117	*REF	4	LAST	1509	21,3734	55'745 1	TS	OLDSENSE	JETS OFF
0118	*REF	20	LAST	1509	21,3735	3 1427 1	SPSSTART	CA	EDDT
0119	*				21,3736	0 0006 1	EXTEND		OUTER RATE LIMIT TEST
0120	*REF	1			21,3737	7 4766 0	MP	RATELIM1	
0121	*REF	542	LAST	1509	21,3740	10 000 0	CCS	A	
0122	*REF	1			21,3741	1 3760 1	TCF	NEGTHRST	OUTER RATE LIMIT EXCEEDED
0123	*				21,3742	1 3744 1	TCF	+2	
0124	*REF	2	LAST	1509	21,3743	1 3647 0	TCF	POSTHRST	OUTER RATE LIMIT EXCEEDED
0125	*REF	21	LAST	1509	21,3744	3 1427 1	CA	EDDT	COAST ZONE TEST

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0126	REF 17	LAST 1469	21,3745	6 1752 0	AD	E	
0127			21,3746	0 0006 1	EXTEND		
0128	REF 2	LAST 213	21,3747	7 1411 0	MP	DKDB	PAD LOADED DEADBAND. FRESHSTART: 1.4 DEG
0129			21,3750	0 0006 1	EXTEND		
0130	REF 1		21,3751	1 3766 1	BZF	TJZERO	
0131			21,3752	0 0006 1	EXTEND		
0132			21,3753	6 3762 1	BZMF	+7	
0133	REF 22	LAST 1509	21,3754	3 1427 1	CA	EDDT	
0134	REF 1		21,3755	6 3646 0	AD	RATELIM2	
0135			21,3756	0 0006 1	EXTEND		
0136	REF 2	LAST 1510	21,3757	6 3766 0	BZMF	TJZERO	
0137	REF 29	LAST 1508	21,3760	4 4736 0	CS	HALF	NEGTHRST
0138	REF 3	LAST 1509	21,3761	1 3650 0	TCF	POSTHRST +1	
0139	REF 2	LAST 1510	21,3762	4 3646 1	CS	RATELIM2	+7
0140	REF 23	LAST 1510	21,3763	6 1427 1	AD	EDDT	
0141			21,3764	0 0006 1	EXTEND		
0142	REF 4	LAST 1510	21,3765	6 3647 1	BZMF	POSTHRST	
0143	REF 320	LAST 1509	21,3766	3 4755 1	CA	ZERO	TJZERO
0144	REF 5	LAST 1510	21,3767	1 3650 0	TCF	POSTHRST +1	

0145	REF 5	LAST 1427	4766	RATELIM1 =	CALLCODE	= 00032, CORRESPONDING TO 1.73 DEG/SEC
0146	REF 1		4757	RATEDB1 =	TBUILDFX	= 00045, CORRESPONDS TO 0.101 DEG/SEC

*** END OF LMDAP .015 ***

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
.0075A8	17,3736	1469	1 1465	-.1875	20,3227	1496	1 1499	-TPER	E4,1542	=	115 6 306 721
.0125RS	4744	=	1506 1 1500	-.7071	20,3103	1494	2 1489 1495	-UMASK	20,3766	=	1506 2 1502 1505
.0375AT4	17,3731	1469	1 1467	-AYO	E3,1713	111	1 1147	-UP	00,2620	=	1063 1 1062
.1AT2	17,3730	1469	1 1467	-AZ	11,2351	821		-XMIN	16,3062	=	1431 1 1431
.1AT4	17,3727	1469	1 1465	-AZBIT	4746	=	821 1 821	-XTRANS	17,2147	=	1443 1 1443
.165...	23,3535	1257	1 1253	-BIT10	06,3004	181	1 177	-0.3D/S	01,2343	=	296 1 294
.3D	12,3751	1246	1 1218	-BIT12	7741	=	528 1 528	-0.6D/S	01,2342	=	295 1 294
.5SEC	4774	1096	3 516 1335	-BIT14	7736	1098	2 1423	-1/12	13,3713	=	1247 1 1237
.5SECB17	33,2176	598	1 598	-CCSPR	01,3152	1113	1 1115	-1/2+2	00,2444	=	1059 1 1080
.7071	20,3102	1494	2 1488 1495	-COMMAX	07,3745	1331	2 1313 1314	-1/8	7741	=	1098 3 528 1468
=====				-COMMAX-	07,3746	1331	2 1313 1314	-1CHK	43,3273	=	1287 5 1288 1293
(AT)A	27,2016	39	1 841	-COSR	E5,1644	=	123 1 123	-100MS	16,3615	=	1441 2 1470
(TBUP)A	27,2020	39	1 841	-DEC103	31,3747	827	1 826	-100MST6	16,3731	=	1471 3 1470
(TG)A	32,3760	836	1 839	-DELGMB	E6,1675	=	136 18 914 918	-136MST6	16,3572	=	1440 2 1437 1440
(1/DV)A	27,2012	38	1 841	-EL	11,2363	821		-15DEGS	06,2513	=	170 1 169
=====				-ELBIT	4753	=	821 1 821	-150MS	17,3110	=	1456 1 1453
+AZ	11,2356	821		-ELR	05,3361	223	1 218	-160MST6	16,3527	=	1439 1 1439
+AZBIT	4747	=	821 1 821	-ENDERAS	7743	1098	1 1005	-2JETLIM	E6,1475	=	130 4 130 1487
+DECSGN	40,2303	401	1 400	-ENDVAC	6251	1009	2 1005 1023	-2SEC	10,3570	=	1382 1 1369
+DEC99	31,3750	827	1 826	-EPSILON	0155	=	1496 5 1488 1489	-3DEG	17,3725	=	1469 2 1462
+DOWN	00,2610	1063	1 1062	-EPSMAX	20,3104	1494	4 1488	-45DEGSR	7740	=	532 1 531
+EL	11,2370	821		-FOURDEG	16,3530	1439	1 1438	-50DEGSR	25,2231	=	532 1 532
+ELBIT	4752	=	821 1 821	-FOURDT	27,2534	772	1 771	-50SC	04,3052	=	1185 1 1174
+LIMIT	42,2337	422	1 422	-GYROMIN	07,3520	1323	2 1323 1326	-70DEGS	06,2512	=	170 1 169
+MGA	E4,1652	=	117 5 314 692	-LUKONFG	23,2040	271		-80DEGSR	25,2232	=	532 1 532
+ON	40,2413	402	3 402 441	-MAXADRS	4350	=	1286 1 1291	=====			
+QMIN	17,2252	1445	1 1444	-MUDT	33,2031	44	1 880	/AF/CNST	31,2417	=	797 1 793
+RMIN	17,2262	1445	1 1445	-MUDTMUN	33,2035	44	1 883	/AFC/	E7,1463	=	140 6 140 819
+TJMINT6	17,3107	1455	4 1446 1454	-MUDT1	33,2033	44		/BUF+	00,2721	=	1067 2 1066
+UMASK	20,3770	1506	1 1501	-OCT10	6222	1008	1 1008	/BUF-	00,2715	=	1066 2 1066
+XMIN	16,3064	1431	1 1431	-OCT630	16,2315	1423	1 1422	/LAND/	E4,1732	=	120 10 119 883
+XDRULGE	17,2146	1443	2 1442 1443	-ON	40,2433	403	2 402 441	/MPAC+	00,2767	=	1068 2 1068
+150MST6	16,3612	1441	1 1437	-PHASE1	0752	100	7 214 1301	/MPAC-	00,2763	=	1068 2 1068
=====				-PHASE2	0754	101	8 214 872	/NORM	00,2732	=	1067 1 1067
*ENTER	36,3044	746	1 745	-PHASE3	0756	101	5 214 865	/NORM2	00,2725	=	1067 1 1067
NBSM	23,3673	1263	6 550 968	-PHASE4	0760	101	9 214 1383	/R/MAG	E4,1700	=	119 5 119 850
*PROCEED	36,3041	746	1 745	-PHASE5	0762	101	2 214 859	=====			
SMNB	23,3671	1263	7 487 966	-PHASE6	0764	101	6 214 1395	?	6001	=	749
=====				-QMIN	17,2256	1445	1 1444	?GUIDSUB	31,2454	=	799 1 786
-.0112A8	17,3726	1469	1 1464	-RATEDB	E6,1476	=	130 7 130 1447	=====			
-.025AT2	17,3732	1469	1 1467	-RMIN	17,2264	1445	1 1445	A	0000	=	92 542 158 1509
-.025AT4	17,3733	1469	1 1465	-RRLIMIT	25,2315	535	2 536	A-PCHK	13,3157	=	1216 4 1213 1225
-.03R/S2	20,3764	1506	6 1498 1505	-SIGNADS	0164	=	1506 10 1498 1504	AAPFS	E5,1452	=	121 1 121
-.05AT2	17,3734	1469	1 1464	-TJMAX	17,3740	1469	2 1465 1466	AAPFG*	E5,1462	=	121 1 121
-.15AT2	17,3735	1469	1 1464	-TJMIN	17,3742	1469	1 1467	ABCLOAD	41,2616	=	425 1 409

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
ABDELV	1246	=	105 7 105 1495	ACCTHERE	20,3463	1500	1 1500	ADUPTMP	04,3514	1391	1 1390
ABDVCONV	E7,1513	=	147 5 147 860	ACCWD	E5,1512	=	128 2 386 387	ADVAN	01,3214	1116	2 1110 1287
ABLDAD	41,2703		426 1 409	ACC4-2FL	0307	=	87 2 833 838	ADVANCE	34,3016	642	2 622 627
ABORT	5644	=	1384	ACC4OR2X	4741	=	87 2 293 1443	AFCCALC1	31,3204	809	1 815
ABORTALM	21,2124		836 2 835 836	ACDT+C12	16,3736		1476 2 1428 1480	AFCCALC2	31,3214	809	
ABORTON	21,3067		907 1 907	ACENTRAL	E6,1744	=	132 5 1473 1475	AFCCALC3	31,3230	809	1 809
ABORTS	32,2000	=	34 2 832 836	ACMODBIT	4737	=	68	AFCCLEND	31,3236	810	1 810
ABORTSI	05,2000	=	29 1 830	ACMODFLG	0040	=	68 3 496 498	AFCSPOT	32,3504	819	2 819
ABORTYZ	16,2771		1430 1 1440	ACOS=0	00,3637		1084 4 1084 1086	AFDUMP	31,2223	793	
ABORTZ	5654		1383 1 1383	ACOSABRT	00,3723		1086	AFTERTJ	17,2727	1453	3 1446 1452
ABOUTONE	15,2046		251 2 250 959	ACOSOVF	00,3721		1085 1 1084	AFTRFLTR	30,3215	913	1 912
ABWFG	E5,1416	=	121 2 121 826	ACOSSHR	00,3714		1086 1 1084	AFTRGUID	31,2435	798	1 810
ABWFG*	E5,1426	=	121 2 121 826	ACOSST	00,3625		1084 1 1084	AGAINMM	04,2073	228	1 228
ABRTABLE	36,2112		733 1 836	ACOSST2	00,3642		1084 2 1084	AGSBUFF	E4,1600	=	117 14 117 274
ABRTIGN	36,2531		740 1 733	ACOSZERO	00,3731		1086 1 1084	AGSBUFFE	E4,1615	=	117
ABRTJADR	05,3405		831 1 830	ACOS3	00,3652		1085 1 1086	AGSDISPK	32,2022	207	
ABRTJASK	05,3406		831 1 831	ACTCENT	E3,1755		111 2 314 673	AGSEND	32,2122	208	2 208
ABS	00,3226		1075 4 823 1075	ACTIVE	23,2402		697 4 627 697	AGSINIT	32,2005	206	1 274
ABSADS	0162	=	1506 12 1498 1501	ADDGRAV	15,2740		966 1 966	AGSK	E4,1420	113	6 196 208
ABSEDETP	E6,1737	=	131 2 1435	ADDITIN	21,3563		1483 1 1482	AGSLIST	05,2407	=	193
ABSTJ	E6,1737	=	131 9 1436 1455	ADDPDS	30,2002		610 1 610	AGSRND1	32,2203	209	2 209
ABTCDF	E5,1550	=	122 5 122 834	ADDRESS	6103		1004	AGSRND2	32,2211	209	2 209
ABTCNIC	12,3742		1201 3 1186 1199	ADDRWD	0116		96 83 921 1267	AGSUPDAT	0001	=	236
ABTFLGS	13,2000	=	30 1 1384	ADG	E5,1416	=	826 1 809	AGSVCALC	32,2036	207	1 207
ABTRDOT	E5,1574	=	122 2 122 334	ADG2TTF	E5,1426	=	826 1 807	AGSWORD	1324	107	4 208 229
ABVAL	00,3201		1075	ADIAX	E3,1463		110 1 329	AHEAD5	6433	1016	1 1016
ABVALABS	00,3176		1075 1 1013	ADIAV	E3,1464		110 1 329	AIG	E7,1457	139	9 199 893
ABVEL	E7,1471	=	147 8 147 889	ADIAZ	E3,1465		110 1 330	AIGBANK	26,3332	585	2 579 584
ABVEL*	0130	=	122 3 888	ADRPCHN2	5366		1299 1 1299	AIMER	30,2665	849	1 849
ACADN83	36,3763		763 1 758	ADRUPT	17,3240		1458 1 1458	AINGTN	37,2217	376	1 376
ACADN85	36,2055	=	763 1 754	ADRS+1	43,3625		1292	AINLA	E5,1434	=	128 33 128
ACCDOTQ	E6,1507		132 8 132 1490	ADRSCAN	27,2214		751 1 751	AK	E6,1761	137	21 137 1419
ACCDOTR	E6,1511	=	132 4 1476 1496	ADRSCHK	43,3574		1291 2 1291	AK1	E6,1762	=	137 1 1418
ACCEPTUP	04,3307		1338 2 1339	ADRSDF1	E6,1746	=	133 12 1461 1469	AK2	E6,1763	=	137 1 1418
ACCEPTWD	41,2027		406 2 406	ADRSDF2	F6,1744	=	133 11 1461 1468	ALARM	5567	1381	51 164 1458
ACCFCTZ1	E6,1575	=	134 1 1466	ADPS1	43,3244		1286 1 290	ALARM/TB	35,2423	631	1 621
ACCFCTZ5	E6,1576	=	134 1 1464	ADR40400	5742		1384 1 1384	ALARMIT	27,2526	771	1 771
ACCTHERE	20,3431		1500 1 1500	ADR77770	5741		1384 1 1384	ALARMMGA	30,3756	924	1 914
ACCIFLG	0317	=	88	ADSRAX	E3,1466		110 1 329	ALARM1	5732	1384	1 1086
ACCOMP	11,2516		1230 1 1238	ADSRAY	E3,1467		110 1 329	ALARM2	5571	1381	2 1286 1383
ACCRETRN	0117	=	1506 2 1486 1504	ADSRZ	E3,1470		110 1 329	ALCGKK	37,2627	385	
ACCSEKAY	4751	=	88 3 219 1504	ADSUM	43,3563		1291 2 1291	ALDK	E5,1532	=	128 3 385 385
ACCSW	0122	=	1505 5 1502 1505	ADTIME	35,3236		670 1 670	ALFDK	E4,1422	=	117 1 385
ACCSMU	E6,1547	=	134 3 134 1502	ADUPBFM1	04,3662		1394 2 1390 1391	ALFLT	37,2577	385	1 384
ACCSMV	E6,1550	=	134 1 1502	ADUPBUFF	04,3515		1391 1 1389	ALFLT3	37,2644	385	1 385

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
ALGORITHM	21,3143	1473		ALTBITS	E7,1741	= 151	5 151 899	AOTEL	E7,1412	138	1 246
ALIGNCOA	37,2311	378	3 378	ALTCALC	22,2131	353	1 352	AOTMARK	07,2000	244	3 942 960
ALIGNOPT	15,3331	975	1 975	ALTCHK	33,2664	878	2 878 879	AOTMARK1	07,2000	= 29	2 244 251
ALILP	37,2667	386	1 386	ALTCONV	33,2025	42	1 876	AOTMARK2	04,2000	= 28	2 249 983
ALINEX	26,2067	339		ALTCRIT	33,2677	= 878	1 878	AOTSTALL	07,3712	1329	3 950 1330
ALINEZ	26,2113	340	1 339	ALTDSPY	20,2226	1414	1 1413	AOPERI	23,2000	= 32	1 695
ALINTIME	43,2401	275	1 262	ALTERYZ	16,3002	1430	1 1430	APSESBIT	4747	= 79	
ALK	E5,1446	= 128	6 128 386	ALTIM	E5,1530	= 128	2 384	APSESH	0202	= 79	2 1198 1199
ALKCG	37,2632	385		ALTIMS	E5,1531	= 128	2 384 385	APSFLAG	0230	= 82	3 773 791
ALKCG2	37,2635	385	1 385	ALTM	0060	= 93	1 899	APSFLBIT	4737	= 82	16 213 1486
ALKLP	37,2676	386	1 386	ALTOUT	21,2240	899	1 898	APSIDES	12,3674	1200	1 695
ALLCOAST	20,2204	1408	4 220 761	ALTRATE	E7,1711	= 151	5 151 899	APSTGO	27,2671	775	1 774
ALLCOC/OC	41,3011	427	2 425 426	ALTROUT	21,2167	898		APSVEX	33,2000	39	3 758 860
ALLJETS	17,3225	1458	2 1457 1458	ALTSAVE	E7,1712	= 151	14 151 900	ARATE	22,2771	364	3 364
ALLOOP	37,2536	384	2 383 384	ALTSCALE	0272	= 85		ARCCOS	00,3612	1084	1 1013
ALLOWGTS	E6,1502	= 134	7 1412 1504	ALTSCBIT	4743	= 85	1 884	ARCOMP	21,2176	898	
ALLREAD	25,3074	553	1 554	ALTSYST	16,3431	1437	2 1437	ARCONV	21,2000	42	1 898
ALLSET	35,3507	677	1 677	ALXXXZ	37,3076	389	1 383	ARCONV1	33,2027	42	1 877
ALLIS	26,3703	593	1 592	ALXIS	E5,1444	= 128	4 383 389	ARCSIN	00,3610	1084	1 1013
ALL3DEC	42,3573	436	1 434	A4	E6,1735	135	3 352 364	ARCTAN	13,2510	1137	5 478 1134
ALL4BITS	11,2373	822	2 820	AMEMORY	E4,1400	= 113		ARCTANXX	13,2536	1137	2 1137
ALM/END	43,2120	264	24 262 281	AMG	E7,1460	139	2 570 579	ARCTRGSP	30,3622	922	3 920
ALMCADR	1363	= 108	14 108 1384	AMVED	11,3627	1243	1 1242	ARCTRIG	23,3320	1251	9 299 1254
ALMCYCLE	4145	446	14 407 447	ANET	0157	= 1506	11 1499 1505	ARET	0161	= 1506	3 1500 1504
ALMNCADR	5734	1384		ANGLTIME	22,3001	364	1 364	ARG+	7265	1036	1 1036
ALMXIT	35,2040	621	2 641	ANGTERM	E4,1664	= 119	3 119 810	ARGHI	00,3417	1080	2 1081
ALMXITA	35,2036	621	1 638	ANGX	E5,1500	= 128	2 387 388	ARGLO	00,3470	1081	1 1081
ALOAD	41,2732	426	1 409	ANGY	E5,1476	= 128	1 388	ARGZERO	7305	1036	1 1036
ALOADED	13,3150	1216	2 1215 1216	ANGZ	E5,1472	= 128	1 388	ARGZERO2	7302	1036	1 1036
ALPHA	0010	= 1202	4 1174 1176	ANGICHEK	27,3273	851	1 850	ARG90	5067	1102	1 1102
ALPHAM	E4,1467	= 114	14 114 1236	ANTENBIT	4740	= 85	12 323 596	AROUT1SF	40,2704	419	1 417
ALPHAQ	E6,1424	= 129	6 195 1486	ANTEFLG	0267	= 85		ARTHINSF	40,3076	432	1 431
ALPIAR	E6,1425	= 129	5 1409 1486	AOB	E7,1461	139	7 199 893	ARTIN1SF	40,3111	433	1 431
ALPHASB	E4,1600	= 118	4 118 314	AORBSFLG	0315	= 88		ARTOA	21,2001	42	1 899
ALPHATRY	21,3345	1479		AORBSYST	4747	= 88	2 1436 1437	ARTOA2	21,2002	42	1 899
ALPHAV	E4,1431	= 114	33 114 1245	AORBTFLG	0310	= 87	1 743	ARTOUTSF	40,2677	419	2 417 418
ALRM503	24,2775	509	1 509	AORBTRAN	4742	= 87	2 1443 1445	ARUPT	0010	= 92	13 153 1458
ALRM514	24,2307	499	1 497	AUSQ	E6,1537	133	29 133 1497	ASCALE	13,3707	1247	1 1232
ALRM525	24,2663	507	1 505	AUSQTERM	E6,1545	133	7 133 1427	ASCENT	30,2321	845	3 840 844
ALRM526	24,2305	499	1 496	AOSR	E6,1541	= 133	11 740 1497	ASCFLT	34,2000	= 34	1 843
ALRM527	24,2776	510		AOSRTERM	E6,1546	= 133	6 1409 1427	ASCSPOT	23,2503	867	
ALRM530	24,3114	511	1 511	AOSU	E6,1543	= 133	3 1497 1498	ASCTERM	30,2721	850	2 850 852
ALSIGNAG	7544	1043	5 885 1069	ADSV	E6,1544	= 133		ASCTERM1	30,2731	850	1 850
ALSK	37,3103	389	1 386	AOTAZ	E7,1404	138	5 154 958	ASCTERM2	30,2746	850	1 846
ALT	1124	= 104	6 104 1136	AOTCODE	0735	= 100	12 196 961	ASCTERM3	30,2747	850	4 850

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ASCTERM4	30,2750		850 1 843	ATTSCALE	42,2053		282 1 282	AXD	E3,1715		111 1 1147
ASEXT	E5,1573	=	128	ATTSTEER	17,2661	=	1452 1 1444	AXT	01,2344		1087 1 1012
ASENT	30,2000	=	34 3 39 854	ATY	E4,1754	=	120 5 120 851	AZ	1347		107 4 108 956
ASENT1	27,2000	=	33 4 38 854	AUG2	07,3577		1325 1 1324	AZEACH	11,2374		822 2 821
ASENT2	07,2000	=	29 1 851	AUG3	07,3550		1324 1 1325	AZEL	14,3744		956 1 956
ASENT3	05,2000	=	29 1 852	AURLKON1	23,2034		271 1 271	AZIDUMMY	E7,1645	=	149 1 149
ASENT4	14,2000	=	31 1 852	AURLKON	23,2000		271 1 269	AZIMUTH	E5,1400	=	127 5 127 387
ASENT5	30,2000	=	34 1 854	AUTOMANV	26,2166		474	AZINCR	E7,1556	=	149 4 149 804
ASENT6	33,2000	=	34 1 855	AUTOMBIT	4752	=	86 5 182 605	AZINCR1	1266	=	106 6 106 821
ASENT7	23,2000	=	32	AUTOMODE	0301	=	85	AZO	E3,1711		111 1 1146
ASINEX	00,3707		1085 1 1084	AUTRATE1	4753	=	88	AZCNTRAL	E6,1746	=	132 13 1473 1475
ASKIFNRM	10,2530		1359 1 1358	AUTRATE2	4752	=	88	=====			
ASTAR	15,3067		970 1 970	AUTR1FLG	0321	=	88	B*RN8*8*	36,2135		733 1 756
ASTNBIT	4740	=	77 1 738	AUTR2FLG	0320	=	83	BACKHAND	17,2532		1449 1 1449
ASTNCLOK	32,3204		783	AUXFLAG	0147	=	76	BACKP	16,2316		1423 1 1471
ASTINDEX	4362	=	789 1 788	AUXFLBIT	4752	=	76 3 861 862	BADDES	25,2623		546 1 546
ASTNFLAG	0154	=	77 4 737 759	AVECTR	0024	=	1148 7 1143 1145	BADEND	07,3662		1328 2 563 1327
ASTNRET	32,3210		783 1 746	AVEGEXIT	1252	=	105 7 105 758	BADRAD	25,3206		555 6 555 558
ASTNRETN	36,3030		746 1 745	AVEGFBIT	4747	=	78 6 186 858	BADROOT	31,3656		825
ASTOK	26,3431		586 1 506	AVEGFLAG	0163	=	78 2 228 1246	BADR2	12,3664		1199 2 1198
ASTREND	27,3170		779 1 779	AVEGOUT	37,3517		859 1 858	BADRX	12,2302		1177 3 1175
ASTRDMASK	10,3517		1372 1 1368	AVEIT	07,2276		253 1 250	BAILOUT	5634		1382 1 1421
ASTROTIM	04,2672		701 1 702	AVENDBIT	4753	=	81	BAILOUT1	5716		1384 7 244 1377
AT	E4,1662	=	119 7 119 849	AVEMIDSW	0225	=	81 3 320 1222	BALLANGS	26,2266		477 4 340 519
AT/PCS	30,2000		39 1 846	AVERAGEG	33,2267		861	BALLEEXIT	1342		107 2 477 478
ATAN=90	13,2543		1137 1 1137	AVERTRN	22,3707		864 1 864	BANKCALL	4616		998 323 207 1486
ATDECAY	36,2012		38 1 841	AVESTAR	07,2241		252 2 252 253	BANKJUMP	4640		998 22 271 1504
ATIGINC	E7,1400		138 4 387 728	AVETOMID	13,3467		1221 1 864	BANKMASK	4350	=	1099 3 1010 1023
ATMAG	34,3642		843 2 749 837	AVFLAG	0050	=	69 7 629 776	BANKRUPT	0016	=	92 13 155 1421
ATMAGAD	32,3765		837 1 834	AVFLAGA	35,2347		629 6 621 728	BANKSET	0165		99 14 1000 1372
ATMAGADV	36,3140		749 1 740	AVFLAGP	35,2354		629 6 621 728	BASEOTP	E4,1537	=	115 2 704 705
ATOPCSM	13,2661		1210 5 37 1243	AVFLBIT	4747	=	69	BASEOTV	E4,1517	=	115 2 704 705
ATOPLEM	13,2734		1211 4 37 1243	AVGEND	22,3661		863 1 859	BASETEMP	1061	=	232 2 232
ATOPOTH	13,2661	=	37 1 711	AVGEXIT	1252	=	105 7 739 865	BASETHP	E4,1567	=	115 2 704
ATOPTHIS	13,2734	=	37	AVDUTCAD	37,3535		859 1 859	BASETHV	E4,1504	=	115 2 704
ATP	E4,1760	=	120 4 120 851	AX*ST*T	23,3675		1263 2 601 1262	BASETIME	E4,1513	=	115 3 704 705
ATR	E4,1756	=	120 3 120 849	AXC	01,2351		1087 1 1012	BAWLANGS	26,2000	=	33 2 339 477
ATTACHED	43,3142		297 1 262	AXDSTEM	0147	=	1505 4 1502 1503	BB	0006	=	1300 5 1299 1306
ATTACHIT	43,3147		297 1 297	AXISCTP	E6,1505	=	132 40 132 1509	BBANK	0006	=	92 46 153 1381
ATTCAADR	1307		106 6 106 1331	AXISDIFF	17,3722		1469 2 1449 1461	BBSERVDL	5743		1384 1 1383
ATTCHK	15,3553		980 1 965	AXISDIST	E6,1605	=	134 8 1463 1503	BCDU	E6,1676		135 13 135 1331
ATTCK2	42,2035		282 2 281 282	AXISGEN	23,3441		1255 4 942 971	BDDV	7603		1044 2 1011 1044
ATTFLAG	0150	=	76 1 979	AXISGEN1	23,3447		1255 1 1255	BDOT	26,2010		53 1 1143
ATTFLBIT	4753	=	77 3 976 980	AXISGEN2	23,3476		1255 1 1256	BDSU	7062		1029 1 1011
ATTPIO	1311	=	106 2 369 1331	AXISGEN3	23,3521		1256 1 1256	BOTOK	27,2461		771

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BEE17	04,3027	1185	1 1196	BITS8/7	21,3076	907	1 907	BNKOPTN	43,3315	1287	
BEE19	04,3041	= 1185	1 1193	BITS8.9	16,3617	1441	1 1434	BOOLSMK	20,2114	293	3 292 293
BEE22	04,3045	= 1185	1 1176	BITS9+7	43,3044	287	1 287	BOOLSTRT	05,3063	218	1 212
BEGDES	25,2573	545	3 510	541 BITS9,11	5014	= 1433	1 1432	BOOP	37,2755	387	1 387
BEGDES29	24,3356	599	2 598	599 BIT1	4753	1095	70 66 1492	BORTENT	5574	1381	2 1383
BELDW1	10,2247	1301	1 1302	BIT1H	32,3533	819	1 818	BOTHABRT	5721	1384	1 1384
BELDW2	10,2264	1301	2 1301	BIT10	4742	1095	53 65 1487	BUTHAXES	20,3320	1498	1 1502
BELDW3	10,2300	1301	1 1301	BIT10+15	6021	515	1 516	BOTHJGBS	10,2665	1361	1 1361
BELDW4	10,2303	1301	2 1301	BIT11	4741	1095	35 43 1476	BOTHLITS	25,3640	612	1 613
BESTI	E5,1755	= 124	13 124	962 BIT11+1	25,2372	537	1 537	BOTHPAD	22,3377	715	1 715
BESTJ	E5,1756	= 124	5 124	940 BIT12	4740	1095	44 65 1499	BOTHPOLY	32,3625	833	1 833
BEIAM	E4,1471	= 114	6 114	1245 BIT12,14	7712	= 552	1 551	BOTHSGN	40,2377	402	1 402
BETASB	E4,1602	= 118	3 118	314 BIT13	4737	1095	59 40 1497	BOTHSHIP	22,3336	714	1 715
BETAV	E4,1437	= 114	11 114	1232 BIT13-14	4355	= 1099	6 281 1410	BOV(8)	01,2457	1090	1 1012
BGIM	16,3735	1476	1 1476	BIT14	4736	1095	91 65 1500	BPL	01,2503	1091	1 1091
BGIM23	16,2203	1413	1 1413	BIT14+7	26,2252	475		BPL/BMN	01,2474	1091	1 1012
BH1Z	01,2452	1090		BIT14COM	10,2276	1301	1 1301	BRANCH	6723	1025	11 878 1091
BIASCALE	22,3167	367	1 367	BIT15	4735	1095	54 67 1482	BRATE	E6,1725	= 135	3 364 367
BIASFACT	32,3536	820	1 800	BIT15+6	7734	1098	1 1360	BRNCHCON	40,2600	405	1 405
BIASHI	00,2566	1061	1 1080	BIT15/14	41,3237	437	2 437 439	BRNCHCTR	12,2267	1177	1 1178
BIASLO	00,2270	1054	1 1081	BIT2	4752	1095	55 66 1490	BRSPOT1	31,2617	802	
BIASTEMP	E6,1711	= 135		BIT3	4751	1095	42 66 1431	BRSPOT2	31,2702	804	
BIBIBIAS	37,3416	857	1 243	BIT3H	34,3715	844	1 843	BRSPOT3	31,3057	807	
BIGADS	20,3341	1498		BIT4	4750	1095	57 66 1462	BRSPOT4	31,3243	810	
BIGIQ	20,2617	1488	1 1488	BIT4H	30,3030	855		BRUPT	0017	= 92	4 830 1458
BIGTIME	12,3437	1195	1 1195	BIT5	4747	1095	51 66 1473	BSUBD	26,2016	53	1 1143
BINCON	4363	461	3 441 1099	BIT6	4746	1095	64 66 1466	BUF	0130	96	169 97 1399
BINROUND	40,3106	432	3 431 433	BIT7	4745	1095	44 66 1442	BUF+	00,2422	1058	3 1057 1060
BINS	6245	= 553	2 556	BIT7+9PV	23,2273	519	1 519	BUF-	00,2416	1057	3 1057 1060
BITSET	5020	= 907	1 907	BIT8	4744	1095	45 66 1506	BUFNEG	00,2531	1060	1 1057
BITSOFF	41,2674	426	1 426	BIT8,9	17,3111	1456		BUFNORM	00,2500	1060	1 1060
BITSOFF1	41,2701	426	1 426	BIT9	4743	1095	44 66 1504	BUFPDS	00,2516	1060	2 1057 1060
BITS15+7	10,3522	1372	1 1359	BLANKCHK	10,3132	1366		BUFZERO	00,2363	1057	1 1060
BITS2-10	5011	1097	1 37	BLANKCON	40,2614	405	2 405 418	BUF2	0133	97	30 244 1382
BITS3&4	5751	= 1331	2 1310 1311	BLANKDEX	4752	= 746	1 735	BURNBABY	36,2126	733	3 754 840
BITS4+10	10,3525	1372	1 1371	BLANKDSP	41,3516	453	2 453	BUSYMASK	10,3527	1372	
BITS4&5	4763	1096	3 165 281	BLANKET	5464	1354	12 271 1373	BUTTONS	05,2703	215	
BITS4&6	4771	= 1331	5 211 1310	BLANKRET	0114	= 96		BVECTOR	E7,1524	= 145	24 145 1150
BITS4-5	07,3744	1331	1 1316	BLANKSUB	4255	456	2 439 1366	BVECTR	0032	= 1148	5 1144
BITS4-7	33,3154	883	1 875	BLNKBSNK	4302	456	1 456	BVSU	7036	1028	1 1011
BITS5+11	10,3524	1372	3 1364 1371	BLNKSJBI	40,3505	456	2 456	BYLMATT	15,3545	980	2 976 977
BITS5.8	25,3401	558	2 558	BLNKWAIT	36,3345	756	1 757	BZE/GOTO	01,2467	1091	1 1012
BITS6&15	06,3003	181	1 180	BLOAD	41,2743	427	1 409	B12-1	4356	= 461	
BITS7+4	10,3523	1372	2 1358	BLOCKTOP	E6,1547	134	12 134 1505	B12T14	7722	= 1099	1 1014
BITS7&8	06,2777	181	2 164 176	BNKCHK	43,3716	1293		B14+82	25,2635	546	1 546

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B2/A2	13,2504	1136	1 1138	CALLACCS	20,2133	1407	1 1407	CDUSPOTZ	0770	=	101 3 872 911
B2FR	15,3177	972	1 972	CALLCODE	4768	1096	5 279 1510	CDUT	0035	=	92 12 187 606
B2XSC	13,2502	1136	1 1136	CALLDGCH	26,3643	592	4 516 593	CDUTCMD	0053	=	92 2 536 907
B3TQ34	01,2576	1094	2 1093 1094	CALLGMBL	4747	= 1412	3 1428 1483	CDUTEMPX	1155	104	3 870 893
B5OFF	5563	1380	11 299 717	CALLQERR	17,2072	1442	1 1441	CDUTEMPY	1156	104	3 870 893
B5TQ88	01,2465	1090		CALLRECT	11,3331	1238	4 1237 1238	CDUTEMPZ	1157	104	2 870 872
=====				CALLRPRT	13,2454	1135	1 1135	CDUTIMEF	E5,1436	=	127
C*MM*V1	23,3653	1262	2 1262 1263	CALLRTRP	13,2364	1133	1 1133	CDUTIMEI	E5,1434	=	127
C*MM*N2	23,3655	1262	1 1262	CALLT-35	36,2211	734	1 734	CDUTODCM	22,2410	357	3 351 481
C*MM*N3	23,3666	1262	2 1262 1263	CALDOP	14,3340	947	1 947	CDUTRIG	23,3537	1259	11 487 981
CA+ECC	07,3140	1314	1 170	CALDOP1	14,3366	947	2 947	CDUTRIGS	23,3547	1259	3 1259 1262
CADRFLSH	0372	100	6 195 1370	CALSAM	15,2540	962		CDUWXR	30,3441	918	1 918
CADRMARK	0373	100		CALSAM1	15,2537	962	1 961	CDUX	0032	=	92 29 188 1438
CADRMASK	10,3530	1372	1 1363	CAL53A	14,3327	947	1 930	CDUXCMD	0050	=	92 5 174 1419
CADSTOR	1042	102	13 222 1368	CAM	E6,1733	= 135	4 135 353	CDUXD	E6,1635	134	26 134 1450
CADRTAB	01,2001	= 239	1 1306	CANTROO	04,2065	227	1 227	CDUY	0033	=	92 14 254 1451
CAGESUB	06,2735	180	1 164	CANV37	04,2134	228	1 228	CDUYCMD	0051	=	92 2 174 1418
CAGESUB1	06,2743	180	1 174	CATLOG	14,2346	51	12 938 962	CDUYD	E6,1636	=	134 8 369 1451
CAGESUB2	06,2746	180	1 166	CCALL	6626	1023	1 1011	CDUZ	0034	=	92 17 169 1451
CAGETEST	07,3641	1327	7 1311 1324	CCSHOLE	5705	1283	22 376 1466	CDUZCMD	0052	=	92 2 175 1418
CAGETSTJ	07,3653	1327	5 1310 1319	CCSL	7663	1046	1 1099	CDUZD	E6,1637	=	134 7 369 1451
CAGETSTQ	07,3646	1327	3 1317 1318	CD*TR*G	23,3543	1259	1 478	CDUZDLIM	30,3773	925	1 914
CALCDIP	E5,1460	= 127		CD*TR*GS	23,3555	1260	3 1259 1262	CEARTH	0016	=	936 3 935 939
CALCGA	23,3353	1253	4 374 974	CDELFI/2	0016	= 1268		CENTANG	E7,1620	141	7 198 729
CALCGA1	23,3413	1253	1 1254	CDESBIT	4735	= 85	2 590	CG	E5,1602	=	122 15 122 813
CALCGRAV	33,2730	880	2 867 881	CDESFLAG	0264	= 85	2 271 510	CGCALC	31,3245	810	3 798
CALCGRV1	33,2765	880	1 880	CDHMVR	34,3133	647	2 627 637	CGOTO	6703	1024	1 1011
CALCGTA	23,3247	1249	4 944 971	CDRVE	06,2012	156		CHAN	E5,1443	=	127
CALCMAN2	0053	= 70	2 364 365	CDU*NBSM	23,3661	1262	5 705 982	CHANDSP	41,2504	416	1 415
CALCMAN3	0052	= 70	1 364	CDU*SMNB	23,3646	1262	3 518 957	CHANGEVB	07,2611	260	1 260
CALCN83	36,3462	758	1 763	CDUANG	E5,1543	= 127		CHANG1	5122	1103	4 378 1292
CALCN85	36,3376	757	1 732	CDUDANG	E5,1440	= 127		CHANG2	5126	1103	1 1003
CALCPERR	16,3446	1437	2 1413 1438	CDUFLAG	E5,1461	= 127		CHANJOB	01,2706	1108	4 1103 1115
CALCPHI	22,2701	362	1 362	CDUINC	10,3660	1398		CHANLOAD	41,3161	430	1 430
CALCPGVG	31,3003	806	2 798 799	CDUIND	E3,1474	= 110	21 166 1324	CHAN12	0012	=	93 74 165 1490
CALCRVG	33,2776	880	1 861	CDULIMIT	E5,1443	= 127		CHAN13	0013	=	93 25 212 1456
CALCSMSC	10,2030	1265	7 927 981	CDULOGIC	10,3576	1397	15 249 1260	CHAN14	0014	=	93 23 174 1419
CALCTFF	27,3470	1277	1 721	CDUNDX	E5,1536	= 127		CHAN30	0030	=	93 9 161 1410
CALCTHET	27,2255	765		CDUREADF	E5,1441	= 127		CHAN31	0031	=	93 21 281 1444
CALCTPER	27,3465	1277	1 721	CDUREADI	E5,1442	= 127		CHAN32	0032	=	93 3 158 862
CALCXY	26,3623	592	1 590	CDUS	0036	= 92	4 196 527	CHAN33	0033	=	93 23 167 895
CALC2BIT	4752	= 70		CDUSCMD	0054	= 92		CHAN5	0005	=	93 6 212 1450
CALC3BIT	4751	= 70		CDUSPOT	0766	101	33 101 1261	CHAN6	0006	=	93 3 212 1413
CALL	6640	1023	1 1091	CDUSPOTX	0772	= 101	3 872 911	CHAR	0117	=	96 5 398 400
CALL/ITA	01,2507	1091	1 1012	CDUSPOTY	0766	= 101	3 872 911	CHARALRM	40,3434	446	17 398 446

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CHARIN	40,2077	398	1 1338	CHKVISFZ	16,2740	1429	1 1428	CNTABTAD	21,2104	830	1 830
CHARIN2	40,2112	398	2 398	CHNL12	0066	= 1476	3 1476	CNTCHK	07,2235	252	
CHECKALT	30,2755	850	1 850	CHRPRI0	4355	461	7 158 1392	CNTDNDEX	4762	= 745	5 733 747
CHECKB	7750	1302	1 1299	CH3ITEMP	E6,1443	130	2 1432 1446	CNTRCHK	43,3466	1289	
CHECKCTR	12,2644	1183	2 1177 1195	CH5MASK	1262	105	11 190 1505	CNTRCON	4771	= 1286	1 1289
CHECKG	37,2332	378	2 375 376	CH6MASK	1263	105	6 191 1440	CNTRLOOP	43,3467	1289	1 1290
CHECKG1	37,2335	378	1 379	CIRCL	34,2372	636	3 635	COAALIGN	37,2301	378	1 376
CHECKIN	17,2246	1445	1 1444	CIRCULAR	12,3660	1199	1 1198	COARFINE	14,3360	947	
CHECKMAX	22,2117	352	1 352	CKIMUSE	5244	1121		COARS	07,3010	1312	1 1312
CHECKMM	5321	1294	5 735 833	CKMDMORE	43,3740	= 1388		COARSE	14,3565	952	3 947 974
CHECKNJ	43,3332	1287	3 1287 1292	CKMI02	13,3633	1224	1 1242	COARSERR	07,3110	1314	2 1313
CHECKP	16,3054	1431	1 1431	CKMODCAD	43,2375	274	3 265 273	COARSRET	15,2161	930	1 948
CHECKP22	43,2672	280	1 280	CKRNDBIT	43,2666	280		COARSTOL	07,3116	1314	1 1314
CHECKRR	43,2662	280	1 280	CKSTALL	32,2105	209	1 208	COARSTYP	15,2171	931	1 930
CHECKTAB	04,2072	227	1 227	CK4V32	04,3506	1391	3 1390	COARS1	07,3015	1312	1 1312
CHECKUP	16,2041	1411	1 1411	CLEANOSP	10,2456	1357	2 735 746	COARS2	07,3040	1313	2 1313 1314
CHECKYAW	07,2667	851	2 850 851	CLEANEND	10,3233	1367	1 1365	COASCODE	07,2137	247	1 246
CHEKAXIS	27,2137	482	1 482	CLEAR	40,2467	404	1 399	COASTDB	E6,1603	= 134	7 1463 1503
CHEKBITS	16,2000	1410	2 1411 1421	CLEARMRK	5474	1354	2 225 1354	COASTSET	36,3606	761	1 760
CHEKMORE	16,2016	1410	1 1420	CLEAR1	40,2522	404	1 404	COASTTJ	17,3422	1463	4 1463 1469
CHEKSTIK	17,2323	1446	1 1444	CLOAD	41,2760	427	1 409	COATRIM	15,3254	974	1 971
CHEXER?	32,2536	571	1 570	CLOCKCON	10,3543	1373	1 1358	COB	0040	= 1148	4 1143 1144
CHKBIT10	17,2205	1444		CLOCPLAY	10,2473	1358	2 745	CODE	0124	= 96	15 399 453
CHKBMAG	30,2541	848	1 847	CLOG2/32	30,3102	856	1 856	CODEITG6	07,2123	246	1 246
CHKBORS	07,3073	1313	1 1314	CLOKJOB	36,2737	744	1 744	CODE500	32,3254	789	1 789
CHKDATA1	20,2014	292	1 292	CLOKTASK	36,2717	744	4 243 744	CODE7	07,2107	246	2 246
CHKFAIL1	5603	1381	1 1384	CLOSEADR	21,3630	1484	1 1484	COLFCTR	0160	= 1496	7 1494 1495
CHKFAIL2	5607	1381	1 1381	CLOSEOUT	17,3236	1458	4 1454 1484	COEFF	20,3213	1496	4 1494 1495
CHKINGTS	17,2612	1450	1 1450	CLPASHI	40,2505	404	1 404	COEFFQ	E6,1627	134	7 134 1495
CHKLASTY	21,2643	904	1 904	CLPASS	1015	102	13 222 454	COEFFR	E6,1630	= 134	6 1457 1495
CHKLINUS	26,2201	474	2 474	CLRADM0D	6011	516	1 229 838	COF	E6,1670	= 135	45 352 483
CHKLIST	05,3532	992		CLRMOON	13,2711	1211	2 1212 1239	COFMAXG0	22,2176	353	
CHKMINTJ	17,3623	1467	2 1465 1468	CLROVFLW	13,2512	1137	1 1137	COFSKEW	E6,1725	= 135	9 135 355
CHKNOVAC	01,3637	1305	1 1308	CLRFLAG	30,2716	850	1 851	COGA	E5,1765	= 125	16 125 1198
CHKPOOH	43,2123	264	6 280 290	CLR5	40,2525	404	1 404	COGAFBIT	4750	= 80	
CHKPRI0	10,2427	1356	1 1355	CLUPDATE	35,3664	681	1 680	COGAFLAG	0203	= 79	3 1186
CHKRTMR	16,2672	1428	4 1428 1429	CLUPLCK	04,3361	1339	1 1339	COGAMAX	0016	= 1203	4 1193 1196
CHKRSB	14,3261	946		CL17NET+	20,3462	1500		COGAMIN	0010	= 1203	3 1194 1196
CHKSB	14,3263	946	1 946	CMNTOVFL	12,2315	1178	1 1178	COGAOVFL	12,2764	1186	2 1186 1198
CHKSD	14,3302	946	1 946	CMOON	0022	= 936	2 935 936	COGLOLIM	04,3062	1185	1 1197
CHKSDA	14,3323	946	1 946	CMOONBIT	4740	= 79	1 213	COGUPLIM	04,3060	1185	2 1194
CHKSDATA	14,3256	946	2 945 951	CMOONFLG	0173	= 79	9 37 1211	COLINEAR	04,3160	1188	1 1188
CHKSrch	26,3444	588	1 592	COMPONENT	30,2612	848	1 847	COLREG	1117	= 104	7 104 1243
CHKSUPR	43,3646	1292	1 1292	CMPI	E5,1445	= 128	2 386	COMADRS	43,3533	1290	2 1292
CHKTEMX	07,3641	871	1 871	CNGL	22,2400	57		COMFAIL	36,2571	742	2 242 862

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COMFAIL1	36,2610	742	1 745	CON2	10,2312	1302	1 1299	CSI/B	34,2125	633	1 641
COMFAIL2	36,2623	742	1 745	CON2ADR	5422	1299	1 1299	CSI/B1	34,2165	633	3 638 641
COMFAIL3	36,2612	742	3 731 733	COPIES	10,2735	1362	1 1355	CSI/B2	34,2176	633	1 640
COMFAIL4	36,2614	742	2 731 732	COPIES2	10,2736	1362	1 1360	CSI/B22	34,2216	634	1 634
COMFLAG	5511	1375	2 743 1375	COPINDEX	0164	= 1373	23 1356 1370	CSI/B23	34,2224	634	1 634
COMMAND	E3,1471	= 110	6 1309 1314	CORNPAC	0157	= 1372	3 1368 1371	CSI/B23D	34,2237	634	1 634
COMMEQS	20,2570	1488	1 1488	COPYCYC	33,2423	867	3 861 868	CSI/B3	34,2330	635	1 635
COMIFX	43,3525	1290	2 1292	COPYCYCL	33,2275	861	1 877	CSI/CDH	35,2000	= 35	3 621 661
COMINIT	30,2300	841	2 833 841	COPYCYC1	33,2546	876	1 874	CSI/CDH1	34,2000	= 34	1 632
COMMOUT	12,2747	1186	1 1199	COPYCYC2	33,2627	877		CSI/SOL	34,2737	641	1 640
COMMON	36,2400	738	1 732	COPYFORM	10,2734	1362	1 1359	CSIALRM	E7,1613	141	5 141 641
COMMONLM	12,3426	1195	1 1196	COPYPACS	10,2417	1356	1 1365	CSISTEP	34,2732	640	1 640
COMNEG	07,3117	1314	1 1313	COPYTOGO	10,2415	1356	1 1366	CSMCONIC	13,3066	1214	3 339 589
COMP	7670	1046	4 1013 1076	COREINC	01,3033	1111	2 1107 1111	CSMDKFTG	0305	= 87	
COMPCHK	06,3553	333	1 332	CORFOUND	01,2636	1107		CSMDOCKD	4737	= 87	11 293 1486
COMPDISP	37,3240	705	1 707	CORSCHK2	07,3105	1314	2 1313 1314	CSMINT	24,3274	565	1 565
COMPICK	41,2513	416	1 416	CORSIT	15,3303	974	1 974	CSMMASS	1332	107	7 293 1494
COMPMAT	13,2237	710		COSCDJ	0744	= 100	5 100 1261	CSMPREC	13,3043	1214	6 37 734
COMPMATX	27,2072	481	1 483	COSCDUX	0750	= 100	6 478 1266	CSMSTORE	23,2406	697	1 697
COMPMFSN	27,2151	482	1 482	COSCDUY	0744	= 100	5 478 1266	CSMVEC	43,3054	289	1 263
COMPNUMB	1170	= 104	10 104 1394	COSCDUZ	0746	= 100	7 478 1265	CSS	0016	= 939	1 939
COMPOS	07,3052	1313	1 1313	COSF	0030	= 1204	4 1198 1199	CSSUN	14,2605	936	1 936
COMPTST	41,2424	414	6 414 427	COSI	26,2000	52	2 1144	CSS33	14,2764	939	2 938
COMPTGO	35,2432	650	1 680	COSINE	00,3517	1082	2 1013 1260	CSS40	14,2762	939	1 938
COMPTST1	41,2426	414	1 415	COSMG	0061	= 1413	3 188 189	CSS5	14,2603	936	2 935 936
COMPI2	22,2211	354	1 354	COSPHI/2	0022	= 1247	6 1234 1248	CSTH	E5,1731	= 125	10 125 1199
CONTERM	11,3052	1234	1 1237	COSPHIE	11,3241	1237	1 1234	CSTH-RHO	E5,1735	= 125	4 125 1194
CONZERO	07,3127	1314	2 1313 1314	COSTALIN	0000	= 235	3 235	CSTODAY	05,2023	52	1 985
CONC+S1	43,3241	1286	1 1290	COSTH	0020	= 124	18 299 1253	CSUN	0020	= 936	1 936
CONC+S2	43,3242	1286	1 1290	COSTHET1	E5,1576	= 122	2 122 851	CS359+	35,2415	631	
CONICS	12,2000	= 29	3 1173 1189	COSTHET2	E5,1600	= 122	2 122 851	CTHETA	0322	= 99	3 369 1415
CONICS1	04,2000	= 28	4 45 1186	COSI/2DG	25,3067	552	1 550	CTLIST	0334	= 994	6 992
CONST	30,2572	848	1 847	COS15DEG	23,2274	520	1 518	CTRCHECK	21,3676	1509	1 1508
CONTABRT	05,3402	830	1 830	COS60DEG	23,2517	= 593	2 590	CULTBIT	4745	= 71	
CONTBL2	01,3665	1306	2 1308	COTROLER	E6,1631	134	6 1412 1472	CULTED	14,2757	939	4 939
CONTDESG	26,3567	590	1 592	COUNT	0143	= 97	12 399 445	CULTFLAG	0065	= 71	4 938 939
CONTDESG	26,3576	590		COUNT*EM	11,2341	821	1 820	CULTRIX	E5,1706	= 124	1 939
CONTINU	43,3616	1292	5 1291 1292	COUNTPL	E5,1542	= 127		CURSOR	1236	= 960	4 261 959
CONTMANU	22,3170	367	1 366	COVCNV	42,3677	488	1 488	CURTAINS	5711	1383	11 942 969
CONTSERV	33,2540	875	7 873 889	COZY4	E7,1666	142	4 686 689	CUTOFF	14,2424	853	4 747 853
CONUMNR	41,3071	429	1 428	CPHI	0321	= 99	11 340 1416	CUTOFF1	14,2436	853	1 853
CONV3	42,3625	487		CPSI	0323	= 99	5 351 1415	CUTOFF2	30,2777	854	2 853 854
CONV4	42,3636	487	1 487	CREWMANU	43,3015	286	1 262	CVECTR	0010	= 1148	1 1144
CONV5	42,3640	487	1 487	CRITCON	40,2315	401	1 400	CYCLSHFT	43,3475	1290	
CONI	5405	1299	1 1300	CSI/A	34,2113	632	1 623	CYL	0022	= 92	24 400 1290

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
CY	0020	=	92 46 202 1305	DAPTREG4	E6,1750	=	137 10 131 1426	DECDSP	41,2523		416 1 408
C1/2	7717		1097 1 1102	DAPTREG5	E6,1751	=	137 5 131 1426	DECDSP3	41,2575		417 2 417
CIMP	E6,1723	=	135	DAPTREG6	E6,1752	=	137 7 133 1426	DECEND	40,2265		400 2 400
C1PP	E6,1721	=	135	DAPT4S	06,3132	=	188 3 159 189	DECON	40,2322		401 1 400
C2MP	E6,1717	=	135	DAPZRUPT	E6,1757	=	137 4 1412 1458	DECOUNT	0117	=	96 27 410 433
C2PP	E6,1715	=	135	DASAMPL	25,3344		558 1 559	DECQTIMR	16,2710		1428 1 1428
C2SQM	E6,1713	=	135	DATAFAIL	25,3461		560 1 556	DECRET	0115	=	96 2 429 430
C2SQP	E6,1711	=	135	DATAGOOD	E7,1733	=	144 5 144 592	DEGROUND	40,3261		442 1 441
C3/2	7737		1098 1 1102	DATAGUT	21,2233		899 2 899 900	DECRIMR	16,2712		1428 1 1428
C33JMP	06,2763		181 1 188	DATAPL	E5,1472	=	127 13 375 379	DECTEM	0122	=	96 3 416
C33TEST	06,2374		167 6 164 166	DATGCHK	26,3654		592 1 592	DECTEST	41,2443		415 2 414 415
C5/2	5005		1096 1 1102	DAXMAX	30,3767		925 2 916 925	DECTOBIN	40,2232		400 1 400
=====				DAY/2MAX	30,3771		925 2 916 925	DECTWO	34,3641		730 1 724
DACLIMIT	20,2432		1419 3 1419	DAZMAX	30,3767	=	925 1 916	DEC17	4361	=	381 3 373 859
DACLOP	20,2374		1419 1 1419	DB	1346		107 6 212 1506	DEC22	43,2677		280 1 280
DAD	6775		1026 1 1011	DBB1	0143	=	1505 5 1498 1503	DEC227	15,2561		962 2 957 961
DALTRATE	E7,1716	=	151 3 151 898	DBB2	0144	=	1505 3 1498 1502	DEC23	42,2033		275 1 275
DAMPING	17,2345		1446 1 1446	DBB3	0146	=	1505 4 1499 1502	DEC27	4764	=	1096
DANZIG	6061		1003 64 948 1402	DBB4	0145	=	1505 6 1499 1503	DEC29	4765	=	1096
DAPARUPT	E6,1753	=	137 5 157 1458	DBFUN	20,3556		1502 1 1502	DEC45	4772		1096 2 1016 1089
DAPATTER	43,2163		266 1 262	DBUNE	20,3365		1499 1 1499	DEC51	04,3253		1332
DAPBITS	05,3501		832 1 831	DBSELECT	4750	=	88 1 1407	DEC58	37,2474		381 1 375
DAPBOOLS	0111	=	86 70 212 1509	DBSELFEG	0316	=	88	DEC585	37,3055		388 1 376
DAPBQRPT	E6,1755	=	137 2 1428 1458	DBVAL1	1346	=	1506 6 1497 1503	DEC66	31,2501		800 2 795 801
DAPDATA1	20,2004		292 1 292	DBVAL2	0114	=	1506 2 1497 1499	DEC70	04,2400		233 1 227
DAPDATA2	01,2233		294 3 294 295	DBVAL3	0115	=	1506 3 1497 1500	DEFUNCT	21,3240		1474 1 1474
DAPDATA3	01,2300		295	DCOU	E6,1635	=	136	DEG.5	15,2467		960 1 958
DAPDATR1	1343		107 10 292 314	DCMCL	30,3232		913 1 919	DEGCOM	40,2663		419 1 418
DAPDAT2	01,2250		294 1 294	DCMTCCOU	22,2654		362 2 365 483	DEGCON1	40,3074		432 1 431
DAPDISP	43,3135		292 1 282	DCUGA	0014	=	1203 4 1195 1196	DEGINSF	40,3010		431 2 431
DAPIDLER	16,2024		1411 2 222 1413	DCOMP	7705		1046 2 1046	DEGINSF2	40,3021		431
DAPLRUPT	E6,1754	=	137	DCOMPTST	41,2437		415 2 414	DEJOUTSF	40,2615		418 2 417 418
DAPS1	16,2000	=	31 4 1410 1476	DCTSTCYC	41,2452		415 2 429 430	DEGREE1	14,3411		948 1 947
DAPS2	17,2000	=	31 4 1404 1460	DDUMCALC	32,3102		787 1 812	DEGTAB	40,2673		419 2 418 419
DAPS3	20,2000	=	31 6 42 1497	DDUMCRIT	32,3261		789 1 787	DEG30	15,2465		960 2 251 958
DAPS4	21,2000	=	31 3 1472 1508	DDUMGOOD	32,3163		788 1 787	DEG359	14,3412		948 1 947
DAPTEMP1	E6,1737		136 29 130 1470	DDV	7577		1044 1 1011	DEG60	15,2471		960
DAPTEMP2	E6,1740	=	136 12 131 1471	DDV/BDVV	00,2353		1057 2 324 1044	DEL	E6,1745	=	132 3 1474 1476
DAPTEMP3	E6,1741	=	136 8 131 1471	DDVCALL	00,3004		1068 1 1068	DELAYEX	5255		1120 1 1119
DAPTEMP4	E6,1742	=	136 4 131 1447	DEAD	27,2230		751 2 751	DELAYJOB	00,3735		1377 15 208 757
DAPTEMP5	E6,1743	=	136 5 131 1425	DEBIT	5522		1375 3 743 1375	DELAYLOC	1326		107 6 222 1377
DAPTEMP6	E6,1744	=	136 11 131 1470	DEC-12	12,2016		1101	DELAYNUM	4752	=	37 1 1377
DAPTREG1	E6,1745	=	136 3 132 1509	DEC-6	12,2015		1101	DELCDOX	E6,1640		134 6 134 1421
DAPTREG2	E6,1746	=	136 1 133	DECBNCH	1000		101 18 399 447	DELCDOY	E6,1641	=	134 3 136 1421
DAPTREG3	E6,1747	=	136 1 133	DECCNTR	33,2366		862 1 862	DELCDOZ	E6,1642	=	134 3 136 1421

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
DELCDMP	22,2527	359	3 364 482	DELVOV	E4,1622	116	5 316 710	DFRNT	40,3364	445	
DELCDU	E6,1640	= 136	2 365 369	DELVREF	E7,1526	= 147	5 147 880	DGBF	20,3077	1494	2 1490
DELDCDU1	E6,1641	= 136	1 369	DELVRDD	E7,1766	= 151	6 151 818	DGBITS	25,3147	554	2 554 558
DELDCDU2	E6,1642	= 136	1 369	DELVS	E7,1733	= 151	8 151 902	DGCHECK	25,3442	560	2 556 558
DELDEP	E5,1757	= 125	5 125 1183	DELVSAB	E7,1663	= 142	4 142 765	DGCHECK2	25,3345	558	2 559
DELDOV	E7,1611	141	15 141 640	DELVSIN	E7,1655	= 142	16 142 765	DGOOD?	32,2741	604	
DELEL	E7,1575	= 141	4 667 670	DELVSLV	E7,1433	= 139	2 198 617	DGOODCHK	25,3000	551	1 551
DELELO	0032	= 661	3 667 670	DELVTEST	27,2252	765		DIDFLAG	0020	= 67	
DELERLIM	30,3771	= 925	1 918	DELVTPE	E4,1747	118	4 198 727	DIDFLBIT	4736	= 67	4 217 907
DELGNBLP	30,3300	914	1 914	DELVTPI	E7,1575	141	7 141 727	DIFEQ+0	11,3466	1241	1 1237
DELINDEP	0014	= 1204	2 1132 1183	DELVX	0324	= 99	12 326 871	DIFEQ+1	11,3472	1241	1 1237
DELLDOP	00,3740	1377	1 1377	DELVY	0326	= 99	10 329 871	DIFEQ+2	11,3503	1241	1 1237
DELLT4	E7,1451	139	8 194 766	DELVZ	0330	= 99	9 329 871	DIFEQCNT	E3,1500	110	25 110 1243
DELM	E5,1550	= 128	5 385	DELX	E5,1642	= 125	6 125 1178	DIFEQCOM	11,3646	1243	2 1241
DELMAX1	34,2105	632	2 640	DEP	0036	= 1204	1 1132	DIFEQTAB	11,3247	1237	1 1237
DELMCP	37,2646	385	1 386	DEPRCRIT	22,3657	827	2 805	DIFEQO	11,3342	1238	1 1242
DELOK	12,2632	1183	1 1182	DEPREV	E5,1761	= 125	3 125 1182	DIFFALT	E7,1577	141	5 194 648
DELPERR	1277	106	5 367 1438	DERCLOOP	31,3605	824	1 824	DIMOBIT	4753	= 71	
DELQEROR	1300	106	3 369 1451	DERCOF+1	0153	= 98		DIMOFLAG	0073	= 71	23 236 1243
DELQFIX	E5,1520	= 121	2 121 885	DERCOF-1	0151	= 98		DINDX	0063	= 137	6 1419
DELRREROR	1301	106	3 369 1451	DERCOF-2	0150	= 98		DIRADRES	6106	1004	2 1018
DELRSP	22,3541	= 37		DERCOF-3	0147	= 98		DISDVLVC	35,2370	630	2 623 645
DELT	E5,1644	= 125	3 125 1176	DERCOF-4	0146	= 98		DISGRVER	15,2771	967	1 965
DELTACSM	E3,1572	111	1 585	DERCOF-5	0145	= 98		DISINDAT	21,2324	900	2 898 899
DELTAH	E7,1664	= 150	6 150 885	DERCOF-6	0144	= 98		DISPCHNG	36,2376	737	4 731 737
DELTALEM	E3,1644	111	1 585	DERCOF-7	0143	= 98		DISPCOMN	31,3474	814	2 815
DELTAQ	E7,1546	= 145	8 145 1151	DERCOF-8	0142	= 98		DISPDEX	1163	104	24 148 831
DELTAR	E4,1702	= 117	5 117 726	DERCOFN	0152	= 98	1 825	DISPEXIT	31,3460	814	3 813 819
DELTATM	E7,1426	= 139	2 511	DERPTR	0141	= 98	3 823 824	DISPGYRO	15,3313	974	1 971
DELTATOK	04,3622	1393	1 1393	DERTABLL	31,3676	825	1 823	DISPLACE	41,3066	428	2 428
DELTAX	E5,1664	= 126	12 126 1156	DESASCNT	0004	= 236	3 235	DISPLAIE	35,3674	682	2 661 662
DELTEE	E7,1611	= 141		DESCBITS	20,2115	822	1 255	DISPLAYS	10,2000	= 29	3 1354 1382
DELTEED	E7,1605	= 141	4 670	DESCOUNT	1114	103	4 509 546	DISPNOT	36,2012	746	1 745
DELTIME	12,2421	1180	3 1176 1195	DESGLOS	26,3636	592	1 590	DISPN5X	37,3113	703	2 703
DELTTAP	E7,1425	138	1 802	DESIGBIT	4742	= 85	10 530 876	DISPRSET	21,3053	907	2 898 900
DELTTIME	E4,1704	= 117	3 117 726	DESIGFLG	0271	= 85		DISTEM	0122	= 96	3 414
DELV	0324	99	9 99 966	DESLOOP	25,2600	546	5 546 593	DIVIDER	16,2304	1422	2 1422
DELVCSI	E7,1573	141	16 141 640	DESPRET	1113	103	10 103 543	DKALT	16,3441	1437	1 1438
DELVCTL	E7,1501	= 147	3 758 759	DESRETRN	25,2446	541	1 540	DKDB	E6,1411	129	2 213 1510
DELVEET1	E4,1666	115	5 194 634	DESRTN	25,2452	541	2 541	DKKAOSN	E6,1405	129	1 213
DELVEET2	E4,1674	116	6 194 649	DETENTCK	16,3071	1432	2 1430 1431	DKOMEGAN	E6,1404	129	2 213 1425
DELVEET3	E4,1765	= 119	18 194 780	DEXDEX	0142	= 98	7 1259 1264	DKTRAP	E6,1403	129	2 213 1425
DELVIMU	E7,1622	142	7 316 763	DEX1	0143	= 98	1 1263	DLAYJOB	00,2000	= 28	1 1377
DELVLVC	E7,1433	139	20 137 709	DEX1	0143	= 98	5 98 1264	DLOAD	6052	1002	1 1011
DELVMID	E7,1575	= 141		DEX2	0144	= 98		DLOAD*	7733	1098	1 1006

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DLOADCOD	7732	1098	1 1013	DOCKTEST	20,2773	1491	2 1491 1504	DOTSUB	7156	1033	3 1039
DLYZ	5212	1119	2 1119 1377	DOCMBASE	37,3144	704	1 707	DOTSWFMX	30,3766	925	1 919
DMENFBIT	4743	= 74		DOCSM	23,3234	1157	1 1156	DOT6RUPT	17,2065	1405	1 154
DMENFLG	0121	= 74	7 575 1157	DOCSM1	23,3237	1157	1 1156	DOUBLK	40,2575	405	2 404 405
DMJDE	7332	1038	1 1077	DODAT	07,2074	246	1 246	DOVL9AD	6463	1018	1 1015
DMP	7103	1031	21 400 1266	DODELVZ	37,3570	870	1 871	DOVLOAD*	6466	1018	1 1015
DMPNSUB	7316	1037	1 824	DODES	25,2636	548	1 546	DOX..	11,3705	1245	2 1238 1243
DMPNTEMP	0135	= 97	2 1037	DOUESEND	25,3064	552	1 552	DOX..1	11,3733	1245	2 1245
DMPR	7574	1044	1 1011	DODL0AD	6460	1018	1 1015	DOWMENT2	10,3554	1374	3 1364 1369
DMPSUB	7107	1031	25 1033 1266	DODL0AD*	6144	1006	2 1015 1018	DOWNFLAG	5516	1375	96 208 1366
DMPSUB2	7126	1031	1 1036	DOONAJR	05,3524	991		DOWNGTS	20,3706	1504	2 1491
DMP1	7572	1044	1 1011	DODNCHAN	05,3572	992		DOWNTLM	05,2000	= 29	2 193 991
DNADROCR	05,3531	992	1 994	DODNPTR	05,3611	993	1 992	DOWNTORK	E6,1513	132	7 132 1470
DNDJMP	05,3722	996	1 996	DOJOWNTM	05,3506	991	2 153 154	DO1/NET+	20,3724	1504	2 1500 1501
DNDUMPI	05,3707	996	2 288 996	DOFSTART	05,2474	211	1 218	DP(-22)	27,3760	1283	1 1278
DNDUMPI1	05,3735	996	1 996	DOFSTR1	05,2501	211	2 217 218	DP-.01	35,3741	684	3 680
DNDJMP2	05,3737	996	1 996	DOINT	13,2036	236	2 236	DPAGREE	7255	1036	
DNECADR	0336	= 994	15 991 994	DOINT2	13,2060	236	1 236	DPB-14	26,2410	484	2 481 483
DNEDUMP	43,3045	288	2 262 288	DOIT	31,2312	795	1 796	DPBIT14	01,3477	1131	1 1131
DNINDEX	1335	= 107	4 107 559	DOLEM	26,2454	575	1 575	DPDAT1	20,2037	292	1 292
DNLADMM1	04,2500	235	1 231	DONBRD	25,2661	548	1 548	DPDAT3	01,2315	295	1 295
DNLADPOO	4755	= 235	1 229	DONEADR	37,3654	871	1 871	DPHALF	23,2517	= 1100	12 353 771
DNLRALT	1341	= 107		DONEYET	21,3427	1480	2 1480	DPINCOM	40,3131	433	1 433
DNLRVELX	1336	= 107	4 107 196	DOXPAXIS	20,3270	1497	1 1497	DPINORM	40,3137	433	1 433
DNLRVELY	1337	= 107	1 107	DOPIF	31,2302	794	1 794	DPINSF	40,3114	433	4 431 433
DNLRVELZ	1340	= 107	2 107 194	DOPROC	40,3601	459	2 458 470	DPINSF2	40,3141	433	1 431
DNLSTADR	0332	= 99		DOROTAT	17,2743	1453	2 1453	DPINSF4	40,3146	433	1 431
DNLSTCOD	0332	99	10 99 1395	DORREPOS	25,2127	529	1 187	DPIPAY	E5,1522	= 128	2 385
DNPHASE1	05,3515	991	2 222 996	DORROUT	25,3017	551	2 551	DPIPAZ	E5,1526	= 128	1 385
DNPHASE2	05,3523	991	1 993	DORSAMP	25,2023	490	1 490	DPL1	30,3722	923	1 923
DNO	0337	= 99	2 99 994	DORSAMP2	25,2027	490		DPL3	30,3723	923	1 923
DNRRANGE	1333	107	5 107 606	DORSTART	05,2730	215	1 215	DPL5	30,3724	923	1 923
DNRRDOT	1334	= 107	1 107	DOSHIFT	21,3537	1482		DPL7	30,3725	923	1 923
DNTABLE	05,2441	204	1 992	DOSKIP	17,3010	1454	1 1453	DPL9	30,3726	923	1 923
DNTMBUFF	0340	= 99	22 154 996	DOSSHFT	00,2322	1055	1 1055	DPMODE	10,3716	1401	1 701
DNTMEXIT	05,3701	994	6 992 997	DOSTORE	6362	1014	1 1003	DPOSMAX	4732	1095	3 441 1401
DNTMFAST	06,2671	178	1 181	DOSUBLST	05,3665	994	1 993	DPOUT	40,2723	420	3 419
DNTMGUTJ	0335	= 99	9 99 997	DOSWITCH	11,3375	1239	2 1237 1238	DPPOSMAX	23,2527	1100	9 299 706
DNTM1	0034	= 93	1 994	DOT	7331	1038	1 1011	DPSBURN	E6,1750	= 131	
DNTM2	0035	= 93	1 994	DOTERM	40,3577	459	1 458	DPSFLITE	20,2522	1487	1 1486
DOACCFUN	20,3733	1504	1 1500	DOTICK	22,3441	716	1 716	DPSTHRSH	32,2000	40	1 785
DOALARM	5155	= 1384		DOTINC	0136	97	7 97 1039	DPSVEX	33,2001	39	2 754 833
DOALIGN	15,3121	971		DOTIXBR	01,2424	1088		DPTTEST	41,2261	410	4 410 430
DOCKED	20,3105	1494	1 1487	DOTPER	22,3622	721	1 721	DPTTEST1	41,2301	411	4 411
DOCKTEMP	0157	= 1496	4 1486 1491	DOTRET	0137	97	8 97 1078	DPZERO	12,2006	= 1246	3 938 1238

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DPC	0036	=	940	DSPCADR	16,2211	1413	1 1413	DSPTAB	1023	102	48 156 1382
DP1	0040	=	940	DSPCNT	0776	101	7 157 222	DSPTMX	1051	=	102 8 102 702
DP1/12	15,2465	=	251 1 250	DSPCOM1	41,2371	414	3 414 416	DSPTM1	1045	102	31 102 976
DP1/2	12,2004	=	1136 5 1136 1143	DSPCOM2	41,2405	414	2 414	DSPTM2	1050	102	12 102 381
DP1/20	33,3026	=	881 1 880	DSPCOM3	41,2413	414	1 414	DSPV6N79	07,2627	261	3 256 261
DP1/4	12,3755	=	1246 3 1199 1246	DSPCOUNT	0777	101	66 158 1338	DSPWDRET	0144	=	97 3 441
DP1/4TH	23,2511	=	1100 6 37 1151	DSPDCEND	41,2566	417	4 417 423	DSP2BIT	41,3416	444	1 447
DP1/3	07,2622	=	260 1 253	DSPDCGET	41,2527	416	1 416	DSP2CADR	36,3136	749	1 739
DPIMIN	26,2121	=	341 1 339	DSPDCPUT	41,2537	416	1 417	DSP2DEC	40,3273	442	1 424
DP1OUTSF	40,2710	=	419 1 417	DSPDCWD1	40,3233	441	4 442	DSQ	00,3174	1075	1 1013
DP2(-3)	27,3762	=	1283 1 1280	DSPDC2NR	40,3266	442	3 422 443	DSQSUB	00,3300	1078	5 1075 1083
DP2(-4)	27,3764	=	1283 1 1274	DSPDECNR	40,3262	442		DSREL	0141	=	97 4 444 445
DP2/3	12,3773	=	1246 3 1227 1246	DSPDEC VN	40,3306	443	4 420 458	DSRUPTM	0073	=	95 5 157
DP2OUTSF	40,2715	=	419 2 417	DSPDEC WD	40,3226	441	4 417 421	DSRUPTSW	1313	106	10 155 221
DP3OUTSF	40,2717	=	419 1 417	DSPDELAY	40,3700	703	1 703	DSU	7005	1028	1 1011
DP9/10	04,3050	=	1185 4 1177 1183	DSPDPDEC	40,2771	424	1 408	DT	E7,1715	=	151 7 151 902
DQUARTER	12,3755	=	1246 2 1232	DSPFLG	1070	=	1372 3 1365 1366	DT/DELT	30,3774	925	1 918
DRDOT	E4,1736	=	120 4 120 848	DSPFMEM	41,3353	440	1 409	DT/TAU	22,3121	366	1 365
DRFDB	20,3652	=	1503 1 1503	DSPIN	40,3322	444	5 399 445	DT/2	E4,1475	=	114 11 114 1243
DRFTBIT	4735	=	68 3 165 1315	DSPINI	40,3347	445	2 444 445	DT/2COMP	13,3320	1218	1 1219
DRFTSUB2	06,3474	=	332 1 336	DSPLAY	06,2047	157	1 157	DT/2MAX	13,3412	1219	2 1218 1219
DRIFT/DN	17,3414	=	1463 1 1463	DSPLTST	1043	102	6 222 465	DT/2MIN	13,3410	1219	1 1219
DRIFTBIT	4744	=	87 7 740 1509	DSPLOCK	1012	102	12 222 1370	DTDECAY	36,2004	38	1 833
DRIFTDFL	0312	=	87 1 742	DSPLV	41,3413	443		DTHETASM	1264	105	1 105
DRIFTER	0116	=	1506 3 1497 1498	DSPLYALT	4750	=	1419 2 1414	DUMMYAD	04,2146	229	1 232
DRIFTFLG	0036	=	68 3 863 952	DSPLYMSK	20,2113	290	1 292	DUMMYJUB	01,3206	1116	2 213 1115
DRIFTI	E5,1504	=	128 1 375	DSPLYTOT	20,2252	1415	1 1415	DUMPCNIC	27,3426	1272	
DRIFTO	E5,1502	=	128 1 377	DSPLY58	34,3502	727	1 727	DUMPCNT	0333	99	2 211 996
DRIFTSUB	06,3454	=	332 3 328	DSPLY81	34,3505	727	1 727	DUMPCLOC	0336	=	99 5 996
DRIFTT	E5,1442	=	128 1 376	DSPMN	04,2636	457	1 468	DUMPRPRA	27,3464	1274	
DRIVEON	21,3425	=	1480 1 1480	DSPMMJB	40,3534	458	2 457 1294	DUMPTFF1	27,3547	1278	
DSALMOUT	0011	=	93 36 171 1395	DSPMMJOB	40,3534	=	1294 1 1294	DUMPTFF2	27,3644	1279	
DSEXIT	0114	=	96 3 444 445	DSPMMTEM	0140	=	97 2 458	DUNFVLIM	30,3764	925	1 919
DSKYFBIT	4735	=	73 1 1338	DSPMSK	4757	=	444 1 443	DV/SC	7636	1045	2 1045
DSKYFLAG	0113	=	73 1 443	DSPOCTIN	40,3412	445	1 443	DVBYCOSM	30,3600	921	4 920
DSL V	40,3376	=	445 2 445	DSPDCTWD	41,3363	443	3 408 440	DVCNTR	E7,1515	=	147 54 147 1384
DSMAG	0142	=	97 2 445	DSPDFF	05,3274	221	1 221	DVCNTR1	E7,1570	=	864 2 862
DSMSK	40,3400	=	445 2 445	DSPDPTN	15,3430	976	3 976 977	DVCNTSET	33,2323	861	
DSPA	41,2365	=	414 1 408	DSPDOUT	06,2063	157	2 156	DVECTR	0010	=	1148 1 1145
DSPAB	41,2360	=	414 1 408	DSPDOUTSB	06,2024	157	2 157 160	DVLOS	E4,1702	=	117 5 117 675
DSPABC	41,2353	=	414 1 408	DSPRND	40,3215	441	1 441	DVMAX1	34,2063	632	1 634
DSPABORT	4227	=	455 3 455	DSPRRLDS	40,2000	299	1 299	DVMAX2	34,2065	632	1 634
DSPALARM	40,3420	=	446 6 408 431	DSPSCAN	06,2032	157	2 157	DVMON	33,2314	861	
DSPD	41,2373	=	414 1 408	DSPSFNR	41,2562	417	1 417	DVMONCON	36,2550	740	
DSPC	41,2400	=	414 1 408	DSPSIGN	40,3200	441	4 441 442	DVNORM	00,2505	1060	3 1059

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

J4 UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 3D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
DVMORNET	0137	= 97	6 1057 1068	EARTH2AD	22,3367	715	1 714	ELVDUMMY	E7,1647	= 149	3 149 150
DVJVF	00,2405	1057	11 1059 1070	EARTH*	37,2420	380	1 380	ELVIRA	1265	= 106	5 106 820
DVQVSUB	20,2776	1492	5 1489 1495	EARTH*	37,2447	380	4 375 388	ENABLET6	17,2052	1404	1 1404
DVPREV	E7,1575	= 141	4 638 639	EBANK	0003	= 92	86 212 1486	END-ALIG	E7,1630	= 148	3 148 152
DVSIGN	0136	= 97	10 1057 1074	EBANKSAV	1070	103	3 1356 1372	END-E3	E3,1777	= 112	
DVTHPUSH	1251	= 105	7 105 861	EBANKTEM	1072	103	6 211 1372	END-E4	E4,1757	= 119	
DVTOTAL	E7,1507	= 147	6 147 861	EBANK3	5007	= 1099	3 223 890	END-E5	E5,1774	= 128	
DVXSC	7430	1041	2 1040	EBANK4	4741	= 1099	5 276 892	END-E6	E6,1771	= 137	
DWNPTBB	4062	154	1 153	EBANK5	5014	1097	13 388 1433	END-E7	E7,1777	= 152	
DXCMP	12,2155	1175	1 1175	EBANK5	5015	= 1099	10 212 1486	END-E7.0	E7,1745	= 152	
DXCRIT	0124	= 98	2 823 825	EBANK7	5016	1097	15 387 957	END-E7.1	E7,1747	= 152	
DXCRIT+1	0125	= 99		EBUF2	1167	= 104	10 370 371	END-E7.2	4000	= 152	
DXRPRUR	E6,1446	130	9 130 1435	ECC	E5,1751	= 125	3 125 1200	END-E7.3	E7,1630	= 152	
DYDIT	E4,1740	= 120	4 120 848	ECDUW	E6,1646	= 136	3 136 925	END-E7.4	E7,1777	= 152	
DYEPRUR	E6,1450	= 130	7 130 1448	ECDUWL	30,3761	925	1 910	END-E7.5	E7,1655	= 152	
DYNMDISP	36,3361	757	2 756 757	ECDUWUSR	E6,1646	= 136	3 136 918	END-IN/M	E7,1672	= 142	
DZDIT	E4,1742	= 120	3 120 849	EDDP	0023	= 92	14 439 1290	END-UE	1357	= 108	
DZPRUR	E6,1452	= 130	7 130 1448	EDDT	E6,1427	= 133	23 130 1510	ENDALL	40,2263	400	2 400 401
D1/1024	04,3044	1185	1 1194	EDDTP	E6,1427	= 130	4 1434 1438	ENDALM	4153	446	1 452
D1/128	04,3032	1185	3 1178 1189	EDDTQ	E6,1436	130	5 130 1473	ENDBALL	26,2346	478	
D1/16	04,3040	1185	2 1191 1198	EDDTX	E6,1437	= 130	2 130 1441	ENDBLFF	4303	= 456	1 460
D1/256	04,3046	1185	3 1179 1185	EDDTSQ	E6,1737	= 133	3 1462 1463	ENDBSUB1	40,3534	= 457	1 458
D1/32	04,3042	1185	7 1185 1236	EDRIVEX	E6,1764	137	5 137 1419	ENDCHKG	37,2366	379	
D1/4	04,3036	1185	4 37 1193	EDRIVEY	E6,1765	= 137	1 1418	ENDDAP14	5270	= 189	
D1/64	04,3034	1185	5 1174 1200	EDRIVEZ	E6,1766	= 137	1 1418	ENDDOT	7205	1033	1 1078
D1/8	04,3030	1185	1 1200	EE	13,2506	1136	1 1136	ENDDPDEC	40,3007	424	1 431
D21	E6,1705	= 135		EGRESS	E5,1772	= 126	6 126 1221	ENDDPUSH	6550	1020	1 1020
D29.9SEC	36,3142	749	2 734	EIGHT	4750	= 1099		ENDECVN	40,3322	= 442	1 444
D6OR9BIT	4752	= 71		EIGHTEEN	33,2437	868	1 867	ENDEXT	5472	= 1372	44 207 1396
D6OR9FLG	0072	= 71	10 236 1243	EJSCAN	01,3120	1113	2 1110 1113	ENDEXTVB	5472	= 264	5 268 273
=====				EJ1	01,3171	1115	7 1113 1114	ENDFIND	5160	1105	4 1107 1111
E	E6,1752	= 133	17 1435 1510	EJ2	01,3201	1115	1 1115	ENDHMSS	42,3606	= 436	
E/BKCALL	04,2576	370		EL	1350	= 108	1 316	ENDIDLE	4207	455	1 1368
E/CALL	04,2615	371		ELCALC	35,3004	667	1 670	ENDIMU	07,3631	1327	3 1311 1316
E/JOBWAK	04,2631	372		ELEACH	11,2375	822	2 821	ENDINST	4217	455	6 402 1367
E/P20G	04,2000	= 28	2 370 372	ELEPS	35,3737	684	1 667	ENDINT	13,2632	1210	1 236
E/SWITCH	04,2613	370		ELEV	E4,1656	116	10 194 670	ENDIT	10,3353	1369	1 1366
EARSFH	11,3355	1233	1 1237	ELFVEN	4760	1095	4 467 1471	ENDJASK	17,3241	1458	1 1458
EARTCNTR	14,2522	935		ELEX	35,3261	670	1 667	ENDJBCAD	37,3537	859	1 857
EARTHGON	22,3527	717	1 717	ELIDUMMY	E7,1644	= 149	2 149 150	ENDJOB1	01,3103	1113	1 1105
EARTHHL	06,3753	1147	2 1140 1142	ELINCR	E7,1554	= 149	4 149 804	ENDLLJOB	31,3476	814	2 814 815
EARTHLOC	06,2000	= 29	1 1147	ELINCR1	1267	= 106	5 804 821	ENDLRH	34,3744	893	
EARTHNU	27,2022	44	1 780	ELDOPFIN	43,3437	1289	2 1289	ENDLRV	33,3660	893	1 893
EARTHXX	26,3743	1146	2 1140 1142	ELRCODE	04,3377	1340	1 1339	ENDMANUV	26,2174	474	
EARTHXX	0051	= 1148	4 1143 1146	ELRCODE1	40,2156	399	1 398	ENDMANU1	26,2175	474	2 473 475

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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BD BADLY DEFINED	CD DEFINITION ASSOCIATED WITH CONFLICT	XX MISCELLANEOUS TROUBLE	

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
ENDMARK	5472	1354	2 253 1372	ENDTNDN	06,2266	164	1 164	EPS1	27,2405	766	2 766 776
ENDMARKS	07,2317	253		ENDTNDN2	06,2306	165	1 164	EPS2	27,2407	767	2 766 776
ENDMAXDV	00,2624	1063	2 1063 1065	ENDTPUSH	6552	1020	2 1020 1077	ERAD	04,2000	45	1 1139
ENDMODE	07,3706	1328	2 1328	ENDTSLC	00,2212	1052	1 1052	ERADFBIT	4737	= 67	
ENDMONDD	41,3346	439	1 439	ENDVDAT	33,3514	= 889	3 888 891	ERADFLAG	0021	= 67	5 657 1139
ENDNMTST	40,2247	400	2 400	ENDVLJAD	6511	1019	2 1021	ERADM	E7,1672	= 144	5 144 1139
ENDNUM	40,2257	400	1 400	ENDVPUSH	6540	1020		ERASCHK	43,3337	1288	1 1287
ENDTVBSY	04,2655	464		ENDVXV	7000	1026	4 1026 1043	ERASCON1	43,3232	1286	1 1288
ENDTVSBI	41,3612	454	1 467	ENDW	E5,1642	= 121	3 122 126	ERASCON2	43,3233	1286	1 1288
ENDDEFJOB	5155	1105	159 228 1485	END2DEC	40,3305	442		ERASCON3	43,3234	1286	1 1288
ENDDTJ	10,3312	1369	2 1370	END2JOD	32,2770	604	1 604	ERASCON4	43,3235	1286	1 1288
ENDPASTE	4143	439		ENDMA	05,2765	216	2 832 1383	ERASCON5	43,3243	1286	1 1289
ENDPINBF	4512	= 465		ENGINEOFF	36,3545	760	1 760	ERASCON6	5007	= 1286	3 1288 1289
ENDPINSI	40,3674	= 471		ENGINEOF1	36,3555	760	1 229	ERASER	10,3471	1372	1 1365
ENDPINS2	41,3731	= 469		ENGINEOF2	36,3551	760	1 853	ERASID	5011	= 37	1 996
ENDRCHG	01,2765	1109	2 1108 1115	ENGINEOF3	36,3564	760	1 733	ERASLOOP	43,3367	1288	4 1288 1289
ENDP76	13,2333	711	2 709	ENGINEOF4	36,3561	760	1 742	ERASZERO	0007	= 193	2 193
ENDRADAR	25,3546	563	2 537 546	ENGOFF	14,2355	852	1 846	ERCNT	0117	= 96	7 467 471
ENDRDLD	40,2770	421	1 424	ENGOFFDT	E7,1644	= 152	3 152 853	ERCOM	40,3655	471	1 471
ENDRELD5	40,3505	= 450	1 456	ENGOFFF1	14,2410	853	2 853	ERCOMP	E5,1563	= 128	8 376 380
ENDRET	10,3335	1369	5 1364 1371	ENGOFTSK	36,3542	760	3 241 762	ERCON	40,3670	471	1 470
ENDRMDF	4616	= 525		ENGONBIT	4745	= 74	6 174 915	ERCOUNT	1365	= 108	3 108 1286
ENDROLL	22,3226	369		ENGONFLG	0123	= 74		ERESTORE	1360	= 108	11 108 1289
ENDRQDAT	41,2316	411		ENTER	41,2002	406	2 399 446	EREXIT1	32,2542	571	1 569
ENDRQWT	41,3515	448	1 452	ENTERDAT	07,2073	246		ERMINUS	40,3647	470	
ENDREFD29	24,3475	606	4 605 606	ENTERJMP	40,2157	399	1 399	ERPLUS	40,3652	471	1 470
ENDRSTR	05,2641	213	2 217	ENTERQR	17,2416	1447		ERROR	40,3603	470	1 398
ENDATEUT	41,2616	= 417	1 425	ENTERUV	17,2451	1448	3 1447	ERRORS	43,3257	1286	1 1286
ENDAJTIN	41,3230	= 431	1 437	ENTEXIT	0136	= 406	10 407 447	ERRTEST	17,3327	1462	
ENDRC3	01,2244	294	1 294	ENTMID1	13,3576	1223	1 1223	ERTHR	37,2431	380	1 380
ENDSAM	14,2570	936	1 935	ENTMID2	13,3572	1223	1 1223	ERTHRVSE	37,2401	380	2 383 388
ENDSCALE	40,3043	432	3 431 432	ENTPASHI	41,2012	406		ERVECTOR	E5,1404	= 127	5 127 380
ENDSCAL1	40,3056	432	2 432 433	ENTPASO	41,2035	407	3 406 454	ESCAPE	0136	= 97	4 1084 1095
ENDSPF	41,3362	440	1 443	ENTRET	0136	= 97	6 402 453	ESCAPE2	0137	= 97	2 1084 1085
ENDSPMIN	42,3451	424	1 434	ENTSET	41,3570	453	2 453	ESTICADR	37,2116	374	2 374
ENDSPMM	04,2646	457	1 464	ENTTIM2	04,2005	702	1 702	ESTIMS	37,2500	383	2 374 377
ENDSPOCT	40,3415	445		EOURPERM	E7,1670	= 150	1 150	ETPIBIT	4745	= 69	
ENDSTATE	11,3577	1242	1 1241	EPHEM	15,2000	= 31	1 985	ETPIFLAG	0046	= 69	6 69 670
ENDSTEER	36,3646	761		EPHEM1	05,2000	= 10	2 51 987	EXBRK	31,3352	812	1 799
ENDSUHS	43,3131	291	1 1292	EPSFJR	35,3743	684	1 673	EXDSPRET	10,2620	1360	5 207 281
ENDS40.9	27,2725	776		EPSILN1	34,2075	632	1 640	EXECBANK	5163	1105	8 1103 1105
ENDT(X)	27,3753	1282	1 1282	EPSILON	0155	= 1496	5 1488 1496	EXECTEM1	0061	= 95	6 1103 1111
ENDTASK	5236	1121	4 220 1128	EPSILONL	E5,1763	= 125	3 125 1195	EXECTEM2	0062	= 95	4 1106 1111
ENDTEST1	37,2270	377	3 373 388	EPSTLONT	E4,1576	115	1 1176	EXGSUB	31,2331	811	1 799
ENDTEF	27,3641	1279	3 1279 1281	EPSSMALL	27,2723	776	1 776	EXIT	6743	1025	1 1003

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

JH UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 SD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
EXITEM	0114	=	96 7 428 429	FAZB1	23,3073	1155		FINALFLG	0047	=	69 9 623 727
EXITVR	30,2763		851 1 851	FAZB2	23,3121	1155	1 1155	FINDCDUM	30,3113		910 5 771 910
EXITVR1	30,2774		851 1 852	FAZB5	23,3126	1155	1 1155	FINDGIMB	27,2160		483 2 481 482
EXNORM	31,3360		812 1 799	FAZC	23,3134	1155	2 1155	FINDKEY	07,2365		254 1 254
EXOVFLOW	31,3441		813	FBANK	0004	=	92 30 455 1377	FINDTIME	01,3601		1304 2 1304
EXSPOT1	31,3316		811	FBANKMSK	4350	=	1010 2 1111	FINDVAC	5105		1103 45 211 1392
EXTLOGIC	31,3313		811 2 810	FBIASSUB	06,3644		336 3 334 335	FINDVAC2	01,2601		1106 2 1103 1105
EXTVBACT	1044		102 18 222 1330	FBR3	11,2476		1229 1 1243	FINE	01,2340		295 1 294
EXTVBCHK	07,2006		244 1 244	FC	E7,1615	=	149 3 149 793	FINEK2	43,2347		273
EXTVP1	23,2000	=	32 1 271	FCADRMHI	04,2403		233 1 232	FINEONLY	14,3370		947 1 947
EXTVRRBS	43,2000	=	36 7 262 1388	FCJUN	30,2000	=	34 1 910	FINETIME	4102		381 3 379 1336
EXVERT	31,3436		813	FCDD	E7,1465	=	140 6 140 794	FINIMUDD	37,2320		378 1 374
EO	E7,1676	=	145	FCOLD	E7,1620	=	149 5 149 800	FIREDB	E6,1601	=	134 10 1462 1503
EO1	E4,1630	=	116 1 116	FCOMPSET	31,2267		794 1 794	FIREFCT	E6,1741	=	133 7 1438 1469
EO2	E4,1636	=	116	FDAIX	E4,1744		118 2 305 478	FIREP	16,3041		1431
E1	E7,1700	=	145	FDAIY	E4,1745		118	FIREQR	17,2225		1444
E1345678	43,3350		1288 1 1289	FDAIZ	E4,1746		118	FIRSTIME	12,2606		1182 1 1182
E2	E7,1702	=	145 1 145	FDDT	26,2006		52 1 1143	FIRSTTME	27,3171		779
E2DPS	E7,1621	=	149 3 785 826	FDP5	36,2000		38 1 754	FIVE	4756		1095 26 223 1430
E3	E7,1704	=	145	FEEDBACK	17,3051		1455 1 1454	FIXCLPAS	40,2402		402
E3J2R2M	1352		108 1 1248	FETCHZNB	30,3223		913 1 913	FIXDELAY	5221		1119 16 499 1313
E32C31RM	1353		108 1 1236	FETCH2WD	05,3653		994 2 991 992	FIXLOC	0120		96 63 246 1506
E7OVERLA	E7,1471	=	140 3 140 147	FEXTRA	4737	=	797 1 794	FIXMIN	20,3743		1505 1 1501
=====				FFTAG1	4000	=	28 3 1294 1375	FIXRANGE	40,2652		418 1 418
F	E7,1734		143 7 143 774	FFTAG10	4000	=	28 1 155	FIXROOT	00,3453		1080 3 1079
F(MASS)	20,2540		1487 3 1487	FFTAG11	4000	=	28	FIXY	27,2441		769 1 769
FACEREG	0154	=	1373 8 1363 1364	FFTAG12	4000	=	28	FLAGGON	22,3310		714 1 714
FAIL-	20,3545		1501 1 1501	FFTAG13	4000	=	28	FLAGOFF	35,3576		679 1 678
FAILDOP	17,3205		1458 2 1458	FFTAG2	4000	=	28 2 1304 1306	FLAGON	35,3531		678 2 678
FAILRFG	0375		100 15 211 1382	FFTAG3	4000	=	28 1 1309	FLAGOODW	E6,1651	=	136 6 136 919
FAILT	5613		1331 1 1331	FFTAG4	4000	=	28 2 1354 1379	FLAGORGY	32,3017		785
FAKEPRET	5164		1105 2 1103 1113	FFTAG5	6000	=	28 3 40 593	FLAGS	13,3755		1385 1 1383
FALTOF	4370		461	FFTAG6	6000	=	28 4 516 1459	FLAGWRD0	0074	=	65 33 165 1414
FALTON	4364		461 11 231 1396	FFTAG7	4000	=	28 2 1381 1382	FLAGWRD1	0075	=	66 33 217 1315
FAPS	36,2006		38 2 758 775	FFTAG8	4000	=	28 1 439	FLAGWRD2	0076	=	68 32 165 1385
FASTCHNG	31,3740		826 9 794 811	FFTAG9	4000	=	28 1 1404	FLAGWRD3	0077	=	70 22 206 1385
FAZA	23,2771		1153 1 1155	FHNM	25,3577		567 1 566	FLAGWRD4	0100	=	71 34 222 1374
FAZAB	23,3146		1156 1 1157	FIFPSOP	34,2101		632 1 640	FLAGWRD5	0101	=	73 30 157 1453
FAZAB1	23,3174		1156 1 1156	FIFTYFPS	34,2663		640 1 639	FLAGWRD6	0102	=	75 15 186 980
FAZAB2	23,3200		1156 1 1156	FIGTIME	35,3046		668	FLAGWRD7	0103	=	77 33 186 1391
FAZAB3	23,3207		1156 1 1156	FILDELV	E5,1460	=	128 1 128	FLAGWRD8	0104	=	78 15 258 972
FAZAB4	23,3217		1156 1 1157	FILLEO	01,3371		1126 1 1125	FLAGWRD9	0105	=	80 6 739 850
FAZAB5	23,3226		1157 2 1157 1222	FILLER	E7,1622	=	149 1 149	FLAP	0216	=	81 3 833 841
FAZAI	23,2775		1154	FINALBIT	4746	=	59	FLAPBIT	4744	=	81
FAZB	23,3070		1155 1 1154	FINALDV	00,2625		1064 3 1057 1063	FLASHH?	21,2025		829

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
FLASHOFF	4433	462	6 274 1366	FRANDRES	05,2000	=	29 2 43 211	GCOMP SW	E3,1477	110	10 326 383
FLASHON	4427	462	4 407 1368	FRCS2	36,2016		38 2 756 773	GCOMPZER	06,3701	336	1 966
FLASHSJB	10,3260	1368	3 1366 1367	FRCS4	36,2014		38 2 755	GCOMP1	06,3540	333	1 333
FLASHV?	21,2033	829	1 829	FREEFBIT	4751	=	66 1 965	GCTR	E5,1736	=	123 10 123 966
FLAT	E6,1555	=	134 6 1463 1503	FREEFLAG	0014	=	56 12 942 986	GDESELECT	07,3626	1326	1 1321
FLATEMP	0151	=	1506 6 1497 1503	FREERET	0144	=	97	GDT/2	1236	105	19 105 973
FLATOUT	31,2370	796	1 741	FRSTPAS	34,2644		639 1 639	GDT1/2	E7,1562	=	147 5 147 883
FLATOUT1	31,2277	794	1 794	FRSTZERO	20,2746		1490 1 1490	GDJMP1	31,3453		813
FLATOUT2	31,2301	794	1 794	FSPASBIT	4742	=	65	GEADDR	6136	1005	1 1005
FLATVAL	20,3763	1506	1 1497	FSPASFLG	0005	=	65 3 510	GEFF	E4,1714	=	120 4 120 849
FLSHLOC	10,2000	=	29 1 1265	FSUB0	26,2014		53 1 1143	GENDDV	00,2570	1062	2 1061 1065
FLESHPOT	10,2037	1265	2 861 1265	FTHR0T	31,2000	=	54 2 40 793	GENMARK	10,3021	1364	
FLGWRD10	0106	=	82 24 81 1486	FT99999	30,2057		611 2 610	GENMASK	0162	=	1373 4 1356 1369
FLGWRD11	0107	=	83 38 229 373	FUELNEED	E7,1666	=	150	GENPL	E5,1434	=	127 27 127 128
FLGWRD12	0110	=	85 3 85 884	FULLAPS	05,2000		43 1 212	GENRET	1143	104	4 513 519
FLGWRD13	0111	=	87 1 86	FULLDSP	41,3654		467 1 467	GENSCL	00,2346	1056	2 1056
FLIP	4606	525	2 829	FULLDSP1	41,3655		467 1 467	GENSCR	00,2277	1055	4 1054 1076
FLGSSUB	30,2000	=	34 1 856	FULLTIME	17,3465		1464 6 1465 1469	GENSHFT2	00,2224	1053	1 1053
FLPASS0	E7,1623	=	149 6 149 811	FUNCTION	E6,1751	=	132 16 1474 1482	GENSHIFT	00,2214	1053	1 1044
FLPAUTND	E6,1652	=	176 4 135 915	FUNCT2	21,3247		1475 2 1474	GENTRAN	5544	1379	4 297 1502
FLPC	0212	=	80 2 847	FUNCT3	21,3252		1475	GEQCOMPS	E5,1562	=	128 3 384 385
FLPCBIT	4740	=	80	FUNNYDSP	E7,1666	=	150 5 150 315	GEOIMUTT	37,2004	373	
FLPI	0213	=	80 3 838 849	FUNTEM	0157	=	1506 2 1497 1498	GEOM	04,3130	1188	2 1186 1193
FLPIBIT	4741	=	80	FV	E4,1461	=	114 15 114 1245	GEOMSGN	E5,1672	=	125 11 125 1194
FLPCS	0214	=	80 4 832 853	FVACCADR	01,3773		1308 1 1305	GEORGEJ	37,3107	389	2 387 388
FLRCSBIT	4742	=	80 2 850	FWCOMP	31,2335		795 2 795	GEORGEK	37,3111	389	
FLTASUB	30,3503	919	2 912	FWEIGHT	E7,1610	=	149 7 149 818	GEOSTRT4	37,3025	388	
FLUNDBIT	4742	=	79 3 739 850	FXADRS	43,3557		1291 2 1292	GET.LVC	06,3733	692	3 653 766
FLUNDISP	0175	=	79 4 742 833	FXFX	43,3543		1291 1 1292	GET+MGA	06,3717	692	1 680
FLVR	0210	=	80 4 834 851	F2DPS*11	11,2000	=	29 1 820	GETABVAL	33,2217	860	1 860
FLVRBIT	4736	=	80	F2DPS*31	31,2000	=	34 3 39 822	GETAOSUV	20,3242	1497	
FMAXDD	31,2002	40	1 794	F2DPS*32	32,2000	=	34 3 40 785	GETAZEL	14,3734	956	3 955 956
FMAXPOS	31,2003	40	1 794	=====				GETCADR	01,3516	1132	1 1132
FORCEONE	20,2034	292	1 292	G(CSM)	E4,1716	=	120 4 120 882	GETCOMP	41,2515	416	5 414 416
FORCEV25	42,3603	436	2 436	G+N,AUTO	26,2255		475 3 474 748	GETDAT	07,2063	246	4 244 252
FORMULA1	17,3503	1465	1 1464	GACC	E5,1706	=	123 4 965 966	GETDT	36,3735	763	2 759 762
FORMULA2	17,3513	1465	1 1464	GAINAPPR	E5,1466	=	121 1 121	GETECC	12,3710	1200	1 1200
FORMULA3	17,3616	1467	1 1466	GAINBRK	E5,1432	=	121 2 121 810	GETERAD	13,2466	1136	1 1139
FOOTONE	13,3452	1220	1 1213	GAINFLTR	30,3762		925 1 919	GETGOBL	27,3177	780	1 779
FOUVEL	E7,1701	=	150 2 150 904	GAMCOMP	11,2650		1231 3 1230 1231	GETINREL	40,2324	401	4 399 404
FORVMETR	E7,1677	=	150 2 150 900	GAMMA	E7,1477	=	145 5 145 1153	GETLMATT	15,3541	980	1 976
FOUJ	4751	=	1099 47 211 1472	GAMPREV	E7,1607		141 7 142 640	GETMAXDT	13,2345	1219	1 1218
FOURSECS	27,2536	772	1 771	GAMRP	0010	=	1138 3 1134 1138	GETMKS	07,2202	252	3 248 261
FOUJTEEN	4317	=	1073 2 562 1070	GCOMP	E3,1471		110 24 110 952	GETNEWM	5427	1300	1 1299
FOU	E7,1467	=	140 5 795 795	GCMPSUB	06,3425		331 6 329 330	GETPART2	01,3541	1303	1 1308

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GETPRIO	5423	1299	2 1299 1302	GOCH55	17,2063	1404	2 1404	GOPERFS	10,2625	1360	
GETTRANS	36,3656	761	1 761	GOCLUSE	21,3625	1484		GOPERF1	10,2623	1360	10 497 1335
GETROOT	21,3303	1475		GOCUTOFF	36,3062	747	2 731 733	GOPERF1R	10,2703	1362	
GETRPSV	11,2622	1231	1 1231	GOOSDP	10,2443	1357		GOPERF2	10,2630	1360	
GETRVN	37,3326	706	2 704 707	GOOSPALM	41,2351	412	20 406 453	GOPERF2R	10,2710	1362	2 473 511
GETRVN2	37,3363	707	1 706	GOOSPR	10,2451	1357	3 474 944	GOPERF4	10,2633	1361	2 493 655
GETULC	26,3333	585	3 576 586	GOOSPRET	10,2446	1357	4 756 950	GOPERF4R	10,2713	1362	2 928 975
GETVRVG1	27,3113	779	1 779	GOOSPRS	10,2637	1361	8 1355 1362	GOPIN	43,2121	264	23 265 298
GETVRVG2	27,3115	779	1 779	GOOSPRS1	10,2641	1361	1 1357	GOPLAY	10,3070	= 1372	1 1360
GETX	12,2767	1189	3 1186 1199	GOOSPR1	10,2452	1357		GOPODDO	5665	1383	1 242
GET22/32	21,2552	903		GOOSPR2	10,2453	1357	2 1355 1358	GOPODFIX	04,2024	224	2 224 242
GET45	35,3634	580	3 680	GOOSPR2	10,2444	1357		GOPOST	36,3047	746	2 731 732
GFACTM	20,3101	1494	1 1489	GOESTIMS	37,2113	374	1 374	GOPROG	05,2667	215	2 153 154
GIMBLBTS	20,3073	1494	2 1490	GOEXTVB	43,2000	262	1 408	GOPROG2	05,2770	216	2 230 288
GIMLOCK1	23,3431	1254	1 1253	GOFLASH	10,2476	1358	44 225 977	GOPROG2A	05,2771	216	1 216
GL+NDATT	40,3672	471	1 470	GOFLASHR	10,2635	1361	5 724 759	GOPROG3	05,2775	216	2 216
GLAMPTSI	06,2507	170	1 170	GOFLASH2	10,2500	1358	15 1355 1361	GOQ	41,3025	428	1 428
GLINVERT	06,2500	170	1 170	GOGOMARK	10,2405	1356		GOQTRIMS	21,3115	1472	2 1472 1484
GLM	35,2000	= 35	1 652	GOGOPROG	04,2224	230	1 231	GOREADAX	37,3436	857	1 859
GLOCKCHK	05,2441	169	2 169	GOINT	35,3462	677	2 670	GUSERV	33,2274	861	
GLOCKMON	06,2434	169	1 167	GOLUADLV	43,2361	274	6 262 263	GUSHDSUM	43,3100	= 290	1 263
GLOCKOK	5270	= 181	4 170	GOLOC	0705	= 1308	30 1303 1308	GOSLEEPS	10,2754	1363	3 1360 1371
GLOCKFAIL	0056	= 70	2 274 1254	GJMANUR	07,3750	1331	1 474	GOTANGLS	32,2627	601	1 601
GLOCKBIT	4736	= 70		GJMARK	10,2330	1354	1 1372	GOTO	6646	1023	13 1024 1091
GMBDRBIT	4742	= 76	1 781	GJMARKF	10,2334	1355	12 207 1372	GOTOERS	6662	1023	1 1023
GMBDRVSW	0137	= 76	2 781 782	GJMARKFR	10,2353	1355	5 271 1372	GOTOGE	6675	1024	1 1023
GMBLBITA	21,3633	1484	1 1483	GJMARKR	10,2350	1355	1 1372	GOTOGSTS	17,2607	1450	1 1442
GMBLBITS	21,3635	1484		GJMARK2	10,2337	1355		GOTOPOOH	6001	224	68 217 1337
GMERGE	07,3500	1323	1 1326	GJMARK2R	10,2356	1355		GOTOV56	6022	593	14 475 515
GMOOE	E4,1501	= 114	1 114	GJMARK3	10,2342	1355	1 208	GOUT	E5,1714	= 123	3 964 966
GN/CCODE	5001	1096		GJMARK3R	10,2361	1355	1 295	GOVNUPDT	40,3317	443	1 412
GNUPAZE5	37,3531	859	2 857 858	GJMARK4	10,2345	1355	2 252 277	GOXDSP	10,2330	= 1372	
GNJX	E7,1656	= 150	4 885 890	GJMARK5	10,2331	1355		GOXDSPF	10,2334	= 1372	13 268 1590
GNURVST	33,3534	889	2 885 889	GJMIDAV	36,2200	734	1 734	GOXDSPFR	10,2353	= 1372	3 292 295
GNUTFAZ5	37,3525	859	2 857 859	GJMOD	04,2220	230	1 231	GOXDSPR	10,2350	= 1372	
GNJV	E7,1656	= 150	1 889	GJMOVE	23,2111	485	1 485	GPMATRIX	06,3132	188	1 188
GOABORT	32,3540	832	1 241	GONXTBNK	43,3662	1292	3 1292	GRABGRAV	15,2731	966	1 966
GOAGIN	10,3050	= 1372		GOODARG	21,3460	1481	2 1481	GRAVEL	15,2603	964	1 964
GOALMCYC	41,2350	412	1 411	GOODEND	07,3665	1328	4 245 1328	GREED	15,2724	966	1 966
GOANIDLE	10,3141	1366	1 1366	GOODEPS1	20,2604	1488	1 1488	GRP2OFF	21,2150	872	3 872
GOBAC	13,3463	1220	2 1220	GOODEPS2	20,2630	1489	1 1488	GRP2PC	04,3244	1226	26 493 1242
GOBACK	35,3772	748	2 748	GOODMANU	22,3234	369	1 363	GRP2SVQ	E5,1711	= 126	3 126 1226
GOBAQUE	11,2774	1233	3 1235 1242	GOODNEG	20,3020	1493	1 1492	GRP4OFF	32,3704	835	
GOBB	4054	154	1 153	GOODRAD	25,3253	556	1 558	GSAV	E4,1630	116	10 116 982
GOBLTIME	E7,1511	= 147	3 147 780	GOPERFRS	10,2705	1361		GSCALE	22,3651	827	2 809 818

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GSELECT	07,3433	1322	3 1321	HANG20	06,2071	157	1 156	HLIGHT	25,3630	612	2 612
GSHIFT	7621	1044	1 1011	HAPC	E4,1716	= 117	5 117 653	HLITE	4747	= 613	2 612 829
GTMP	0026	= 987	5 985 987	HAPOX	E4,1517	= 114	4 114 720	HMEAS	E7,1654	= 149	7 149 893
GTS	21,3077	1472	1 1450	HAVEGUES	11,2002	686	1 776	HMSIN	42,3452	434	1 431
GTSCADR	17,2624	1450	1 1450	HAVENORM	04,3162	1188	1 1188	HMSOUT	42,3230	421	1 417
GTSFIN	42,2147	305	1 430	HAVEQUOT	21,3203	1474	1 1474	HOLD	0165	= 1506	2 1504
GTSFINLC	41,3157	430	1 430	HBAD	34,3745	894	1 893	HOLDQ	E6,1745	= 133	2 1461 1465
GTSEJUT	42,2141	304	1 417	HBEAMANT	33,2002	41	1 896	HOLDW	E5,1734	= 126	7 126 1155
GTSEOUTL	41,2564	417	1 417	HBEAMNB	E4,1672	= 119	2 884 896	HPER	E4,1720	= 117	3 314 653
GTSGO+ON	21,3113	1472		HCALC	E7,1534	= 147	9 147 885	HPERMIN	E4,1600	= 115	6 115 721
GTSQAXIS	21,3133	1473	1 1473	HCALC1	E7,1774	= 151	3 315 876	HPERX	E4,1521	= 114	2 314 721
GTSQRT	21,3441	1481	1 1482	HDOTDISP	E7,1473	= 147	11 120 883	HRCON	42,3536	435	2 434
GTSTEMPS	E6,1737	= 132	13 132	HEADTJET	16,3505	1438	1 1438	HRCON1	42,3277	422	1 421
GUESS	37,2020	373		HFAIL	33,3560	890	2 885	HSCAL	33,2010	41	1 884
GUESSBIT	4752	= 68		HFLSH3IT	4753	= 85	2 612 613	HSTILBAD	34,3755	894	2 893 894
GUESSW	0034	= 68	3 686 1194	HFLSHFLG	0263	= 85	2 885 890	HUGEQUOT	21,3200	1474	1 1473
GUESSI	37,2255	377		HH	E6,1747	= 133	15 1464 1467	IBVKCALL	4674	1000	63 165 1497
GUIDJURN	32,3257	789	1 786	HIASCENT	E6,1400	129	4 212 1487	IC	E7,1655	= 143	6 776 779
GUIDINIT	23,2432	841	2 786 838	HIDESCENT	20,2002	43	1 1487	ICDUFALL	06,2703	= 180	1 181
GUIDSUB	31,2460	799	1 812	HIDPHALF	23,2517	= 37	6 483 1251	ICORK2	43,2214	268	
GUILDEN	31,2467	800		HIDP1/4	23,2511	= 37	1 1283	IDADDTAB	42,2650	314	2 304
GUILDRET	31,2601	801	3 799 801	HIENERGY	12,3422	1195	1 1195	IDADDTM	0142	= 97	
GVDETER	15,2563	963	2 965 980	HIGATASK	33,2447	873	1 875	IDADITEM	0150	97	4 304 429
GWAKE	07,3374	1320	1 1320	HIGATCHK	33,2515	874	1 874	IDAD2TEM	0151	97	2 304
GWAKE2	07,3334	1319	1 1320	HIGATJOB	33,3670	895	1 873	IDAD3TEM	0152	98	
GYCDARS	14,3164	944	1 931	HIGHCRIT	E5,1507	= 121	1 121	IDLEADR	05,3346	222	1 219
GYRCDP	15,3044	969	1 969	HIGHESTF	22,3647	827	1 809	IDLEFBIT	4745	= 78	4 760 865
GYROAGRE	07,3346	1319	1 1319	HIGH4	7742	1098	3 1006 1023	IDLEFLAG	0161	= 78	7 740 853
GYROBUSY	07,3367	1320	1 1319	HIGH9	7744	1098	8 246 1006	IDLEMASK	10,3010	1364	1 1368
GYRJCMD	0047	= 92	6 175 1325	HIMINCON	42,3376	423	1 423	IDLERADR	16,2155	1413	1 1413
GYROEXIT	07,3537	1324	1 1324	HINJECT	32,3756	836	1 841	IDLEREY1	10,3301	1368	
GYROFFAC	07,3627	1326	2 1323 1326	HIPRIO	10,2522	1358	1 1358	IDLESLEP	10,3534	1373	1 1363
GYROTFRM	15,2774	968	1 974	HIRTHROT	4737	= 40	1 760	IERASTST	6125	1005	1 1005
GYTOBETQ	E5,1462	= 127		HISCALAR	0003	= 93	2 381 1026	IFAILINH	05,3350	222	1 216
G21	E6,1707	= 135		HISCALIM	25,3441	559	1 559	IFAILJMP	06,2755	181	1 162
=====				HISECON	42,3375	423	1 422	IFAILOK	07,3234	1317	1 1316
H	E4,1477	= 114	8 114 1243	HITEMIN	0123	= 96	3 434 435	IFLAGC	13,3074	1214	1 1215
H*GHCR*T	0131	= 122	2 794	HITEMOUT	1007	= 101	4 421 424	IFLAGP	13,3051	1214	1 1214
HAFPAI	E7,1603	= 141	3 634 636	HITEST	33,2476	874	2 878	IFLEGAL	10,2561	1359	1 1359
HALF	4736	= 1099	29 334 1510	HIUNITX	23,2517	= 37	1 488	IG	E6,1725	= 135	
HALFARG	E6,1747	= 132	4 1482 1484	HIUNITY	23,2515	= 37	2 488	IGC	E5,1741	= 123	3 123 1254
HALFDP	12,2004	= 1101	3 938 1232	HIUNITZ	23,2513	= 37	4 489 518	IGNALG	32,3031	785	
HALFREY	06,3715	692	2 692	HI10	04,3374	1340	1 1339	IGNALCRT	32,3202	788	
HALFSEC	24,3117	511	1 509	HI5	4350	461	10 157 1292	IGNALCOP	32,3070	786	1 788
HANDADR	17,2573	1449	1 1448	HI6ZEROS	23,2521	= 37	16 299 1283				

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IGNADSQ	E6,1412	129	1 740	IMUZERO	07,2714	1310	3 208 378	INITABIT	4752	= 80	2 971 972
IGNADSR	E6,1413	129	1 740	IMUZEROA	07,2724	1310	1 1310	INITALGN	0205	= 80	4 971 980
IGNFLAG	0153	= 77	3 737 759	IMUZEROK	43,2133	265	1 265	INITBY	15,3126	971	1 971
IGNFLBIT	4737	= 77	2 738 747	IMUZERO2	07,2757	1311	1 1310	INITCDUH	30,3104	910	2 734 832
IGNITE	36,3102	747	1 746	IMUZERO3	07,2766	1311		INITDSP	10,3037	1364	1 1303
IGNITE1	36,3116	747	1 747	IMUZERR	37,2325	378	1 373	INITREAD	25,3114	554	6 553
IGNITION	36,2426	738	2 241 747	IMU2	37,2000	= 36	2 44 373	INITST	34,2061	632	2 633 639
IGNYFT?	36,2421	738	1 738	IMU4	37,2000	= 36	1 383	INITV	12,3506	1197	3 1195 1196
IGRET	E7,1675	= 145	2 584	IM30INIF	05,2362	223	1 212	INITVEL	11,2000	686	3 652 766
IGSAMEX	27,2125	482	1 482	IM30INIR	05,3363	223	1 216	INITVELX	11,2255	690	1 690
IMEDIATE	01,3620	1305	4 1304 1307	IM33INIT	5026	= 223	2 213 222	INITVEL1	11,2026	686	1 686
IMMEDPET	10,3367	1370		INBOUND	27,3550	1278	1 1277	INITVEL2	11,2062	687	1 689
IMODES30	1302	106	67 161 1332	INCAZ	15,2310	957	1 959	INITVEL3	11,2105	687	2 687
IMODES33	1303	106	51 158 1410	INCORPEX	E7,1674	= 144	5 144 1136	INITVEL4	11,2137	688	1 688
IMPLBURN	36,3522	759	1 740	INCORP1	23,2531	1149	1 586	INITVEL5	11,2163	689	1 688
IMPJLBIT	4743	= 69	2 740 762	INCORP2	23,2743	1153	1 586	INITVEL6	11,2225	689	1 689
IMPULSW	0044	= 69	5 759 774	INCOR1	23,2565	1150	1 1150	INITVEL7	11,2230	689	1 688
IMUATTCK	43,2707	281	1 262	INCOR1A	23,2574	1150	1 1150	INITWMX6	26,3231	583	1 583
IMUBACK	37,2005	373		INCOR1B	23,2623	1150	1 1150	INJTARG	32,3623	833	1 835
IMUBAD	07,3637	1327	5 165 1327	INCOR1C	23,2631	1150	2 1150	INLINK	0045	= 92	2 222 1339
IMUCADR	1304	= 106	4 208 1327	INCOR2	23,2672	1151	2 1151 1158	INLUNCHK	11,3276	1237	1 1238
IMUCAGE	06,2565	174	1 181	INCOR2AB	23,2722	1152	1 1152	INREL	0137	= 97	23 400 405
IMUCHK	15,3652	983	2 950 975	INCOR3	23,2726	1152	1 1152	INRELTAB	40,2330	401	2 401 404
IMUCJARK	43,2205	268	1 267	INCR	01,2406	1088	1 1012	INT-ABRT	11,3017	1233	1 1233
IMUCOARS	07,3000	1312	5 268 965	INCROCDU	22,3035	365	2 366 367	INT/W	13,3536	1222	2 1221
IMUCOARV	43,2226	258	2 268 269	INDEP	E5,1765	= 125	4 1182 1183	INTBANK	13,3042	1213	1 1213
IMUCOMP	06,2000	= 29	1 326	INDERASE	6206	1006	1 1006	INTBITAB	13,3466	1220	2 1219 1220
IMUFAIL	06,2703	= 180	1 181	INDEX	6146	1006	1 1004	INTBIT15	0115	96	7 96 1006
IMUFINE	07,3210	1316	6 273 1331	INDEXES	17,3105	1455	3 1454	INTB15+	0114	96	7 96 1506
IMUFINED	07,3232	1316	2 1316 1321	INDEXI	23,3763	1264	1 1263	INTEGRV	13,3134	1216	13 236 1224
IMUFINEK	43,2330	273	1 262	INDEXLOC	0130	= 97	12 1006 1089	INTEGRVS	13,3107	1215	7 656 788
IMUFINEV	43,2360	273	1 273	INDEX2	6164	1006	1 1006	INTEGRV1	13,3136	1216	2 1214
IMUFIN20	07,3210	= 1331		INDJUMP	6274	1011	6 1005 1008	INTEGRV2	13,3141	1216	1 1243
IMUGOOD	07,3636	1327		INDWORK	6204	1006	1 1006	INEXIT	13,3225	1217	3 1218 1219
IMUMON	06,2172	161	2 159	INDXYZ	16,3572	= 1440	1 1429	INTFLAG	0227	= 82	
IMUOP	06,2622	176	1 181	INERCONA	20,3041	1493	1 1488	INTFLBIT	4736	= 82	2 215 1220
IMUOP2	06,2643	176	1 176	INERCONB	20,3057	1494	1 1488	INTGRATE	11,3333	1238	2 1238 1239
IMUPULSE	07,3323	1319	7 273 1400	INERCONC	20,3060	1494	1 1487	INTGRCAL	26,3242	584	7 575 583
IMUSE	0007	= 66	7 231 1335	INFINAPO	12,3737	1200	2 1200	INTIME	E7,1607	= 142	6 663 726
IMUSEBIT	4744	= 66	3 165 208	INFINBIT	4745	= 79		INTINIT	13,2000	= 30	4 46 1221
IMUSEFLG	4744	= 1331	1 176	INFINFLG	0200	= 79	4 1186 1195	INTINT	35,3466	677	6 622 675
IMUSLLLG	37,2315	278	3 274 388	INFINITY	12,3205	1192	5 1189 1192	INTINT2C	34,3062	644	2 636 637
IMUSTALL	07,3716	1330	15 208 969	INFLIGHT	23,2000	= 32	2 324 1249	INTINT3P	34,3071	644	2 627
IMUSTPER	37,2000	= 36	1 290	INGTS	E6,1633	= 134	8 1412 1504	INTLOOP	35,2604	662	1 662
IMUVAP	26,3435	586	2 581 582	ININDEX	E6,1744	= 132	5 1481 1482	INTLZE	21,2365	900	1 900

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 3D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
INTACTBS	41,2116	408	2 407	ISSWIN	06,2726	180	1 179	JAMTERM	4231	455	1 1367
INTCTHIS	13,2300	710		ISSZERO	06,2361	165	1 174	JAPFG*	E5,1464	=	121 1 121
INTPRET	6037	1302	242 207 1392	ISWCALL	4700	1000		JBRFG*	E5,1430	=	121 2 121 826
INTPRETX	31,3677	825	3 807 810	ISWRETRN	4707	1000	3 612 760	JDG2TTF	E5,1430	=	826 1 807
INTPRET1	23,2000	=	32 1 1100	ITCTR	E7,1616	=	142 4 686 689	JETRATE	E6,1745	=	132 5 132 1425
INTPRET2	12,2000	=	30 1 1101	ITEMP1	0061	95	71 95 1416	JETRATEQ	E6,1746	=	132 3 1423 1471
INTPVP	34,3605	730	2 726	ITEMP2	0062	95	32 95 1480	JETRATER	E6,1747	=	132 3 1423 1471
INTRSW	6050	1002	1 1110	ITEMP3	0063	95	30 95 1478	JETSALL	16,3554	1440	1 1440
INTSTALL	13,3414	1219	38 229 1392	ITEMP4	0064	95	17 95 1326	JETSOFF	16,3442	1437	7 1431 1440
INTVAL	37,3065	389	2 383 385	ITEMP5	0065	95	50 95 1300	JETSON	17,3402	1463	
INTVFC	E5,1462	=	128	ITEMP5	0066	95	9 130 1478	JOBSLEEP	5133	1105	8 374 1377
INTVEL	11,2000	=	29 1 686	ITERATOR	12,2536	1182	1 1195	JOBSLP1	01,2776	1110	1 1105
INTWAKE	13,3425	1220	4 297 1217	ITERCTR	0026	=	1204 5 1174 1246	JOBSLP2	01,3007	1110	1 1112
INTWAKEC	04,3216	1226	1 1226	ITTSWASK	10,3266	1368	1 1267	JOBWAKE	5137	1105	13 372 1378
INTWAKEV	04,3213	1226	1 1225	ITRPNT1	32,3354	817		JOBWAKE2	01,3023	1111	1 1105
INTWAKEU	04,3165	1225	1 1394	ITRPNT2	32,3510	819		JOBWAKE3	01,3035	1111	2 1111
INTWAKEV	04,3230	1226	1 1226	ITRO	6370	1014		JOBWAKE4	01,3027	1111	1 1111
INTWAKEO	13,3423	1220	2 495 1226	ITR1	6357	1014		JOBXCHS	10,2774	1363	2 1359
INTWAKEI	13,3445	1220	4 711 1220	ITR10	6142	1005		JOIN	10,3552	1374	1 1374
INTWAKLM	04,3226	1226	1 1226	ITR11	6202	1006		JSWCHBIT	4736	=	65
INTWAKUP	04,3232	1226	1 1225	ITR12	6134	1005		JSWITCH	0001	=	65 5 1238 1243
INTWAKUQ	1167	=	1225 3 1225 1226	ITR13	6213	1007	1 1006	JTLST	17,3114	1456	2 1437 1455
INTWAKIQ	1167	=	104 1 1225	ITR14	6237	1008		JUMPOSP	16,2206	1413	1 1410
INTY	E5,1470	=	128 6 385 386	ITR15	6123	1005		JUNCTN1	34,3375	725	1 725
INTYPBIT	4750	=	71	ITR7	6261	1009		JUNCTN2	34,3430	726	1 726
INTYPFLG	0070	=	71 19 493 1224	ITSAJOB	01,3635	1305	1 1304	JUSTOA	15,2042	250	1 251
INT7	E5,1474	=	128	ITSAJOB2	01,3746	1308	1 1306	JUSTOUT	16,3157	1433	1 1434
INVERT	20,3700	1504	4 1498 1504	ITSATBL	01,3651	1305	1 1303	JUSTTRIM	15,3027	968	1 972
INVFLAG	36,2645	743	1 743	ITSAVAR	01,3551	1303	1 1303	JUSTZY	15,2011	250	1 251
INVERSEON	12,3127	1191	1 1191	ITSAWAIT	01,3570	1304	1 1304	J2REQSQ	13,2022	46	1 1235
IRETURN	E4,1502	=	114 8 114 1217	ITSEVEN	01,3752	1308	1 1305	J4REQ/J3	13,2012	46	2 1235
IRETURN1	E7,1744	143	6 152 1225	ITSINDIR	5436	1304	1 1304	=====			
IRISCOMP	06,3330	328		ITSLGCL1	5445	1306	1 1306 1307	K.O1	24,3666	657	1 657
IRISX	06,3356	329	2 323 334	ITSLGCL2	01,3707	1307	1 1307	K(AT)	32,3762	836	1 833
IRISY	06,3373	329	2 328 334	ITSLIKEB	01,3622	1305	1 1303	K(1/OV)	27,2014	39	1 833
IRISZ	06,3410	329	2 328 335	ITSLNGCL	01,3734	1307	1 1303	KALCMAN3	22,2004	351	1 1331
IRIGI	06,3353	328	3 326 337	ITSNOVAC	01,3645	1305	1 1305	KALCMON1	22,2000	=	32 4 351 365
ISCADR+O	4220	455	2 455 464	ITSWBIT	4735	=	77	KALCMON2	22,2000	=	32 1 356
ISITAUTO	26,2262	476	1 365	ITSWICH	0151	=	77 5 627 667	KALEBCON	07,3772	1331	1 1331
ISITNOO	10,3155	1366	1 1366	ITSWTLST	01,3741	1307	1 1306	KAOS	16,2623	1427	
ISITPRIO	10,3240	1367	2 1368	ITURNON	06,2533	172	1 181	KCENTRAL	E6,1741	=	132 8 1473 1475
ISLIST+O	4224	455	2 455 464	ITURNON2	06,2556	173	2 172 176	KDPNOX	E6,1702	=	135 3 135 367
ISSERVON	04,2107	228	1 227	=====				KEEP-2	E7,1560	=	149 1 149
ISSJP	06,2321	165		JACCUV	20,2642	1489	1 1488	KEEPPRIO	10,2544	1359	2 1365 1369
ISSNOFF	06,2716	179		JAMPDOC	4243	456		KEEPVR	14,2347	852	2 852

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

JD UNDEFINED	= DEFINED BY EQUALS	J DEFINED BY JOKER OR ERASE ANYWHERE	ND MULTIPLY DEFINED
BD MULTIPLY DEFINED	CD DEFINITION ASSOCIATED WITH CONFLICT	XX MISCELLANEOUS TROUBLE	

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
KEEPVR1	14,2351		852 1 851	K1VAL	27,2000		38 1 773	LASTTIME	01,3501		1132
KEL	E4,1630	=	116 12 360 482	K2	E6,1711	=	135	LASTPIP	E7,1757	=	151 4 151 818
KEPCONVG	12,2333		1178 3 1176 1177	K2.	34,2561		638 1 638	LASTXCMD	0113	=	96 1 530
KEPC1	0042	=	1202 3 1174 1190	K2CNTRAL	E6,1742	=	132 22 1474 1483	LASTYCMD	0112	=	96 8 96 535
KEPC2	0044	=	1202 3 1174 1190	K2THETA	E6,1737	=	132 12 1473 1483	LAT	1120	=	104 8 104 1135
KEPLERN	12,2023		1174 2 1228	K2VAL	27,2002		38 1 774	LAT-LONG	13,2351		1133 3 657 933
KEPLOOP	12,2166		1176 1 1177	K3	E6,1717	=	135	LATAZCHK	37,2021		373
KEPPREP	11,2376		1227 3 1217 1233	K3S1	22,2370		357	LATFWDV	21,2562		903
KEPRTN	E4,1512	=	114 3 1178 1228	K3VAL	27,2004		38 1 774	LATITUDE	E5,1402	=	127 6 127 380
KEPZERO	12,2006	=	1185 3 1175 1199	K4	22,2372		357	LATLONG	13,2000	=	30 1 1133
KEYCOM	04,3303		1338	K4SQ	22,2374		357	LATVEL	E7,1700	=	150 18 150 906
KEYRPTBB	4060		154 2 153 154	=====	=====		=====	LATVMETR	E7,1676	=	150 13 150 907
KEYRUPT	04,2000	=	28 1 1338	L	0001	=	92 311 93 1509	LATVNEG	21,2766		906 1 905
KEYRUPT1	04,3274		1338 2 153 154	L*WCR*F	0130	=	122 794	LATVPOS	21,2761		906 1 905
KFYTEMP1	0073	=	95 6 154 1339	L.PVT-CG	E6,1527		133 1 1489	LAXIS	E4,1702	=	119 5 120 851
KEYTEMP2	0734	=	100 2 1339	LADQSAVE	E7,1714	=	151 5 151 907	LBUF2	00,2470		1059 2 1083 1085
KIGNV/84	E5,1504	=	121 2 121 787	LAG/TAU	E5,1542	=	122 2 122 819	LCHAN	0001	=	93 19 158 1437
KIGNX/84	E5,1500	=	121 3 121 787	LAGSLIST	4753	=	209 1 208	LDANZIG	00,3713		1085 1 1084
KIGNY/88	E5,1502	=	121 2 121 787	LALOTORV	13,2422		1135 1 933	LDATALST	0334		99 2 99 994
KILCLOCK	35,3651		680 2 680 681	LAMBERT	12,3212		1193 2 1246	LDLOOP72	04,3673		1394 1 1394
KILLACT	07,2060		246 4 246 261	LAMBLOOP	12,3330		1194 3 1195 1197	LDNDUMP	05,3720		996 1 996
KILLBB	6036		750 1 750	LAMENTER	12,2701		1184 1 1197	LDNDUMPI	43,3050		288 1 288
KILLCLOCK	36,2733		744 1 744	LAMPTEST	06,2766		181 2 170 171	LDNDUMPI	05,3721		996 1 996
KILLDEAD	27,2242		751 1 751	LAND	E7,1634	=	149 19 149 812	LDNPHAS1	05,3351		222 1 219
KILLMON	41,3314		438 2 438	LANDALT	E5,1712	=	123 3 317 933	LDNPHAS2	05,3640		993 1 991
KILLTASK	6027		750 11 510 746	LANDCNST	22,2000	=	32 1 827	LDPOS MAX	12,2017	=	1202 1 1200
KILLTSK2	27,2200		750 2 750	LANDISP	21,2154		898 4 829 830	LEADTIME	E7,1426		138 1 808
KILL2	04,2254		231 3 231	LANDJUNK	31,2144		791 1 233	LEFT	00,2342		1056 1 1053
KILMONDN	4204		454 4 446 468	LANDLAT	E5,1706	=	123 4 123 933	LEFT-	00,2336		1056 1 1053
KLEENEX	10,2333		1355	LANDLONG	E5,1710	=	123 4 123 933	LEFTNCOM	40,3156		433 1 433
KONMAT	05,2001		51 5 985 987	LANDTEMP	E7,1544	=	149 9 149 805	LEFT5	4331		460 5 414 1292
KPIP	33,2020		41 1 860	LARGE	00,3065		1070 1 1070	LEGAL?	21,2110		835 2 830
KPIP1	33,2021		41 5 817 887	LARGE2	00,3112		1072 2 1070 1071	LEGALTST	40,2527		404 2 404
KPIP1(5)	21,2004		42 3 901 902	LARGE3	00,3074		1072 1 1070	LEMALONE	01,2271		295 1 294
KPIP2	33,2023		41 1 882	LARMENT	5601		1381 1 1384	LEMCONIC	13,3100		1214 5 339 954
KQ	E6,1504		132 4 132 1490	LASINEX	00,3631		1084 1 1084	LEMGEOM	13,2000	=	30 1 320
KRDAP	E6,1506	=	132 1 1490	LAST	16,3325		1435 2 1435	LEMMASS	1331		107 21 194 1495
KSPNDX	E6,1701	=	135 6 135 367	LASTBIAS	06,3663		336 1 857	LEMONM	0056	=	93
KT	E7,1575	=	141 5 666 729	LASTCHG	17,3142		1457 1 1457	LEMPREC	13,3057		1214 13 37 976
KT1	33,2200		855 1 846	LASTLADW	E7,1745	=	151	LEMSTORE	23,2376		697 1 697
KV1	E6,1703	=	135 4 135	LASTLRDT	25,3535		562 1 561	LEMVEC	43,3051		288 1 263
KV2	E6,1711	=	135 4 135	LASTNEGY	21,2712		905 2 904	LENGTHOT	E5,1412	=	127 9 127 388
KV3	E6,1717	=	135 4 135	LASTOK	21,2662		904 2 904	LESCHK	05,3352		222 1 222
K1	E6,1703	=	135	LASTPOSY	21,2674		905 2 904	LETABBIT	4743	=	81 3 739 835
KIORK2	34,2542		638 1 638	LASTSEG	07,3530		1324 1 1324	LETABORT	0215	=	81 3 791 854

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED
SD BADLY DEFINED= DEFINED BY EQUALS
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MD MULTIPLY DEFINED

XX MISCELLANEOUS TROUBLE

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
LEFITLIV	27,2221	751	1 751	LMLSAL01	05,2127	= 202	1 202	LOCKSKIRT	22,2744	= 364	7 353 355
LGCLTADR	01,3772	1308	1 1307	LMLSAL02	05,2136	= 202	1 202	LODESCNT	20,2003	43	1 1487
LGCLZCDR	5307	1131	1 1131	LMLSAL03	05,2145	= 202	1 202	LODMIXNN	42,2121	304	1 304
LGCDMP	06,3531	333	3 326 336	LMLSAL04	05,2154	= 202	1 202	LODNLV	42,2137	304	1 304
LGCPDTE	26,3401	586	4 577 582	LMLSAL05	05,2157	= 202	1 202	LODNNLOC	41,2113	408	8 407 427
LGRET	E7,1675	= 145	4 145 586	LMLSAL06	05,2170	= 202	1 202	LODNNTAB	42,2103	304	1 408
LGWAKE	07,3404	1320	2 1320 1321	LMLSAL07	05,2276	= 202	1 202	LODPHALF	12,2004	= 37	3 322 1199
LGYSO	1314	106	9 222 1324	LMLSAL08	05,2224	= 202	1 202	LODPMAX	12,2017	1101	3 37 1202
LGYROBIN	43,2356	273	1 273	LMLSAL09	05,2226	= 202	1 202	LODPMAX1	12,2021	1101	1 37
LIGHTSET	05,3070	218	2 215 216	LMOMEGAN	E6,1407	129	2 213 1425	LODP1/4	04,3036	= 37	1 1137
LIM(-22)	27,3756	1293	1 1278	LMONLY	16,2462	1425	1 1425	LODSAMPT	4400	462	3 438 1339
LIMALARM	26,3675	593	2 591	LMOONBIT	4741	= 79	1 213	LOENERGY	12,3442	1196	1 1195
LIMITCOM	42,3334	422	1 422	LMOONFLG	0174	= 79	5 37 1212	LOGSUB	30,3036	856	1 847
LIMITS	4734	= 1095	10 923 1473	LMORBM01	05,2066	= 194	1 204	LOKONBIT	4747	= 66	1 551
LIMITSUB	30,3727	924	7 914 919	LMORBM02	05,2127	194	4 194 202	LOKONSW	0012	= 66	5 271 510
LINRAT	17,2344	1446	2 1446 1447	LMORBM03	05,2136	194	6 194 204	LOLIM	12,3503	1197	2 1194
LINRATP	16,3135	1433	1 1434	LMORBM04	05,2145	195	6 194 204	LOMAT	35,3447	677	2 674 675
LINUS	5464	= 1373	2 474 511	LMORBM05	05,2154	195	6 194 204	LONG	1122	= 104	7 104 1135
LINUSCHR	10,3374	1370	2 1358 1359	LMORBM06	05,2157	195	3 194 202	LONGBASE	1151	104	2 1301 1307
LITIT	25,3650	513	1 613	LMPOS	E4,1751	= 119	4 119 565	LONGCADR	1147	104	2 1131 1132
LMAGSIDL	05,2407	= 204	3 193 204	LMRENDL	05,2232	= 198	1 204	LONGCALL	5277	1130	5 374 1308
LMAGSI02	05,2136	= 204	1 204	LMREND01	05,2127	= 198	1 198	LONGCLCL	01,3727	1307	2 1307
LMAGSI03	05,2145	= 204	1 204	LMREND02	05,2136	= 198	1 198	LONGCYCL	01,3466	1131	2 1131 1132
LMAGSI04	05,2154	= 204	1 204	LMREND03	05,2145	= 198	1 198	LONGEXIT	E3,1434	109	4 1131 1132
LMAGSI05	05,2157	= 204	1 204	LMREND04	05,2154	= 199	1 198	LONGGYRO	07,3543	1324	1 1323
LMCSTADL	05,2172	= 196	2 193 204	LMREND05	05,2157	= 199	1 198	LONGPOSH	01,3521	1132	2 1131
LMCSTA01	05,2127	= 196	1 196	LMREND06	05,2157	= 199	1 198	LONGTRN	01,3506	1132	1 1132
LMCSTA02	05,2136	= 196	1 196	LMREND07	05,2224	= 199	1 198	LONGTIME	1153	104	13 1130 1307
LMCSTA03	05,2145	= 196	1 196	LMTRAP	E6,1406	129	2 213 1425	LOOKANGL	E7,1667	= 150	1 807
LMCSTA04	05,2154	= 196	1 196	LMVEL	E4,1757	= 119	4 119 565	LOOPCT	E7,1605	= 141	5 633 641
LMCSTA05	05,2157	= 196	1 196	LMCHTM	E7,1660	= 148	3 148 495	LOOPER	17,3005	1454	3 1449 1455
LMCSTA06	05,2224	196	4 196 202	LNSCALL2	01,3452	1131	1 1131	LOOPMX	34,2057	632	1 633
LMCSTA07	05,2226	196	2 196 202	LOADDAP	20,2000	= 31	1 292	LOOPRATE	16,3670	1470	2 1470 1471
LMDSASDL	05,2303	= 200	1 204	LOADDAP1	01,2000	= 28	2 43 293	LOOPSIN	22,2417	357	1 358
LMDSAS02	05,2136	= 200	1 200	LOADITIS	10,3461	1371	1 1368	LOOPI	23,3716	1264	1 1263
LMDSAS03	05,2145	= 200	1 200	LOADLV	41,2775	427	10 406 435	LOOP2	23,3715	1263	1 1264
LMDSAS04	05,2154	= 200	1 200	LOADLVI	41,2001	406	1 274	LOOP3	20,2730	1490	2 1490
LMDSAS05	05,2157	= 200	1 200	LOADSTAT	1014	102	4 427 458	LOUSE	37,2730	386	1 387
LMDSAS06	05,2170	= 200	1 200	LOADTIME	10,3573	1397	35 207 1224	LOSCALAR	0004	= 93	4 381 1454
LMDSAS07	05,2341	200	1 200	LOASCENT	20,2001	43	1 1487	LOSCMBIT	4740	= 68	4 552 604
LMDSAS08	05,2355	201	1 200	LJC	0164	99	46 371 1373	LOSCMFLG	0041	= 68	10 496 598
LMDSAS09	05,2224	= 201	1 200	LOCCTR	0064	= 95	31 372 1367	LOSCOUNT	E7,1456	139	39 183 612
LMINT	24,3264	565	1 565	LOCKANGL	22,2402	157	1 351	LOSDESRD	E7,1711	= 144	6 144 592
LMKQDSN	E6,1410	129	1 213	LOCSAM	14,2506	935	3 935 962	LOSSM	1101	= 604	3 598 600
LMLSALDL	05,2357	= 202	1 205					LOSVDT/4	E3,1760	= 604	5 598 600

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

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LOSVEC	E5,1413	=	127 3 127 387	LRHMAX	E7,1420	138	2 885	LRWVX	E5,1532	=	122 1 122
LOSVEL	E3,1760		112 6 112 604	LRHTASK	21,2130	872	1 829	LRWVY	E5,1531	=	122 1 122
LUS1	E5,1444	=	127	LRINH	0254	=	84 2 272	LRWVZ	E5,1530	=	122 2 122 888
LOS2	E5,1452	=	127	LRINHBIT	4744	=	84 2 885 888	LRXCDU	E4,1654	=	116 5 116 894
LOTMIN	0124	=	96	LRICTR	E7,1670	=	150 5 150 896	LRXCDUDL	E4,1734	=	119 3 119 892
LOTMCUT	1010	=	101 1 474	LRMCTR	E7,1672	=	150 5 150 896	LRXCDU	E4,1655	=	116 2 116 886
LOTHRUST	33,2352		862 1 861	LROFF	43,2325	272	1 262	LRXCDUDL	E4,1735	=	119 1 119
LOUNITX	12,2004	=	37	LRON	43,2322	271	1 262	LRZCDU	E4,1656	=	116 4 116 894
LOUNITY	12,2002	=	37	LRPOSALM	33,2536	875	1 874	LRZCDUDL	E4,1736	=	119 3 119 892
LOUNITZ	12,2000	=	37	LRPOSBIT	4746	=	86 1 561	LSDISP	14,2462		933 1 933
LOUPF	21,3621		1484 1 1483	LRPOSCAL	43,2641	279	2 276	LSORIENT	04,3013		983 2 932 976
LONGRIT	E5,1506	=	121 3 121 794	LRPOSCAN	25,3543	562	1 561	LSPOS	15,3664		985 4 935 1237
LOWFCOLD	31,2272		794 1 794	LRPOSCHK	25,3220	556		LSR22.3	26,2412		575 2 506 585
LOWIDCUD	05,2065		193 1 997	LRPOSFLG	0275	=	86	LSR22.4	26,3200		583 1 575
LOWLOAD	10,3526		1372 1 1368	LRPOSNXT	25,3512	561	2 561 562	LSTBNKCH	43,3723		1293 1 1292
LOWSUPER	30,2000	=	34 8 210 655	LRPOSOUT	40,2635	418	1 417	LSTLIM	4747	=	751 1 751
LOWVERB	41,2034		407 1 407	LRPOS2	25,3471	561	2 265 895	LSTPTR	0144	=	97
LOW10	5012		1097 21 232 1291	LRPOS2K	43,2151	265	1 262	LST1	E3,1400		109 48 154 1303
LOW11	4356		461 7 156 1014	LRP2ALM	43,2160	265	1 265	LST2	E3,1410		109 41 220 1128
LOW2	5245	=	1099 1 1053	LRRCTR	E7,1671	=	150 4 150 896	LST2CON	41,2145		408 1 408
LOW3	4757	=	1099 2 232 1050	LRSCK	25,3417	559	1 559	LST2FAN	43,2002		262 2 262 466
LOW4	4762		1095 3 745 1375	LRSCTR	E7,1673	=	150 4 150 896	LS21X	E3,1757		112 4 499 565
LOW5	4346		461 14 399 1339	LRS22	32,2000	=	34 2 41 569	LTHVACA	05,3355		222 4 221
LOW7	6074		1003 14 228 1371	LRS22.1	32,2366	569	1 505	LUNABIT	4740	=	70
LOW7+2K	5013		1097 1 1009	LRS22.1X	E7,1737	=	146 6 146 573	LUNAFLEG	0060	=	70 9 656 1139
LOW8	4357		461 21 191 1394	LRS22.2	24,3333	572	1 505	LUNDESCH	25,2421		539 1 322
LOW9	5004		1096 12 245 1113	LRS24.1	26,3442	588	2 516 592	LUNG	15,2670		965 2 963 964
LOSZEROS	12,2006	=	37 5 248 1185	LRS24.11	26,3471	589		LUNLANAD	17,2025		741 1 741
LPS20.1	24,3255		565 5 496 570	LRUPT	0011	=	92	LUNLAND	31,2462		799 1 741
LPS20.2	25,3565		566 1 496	LRVEL	25,3107	551	1 892	LUNPOS	15,3664	=	985 2 487 1238
LRADRET	E7,1650	=	149 4 149 897	LRVELBIT	4744	=	86	LUNRSALN	0005	=	236 2 235
LRADRETI	E7,1656	=	150 2 895 896	LRVELFLG	0273	=	86	LUNSFCHK	24,2667		507 9 492 516
LRALPHA	E5,1522	=	121 3 122 896	LRVELX	25,3101	551	1 491	LUNSPH	11,3360		1238 1 1237
LRALPHA2	E5,1524	=	122 1 172	LRVELY	25,3077	551	1 491	LUNVEL	15,3775		987 1 1239
LRALT	25,3073		553 2 491 893	LRVELZ	25,3075	553	2 491 553	LV	0044	=	93 2 1070 1072
LRALTBIT	4747	=	86 1 612	LRVF	E5,1527	=	122 3 122 888	LVBUP	6273		1010 1 1034
LRALTFLG	0276	=	86	LRVJOB	33,3616	892	1 889	LVELBIAS	25,2000		41 1 556
LRBETA1	E5,1523	=	122 1 122	LRVMAX	E5,1526	=	122 3 122 888	LVLIMITS	21,2730		905 4 904
LRBETA2	E5,1525	=	122 1 122	LRVTIMDL	E4,1737	=	119 2 200 892	LVMINLM	21,3020		906 6 905 906
LRBYBIT	4735	=	83 7 229 874	LRVTIME	E4,1652	=	116 7 116 894	LVSQUARE	0042	=	93 2 1070 1075
LSBYPASS	0245	=	83 1 785	LRWH	E7,1421	138	1 885	LVWTLIST	5215		1119 1 1123
LRGCHK	04,3000		702 1 701	LRWVFF	E5,1536	=	122 2 122 889	LXA	01,2354		1087 1 1012
LRESC	20,2667		1489 1 1488	LRWVFX	E5,1535	=	122 1 122	LXC	01,2360		1087 1 1012
LRHEIGHT	25,3272		557 1 556	LRWVFX	E5,1534	=	122 1 122	L14/OUT	40,2711		419 1 419
LRHJOB	34,3716		893 1 872	LRWVFZ	E5,1533	=	122 2 122 888	=====			

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M/SCON1	42,3377	423	1 422	MARKPERF	10,2440	1357	1 1367	MDDTDPS	36,2002	38	1 833
M/SCON2	42,3400	423	1 422	MARKPLAY	10,2377	1356	4 1356 1372	MD1	4362	461	4 458 1391
M/SCON3	42,3402	423	4 422	MARKRET	10,3413	1370	1 1369	MEASINC	23,2000	=	32 1 1149
M/SLIMIT	42,3326	422	2 422	MARKRUPT	07,2332	254	2 153 154	MEASINC1	23,2000	=	32 1 1153
M/SNORM	42,3342	422	7 422	423 MARKSTAT	1312	106	34 222 261	METHOD1	22,2242	354	1 354
M/SOUT	42,3303	422	1 417	MARKTEST	26,2504	576	1 575	METHOD2	22,2216	354	
MAGSUB	4512	521	9 523	544 MARKTYPE	07,2514	258	5 255 260	METHOD3	22,2266	355	2 354
MASVEC2	E5,1717	=	125 6 125 1197	MARKWAKE	10,3023	1364	1 1371	MFI	E4,1630	=	116 12 351 353
MAINENG	30,2425	846	1 846	MARK2PAC	1073	103	2 1364 1365	MFI SYM	E6,1703	=	135 12 353 355
MAINLINE	30,2704	850	2 851	MARK3MSK	10,3505	1372	2 1355	MFRFF	15,3462	978	2 981 982
MAINRTNE	34,3434	726	1 729	MARK4MSK	10,3506	1372	1 1355	MFS	E4,1630	=	116 5 116 351
MAINRTNI	34,3460	727	1 727	MARSLEEP	10,3454	1371	1 1356	MGARET	30,3275	914	1 924
MAJ+	07,3467	1323	1 1322	MASKREG	E5,1534	=	127	MGC	E5,1743	=	123 3 123 1253
MAJ-	07,3607	1326	1 1322	MASS	1244	=	105 18 105 1495	MGLVFBIT	4752	=	75
MAKEACCS	37,3515	859	2 858	MASSCTR	0161	=	1496 5 1494 1495	MGLVFLAG	0130	=	75 2 692
MAKECADR	4645	999	16 271 1486	MASSFIX	20,2513	1487	3 1487	MG2	07,3726	1330	1 1330
MAKEGEN	10,3537	1373	1 1361	MASSMJN	33,2233	860		MIDAVBIT	4752	=	81
MAKEMARK	10,2364	1355	1 1359	MASSMULT	31,2400	796	2 793	MIDAVFLG	0224	=	81 3 1224 1242
MAKEMAX	20,3027	1493	1 1493	MASSI	E7,1570	=	147 5 147 864	MIDDGIM	06,2000	=	29 1 692
MAKEPLAY	10,2546	1359	2 1358 1373	MATINC	0140	97	9 97 1039	MIDFLAG	0002	=	65 5 1218 1245
MAKEPRIO	10,2512	1358	1 1359	MATMOVE	14,3377	948	7 944 975	MIDFLBIT	4737	=	65
MAKERUPT	7754	1459	2 1458 1459	MAX	0016	=	1204 4 1182 1183	MIDORLST	17,3131	1457	1 1456
MANFLAG	16,2202	1413	1 1412	MAXANG	22,2364	357	1 352	MIDTOAV1	13,3557	1223	1 734
MANMODE	16,3027	1430	1 1430	MAXCHECK	12,2625	1183	1 1183	MIDTOAV2	13,3553	1223	1 758
MANJCALL	22,3177	367	1 367	MAXCHK	22,3636	721	6 617 720	MID1FBIT	4751	=	81
MANUFBIT	4736	=	77	MAXCOGA	12,3302	1194	2 1194	MID1FLAG	0223	=	81 4 1223 1225
MANUFLAG	0152	=	77	MAXDB	05,3067	218	1 212	MID2	13,3652	1224	1 1224
MANUOFF	22,3113	366	1 366	MAXDT	13,3341	1219	2 1218	MID5	4347	461	1 428
MANUSTAL	22,3067	366		MAXDV	00,2642	1065	1 1061	MID7	4144	439	4 439 1372
MANUSTAT	22,3122	366	1 365	MAXDVSW	0140	=	97 6 1057 1072	MIMRET	17,2307	1445	1 1445
MANUSTOP	22,3213	369	1 366	MAXFORCE	E5,1546	=	122 2 122 819	MIN	0010	=	1204 4 1182 1183
MANJVER	26,2000	=	33 1 473	MAXJETS	17,3340	1462	1 1462	MIN+	07,3464	1323	1 1322
MANJVER1	26,2000	=	33 1 483	MAXNM	22,3645	721	3 721	MIN-	07,3604	1326	1 1322
MARKCHEX	07,2216	252	2 252 261	MAXPLJS	20,3035	1493	2 1492 1493	MIN3DV	33,2204	855	1 843
MARKCNTR	E7,1550	=	145 13 145 261	MAXRA	27,3461	1274	2 1274	MINADR	17,2317	1446	1 1445
MARKCOP	10,2413	1356	1 1356	MAXTEST	00,2565	1061	4 1060 1074	MINANG	22,2362	357	1 352
MARKCTR	E7,1462	=	139 5 496 711	MAXTFF	27,3651	1280	1 1279	MINB12	7741	=	994 1 992
MARKFBAN	1071	103	1 1372	MAXTFF1	27,3650	1280	1 1277	MINB1314	05,3560	992	1 992
MARKEND	10,2326	1354	1 1354	MAXTRIES	24,2310	499	2 509 510	MINCHECK	12,2571	1182	1 1182
MARKFLAG	1071	=	1372 1 1356	MAXTRYS	25,2474	542	1 543	MINCOGA	12,3320	1194	1 1197
MARKFMSK	10,3031	1364	2 1355	MAXVBITS	21,2005	42	8 904 906	MINCON	42,3540	435	1 424
MARKFORM	10,2340	1355		MAX250	35,3733	684	1 667	MINCON1	42,3275	422	1 424
MARKNV	0370	100	5 1356 1365	MCTOMS	25,3071	552	2 548 551	MINCON2	42,3273	421	2 421
MARKPCT	10,1522	1373	1 1367	MOUT	E7,1736	=	143 2 143 774	MINCSM	4741	=	43 1 294
MARKOVER	10,3421	1371	1 1354	MDDTAPS	36,2010	38		MINDEX	0774	101	4 228 232

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MINFORCE	E5,1544	=	122 2 122 819	MINKEYIN	0015	=	93 2 218 1338	MOREIDLE	16,2157	1413	3 1410 1411
MINIMP	43,3001		234 1 263	MODABORT	07,3741	1330	2 1330	MORNUM	40,2312	401	2 400
MINIRECT	11,3455		1240 3 495 1222	MODDONE	12,2124	1175	3 1175	MOVATHIS	13,2747	=	37 1 1222
MINLMD	01,2000		43 1 294	MODE	0163	99	37 326 1373	MOVEACSM	13,2674	1211	3 1157 1211
MINMINLM	01,2001		43 1 294	MODEA	1107	=	103 4 323 539	MOVEALEM	13,2747	1212	4 37 1212
MINPERE	22,3365		715 2 714 717	MODEB	1111	103	4 103 542	MOVEPCSM	13,2723	1211	3 1157 1211
MINPERM	22,3363		715 1 717	MODECADR	1304	106	10 106 1330	MOVEPLEM	13,2770	1212	3 1156 1212
MINP	17,2266		1445 2 1445	MODEEXIT	07,2755	1311	8 1310 1330	MPAC	0154	99	921 98 1506
MININ	17,2273		1445 1 1446	MODEGOOD	07,3731	1330	1 1330	MPAC+	00,2437	1059	2 1058
MINTIMES	16,3621		1441 1 1437	MODESLP	07,3735	1330	1 1330	MPAC+6	0162	=	420 7 420 462
MINTIME2	05,3525		991 1 992	MODESW	07,2000	=	29 1 1310	MPAC-	00,2433	1058	2 1058
MINUS1	7747	=	1099 2 1373 1371	MODEZCHK	4550	523	2 522 544	MPACSHR	00,2033	1047	2 1055 1076
MINUS2	7746	=	1308 3 219 1303	MODE70	05,3476	832	1 831	MPACSRND	00,2050	1048	1 1047
MIS	E5,1646		134 19 115 433	MODE71	05,3500	832		MPACTST	42,3554	435	1 434
MISCJUMP	6334		1012 1 1009	MODNGDEL	12,2600	1182	2 1182	MPACVBUF	7532	1043	5 601 1262
MIXAD	41,2260		410 1 410	MODPSDEL	12,2636	1183	2 1183	MPAC2SAV	0165	=	1372 2 1356 1365
MIXBACK	40,3047		452 1 452	MODREG	1011	101	25 212 1388	MPERFMSK	10,3520	1372	2 1355
MIXB	0140	=	97 13 304 433	MODROUTB	04,2040	=	447 1 447	MPTMP	0135	97	64 97 1086
MIXCON	4771	=	304 1 304	MONADR	40,3440	446	1 446	MR.KLEAN	05,2643	213	2 212 1383
MIXNN1	41,2234		410 1 410	MONBACK	41,3350	439	1 439	MRKIDBIT	4735	=	72
MIXNN2	41,2246		410 1 410	MONBUSY	41,3351	439	1 438	MRKIDFLG	0074	=	72
MIXNDUN	41,2221		410 1 407	MONDEL	41,3320	438	1 438	MRKNVBIT	4743	=	72 1 1355
MIXTEMP	0125	=	95 3 404 410	MONDO	41,3321	438	1 438	MRKNVFLG	0102	=	72 1 1366
AKABORT	07,2044		245 1 244	MONITOR	41,3230	437	7 408 409	MRUPTBIT	4747	=	73
MKALARM	07,2325		253 1 252	MONIT1	41,3232	437		MRUPTFLG	0106	=	73
MKDEX	E7,1552	=	145 9 145 251	MONIT2	41,3245	437	2 437	MSKDATR1	20,2021	292	1 292
MKOVBIT	4751	=	73 2 1357 1364	MONREF	41,3347	439	1 439	MSTORE1	01,2367	1087	2 1088 1091
MKOVFLAG	0110	=	73	MONREPOS	06,3115	187	1 187	MS100	7727	=	1413 2 1412 1421
MKREJ	07,2461		257 1 254	MONREQ	41,3275	438	2 438	MU(P)	0032	=	1247
MKRELEAS	07,2047		245 1 253	MONSAVE	1020	102	7 222 439	MU/A	E7,1720	=	143 4 143 777
MKRUPTBB	4051		154 1 153	MONSAVE1	1021	102	12 222 465	MUASTEER	E7,1716	=	143 5 143 778
MKTINE	07,1754	=	145 8 146 893	MONSAVE2	1022	102	4 437 452	MUCHTIME	01,3511	1132	2 1131
MKVAC	07,2014		244	MONBIT	4740	=	65	MUEARTH	13,2006	46	8 687 1245
MKVACFND	07,2031		244 5 244	MOONCNTR	14,2543	935	1 935	MULBUSH	21,3467	1481	1 1481
MKV352	07,2620		260	MOONFLAG	0003	=	65 31 656 1247	MULTEXIT	5624	1382	3 1381 1382
MKV353	07,2617		260	MOONGJN	22,3516	717	1 717	MULTFAIL	5630	1382	1 1381
MKV354	07,2616		260 1 260	MOONMX	24,3720	1143	2 1140 1142	MUM	13,2004	46	
MKV354*	07,2621		260 1 252	MOONMXA	25,3671	1144	1 1144	MUM(-37)	27,2024	44	
MLOSV	E3,1766		112 5 548 604	MOONOTH	0173	=	37 2 297	MUNFLAG	0141	=	76 8 229 867
MMADREF	41,2033		406 1 406	MOONPAD	22,3373	715	1 714	MUNFLBIT	4744	=	76 4 186 865
MMATRIX	0024	=	1148 8 1140 1234	MOONRATE	27,2026	44	3 842	MUNG?	37,2377	707	1 703
MMCHANG	41,3430		447 2 406 409	MOONSPOT	33,2254	860	1 860	MUNSPAV	33,3130	883	7 734 885
MMDSPLAY	5315		1294 1 217	MOONTHIS	0174	=	37 6 297 1221	MUNRETRN	33,2461	874	1 883
MMINJMBER	0775		101 10 227 835	MODRECADR	20,2445	1420	1 1420	MUNPVG	33,3066	882	
MMTEMP	1060	=	232 3 232	MOREDES	25,2627	546	2 546	MUSCALE	E7,1766	=	143 2 777

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MUTABLE	04,2004	45	6 690 1193	NEGATE	21,3323	1476	1 1476	NEWDEL	12,2634	1183	2 1182 1183
MWAITBIT	4741	= 72		NEGCHECK	21,3655	1508	1 1509	NEWDELHI	22,3003	365	1 368
MWAITFLG	0100	= 72		NEGCOS	13,2532	1137	1 1137	NEWDELX	12,2260	1177	3 1177
MX	E7,1676	= 145	6 145 580	NEGDRIVE	21,3573	1483	1 1483	NEWIBIT	4737	= 79	
MXMYMZ	26,2757	579		NEGEDOT	17,3266	1461	1 1461	NEWIFLG	0172	= 79	3 1215 1219
MXM3	22,2312	356	4 351 482	VEGFIRE	21,3707	1509	1 1509	NEWJOB	0067	95	22 221 1293
MXV	7334	1038	1 1011	NEGFNCT1	21,3232	1474	1 1474	NEWLIST	05,3536	992	2 991 992
MY	E7,1704	= 145	5 145 586	NEGFNCT2	21,3244	1475	1 1474	NEWLOAD	30,2160	839	1 839
MZ	E7,1712	= 145	3 145 580	NEGLMLV	21,2775	906	1 905	NEWLOC	0065	= 95	9 1103 1111
M11	E6,1414	129	9 154 1433	NEGMAX	4735	= 1099	13 367 1493	NEWMODE	6060	1003	6 1019 1398
M21	E6,1415	129	4 189 1451	NEGONE	7747	1098	15 219 1505	NEWMODEA	5314	1294	2 232 377
M22	E6,1417	129	7 183 1451	NEGOUT	13,2540	1137	1 1137	NEWMODEX	5311	1294	7 373 1394
M31	E6,1416	129	4 189 1451	NEGP	12,3417	1195	3 1194 1195	NEWOPS	6070	1003	1 1002
M32	E6,1420	129	5 189 1451	NEGPRD	27,3146	779	1 779	NEWPAR	14,2733	939	1 939
=====				NEGSGN	40,2374	402	1 399	NEWPHASE	31,2421	798	1 802
NAVLOWDB	20,2150	1407	1 1407	NEGSHAFT	25,2570	544	1 544	NEWPOS	E7,1652	= 148	4 148 495
NAVKEYIN	0016	= 93	6 218 255	NEGTHFF	27,3645	1280	2 1279	NEWPRIO	0063	= 95	12 232 1361
NDONLY	06,3555	334	1 1121	NEGTHRST	21,3760	1510	1 1509	NEWSTATE	12,2653	1184	1 1186
NBDX	E3,1460	109	6 326 1121	NEGTRK	16,3732	1471	1 1470	NEWTN	34,2702	640	2 640
NBDY	E3,1461	109	2 328 335	NEGTRKU	E6,1516	= 133		NEWVEL	E7,1644	= 148	3 148 495
NBDZ	E3,1462	109	2 328 335	NEGTRKV	E6,1520	= 133		NEWZCOMP	22,3711	1157	1 1151
NBD2	06,3602	334	1 336	NEGTOTKP	E6,1514	= 132		NEXTCDU	07,3060	1313	4 1313 1314
NBD3	06,3606	334		NEGTOVFL	12,2330	1178	1 1178	NEXTCOL	11,3562	1242	2 1243
NBPDSPL	37,2012	373		NEGUR	E6,1501	132	11 132 1483	NEXTCORE	01,2674	1107	2 1106
NBRANCH	11,3232	1237	4 1234 1247	NEGUR	E6,1503	= 132	4 1411 1476	NEXTES	35,3213	670	1 669
NEUSMASK	17,3513	1372	1 1360	NEGUSUM	21,3566	1483	3 1476 1483	NEXTIME	E6,1706	= 135	3 367 368
NBINB2	23,2513	= 37		NEGVMAXY	21,2720	905	2 905	NEXTINCL	05,3543	992	1 992
NB2CDUSP	30,3533	920	1 914	NEGO	4754	1095	30 157 1457	NEXTINSL	05,3666	994	1 991
NCDU	E6,1703	= 135	3 365 366	NEG1	7747	= 1099	5 326 1099	NEXTLINE	22,3507	717	1 717
NCDASE	14,3602	952	4 944 974	NEG1/2	4734	1095	6 220 1128	NEXTTP	E6,1472	130	7 130 1430
NCSMVEL	E7,1664	= 148	2 495	NEG1/3	21,3243	1475	2 1475	NEXTU	E6,1473	= 130	5 1405 1443
NDCMPTST	41,2436	415		NEG100	5172	1116		NEXTV	E6,1474	= 130	5 1405 1444
NDXCDJW	E6,1650	= 136	6 156 919	NEG12	00,3733	1086	3 1054 1076	NGUIDSUB	E7,1647	= 150	3 799 812
NDXCHNGE	12,2240	1177	2 1176	NEG180	40,3066	432	1 432	NICKELDP	34,2077	632	1 635
NDXCTP	E5,1414	= 127	7 127 376	NEG2	7746	1098	10 230 1481	HIGNLOOP	E7,1646	= 150	3 786 812
NDI	4361	461	6 381 892	NEG3	7745	1098	7 890 1443	NINE	4320	= 1099	2 1502
NEARONE	27,3770	1283	4 846 1280	NEG4	6112	1004	2 1008 1286	NJETSBIT	4735	= 67	
NEEDLEBIT	4750	= 66	1 1415	NEG5	41,2115	408		NJETSFLG	0017	= 67	1 755
NEEDLER	20,2322	1418	1 1414	NEG7	5660	= 232	2 246 955	NN	E7,1466	140	8 198 724
NEEDLER2	20,2353	1418	1 1418	NETNEG	20,3740	1504	1 1504	NNADTAB	42,2154	305	1 304
NEEDLES	20,2373	1419	1 1419	NETZERO	6121	1005		NNADTEM	0146	97	8 304 430
NEEDLES3	20,2362	1418	1 1418	NEWAGS	32,2014	207	1 207	NNTYPTAB	42,2320	308	1 304
NEEDLE11	20,2334	1418		NEWANGL	22,3007	365	1 364	NNTYPTM	0147	97	5 304 429
NEEDLFLG	0013	= 66	2 766	NEWANGLE	25,3743	1145	4 1143 1146	NO.CORES	01,2634	1106	2 1106 1111
NEG	6741	1025	4 1025	NEWDATA	21,2313	900	1 899	NO.PJETS	E6,1521	133	3 133 1470

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

JX UNDEFINED = DEFINED BY EQUALS JX DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 SD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
NO.UJETS	E6,1522	=	133 3 133 1470	NORBACK	40,3051	432	1 432	NOTWCSM	26,2444	575	1 575
NO.VJETS	E6,1523	=	133	NORDSTAL	25,2456	541	3 539 542	NOTWLEM	26,2476	576	1 576
NO.VDS	6244	1008	5 1008 1077	NOREASON	33,3243	885	1 884	NOULLAGE	36,2653	743	4 740 760
NO.9	36,3663	762	1 761	NORESET	07,3430	1321		NOUN	40,2370	402	1 399
NO-ATP	30,2657	849	1 849	NORFINAL	13,3300	1218		NOUNADD	0145	=	97 29 410 460
NO-INT	13,2063	236	1 236	NORLITE	33,3572	890	2 890	NOUNCADR	1017	102	9 407 460
NOADJUST	42,3723	488	1 488	NORMADR	42,3401	423	1 422	NOUNREG	1002	101	15 222 458
NOADS	20,3453	1500	1 1500	NORMAL	01,2337	295	1 294	NOUNTEM	0122	=	96 3 410
NOATTENT	30,3750	924	3 912 915	NORMBNCH	10,3061	1365	1 1371	NOUNTEST	41,2460	415	2 425 426
NOATTDFE	07,3266	1317	4 165 1316	NORMEX	E7,1463	140	19 140 697	NOUPDOWN	43,3056	289	1 288
NOBITS	E5,1442	=	127	NORMEXIT	32,2531	571	1 571	NOUPFBIT	4746	=	67 1 505
NOCHG	25,3572	579	1 679	NORMGAM	E4,1503	=	114 7 114 1158	NOUPFLAG	0030	=	67 2 289
NODDOT	26,2004	52	1 1143	NORMLIZ	23,2000	=	32 1 866	NOUT	1016	102	9 157 467
NOELSM3	25,2533	543	1 543	NORMLIZE	23,2461	867	2 242 857	NOUTCEN	4760	=	1099 1 222
NOELSSM	25,2471	542	2 539 542	NORMLIZ1	33,2415	867	1 867	NOUVEAU	04,2310	231	1 229
NOEIO	26,2012	53	1 1143	NORMLIZ2	33,2420	867	1 867	NOVAC	5072	1103	32 158 1411
NODOBIT	4753	=	70 3 227 1385	NORMLOP	37,2604	385	1 385	NOVACADR	01,3775	1308	1 1305
NODDFLAG	0054	=	70 6 207 1337	NORMREF	10,3427	1371	2 1369	NOVAC2	01,2625	1106	1 1103
NODSPOUT	06,2130	160	2 157	NORMSBIT	4742	=	77	NOVAC3	01,2630	1106	1 1107
NODSPY	06,2152	160	1 160	NORMSCL	16,3614	1441		NOVRWRT	35,3424	675	1 676
NODVMON1	33,2342	862	1 861	NORMSW	0156	=	77 3 687 1188	NOV37MM	04,2477	235	1 227
NODVMON2	33,2346	862	1 861	NORMTEM1	1045	=	102 3 946 1362	NOWMATX	32,2257	494	1 494
NORERANK	43,3362	1288	1 1289	NORTEST	00,3512	1081		NPTRAPS	E6,1433	=	129 4 1412 1425
NORFID	25,3262	556	1 556	NORAT4	06,2007	155	2 155	NQTRAPS	E6,1434	=	130 4 1412 1426
NORGIMLOC	22,2744	364	1 364	NORMUNIT	10,3726	1401	11 339 1401	NRMAG	0040	=	1268 4 1271 1278
NORGIMRUN	06,2462	170	2 169	NORMUNX1	10,3724	1401	3 585 776	NRMIDBIT	4737	=	72
NORGJ	22,2732	363	3 363 365	NORMWAKE	10,3333	1369	1 1371	NRMIDFLG	0076	=	72
NOGOBL	27,3212	780	1 780	NORMZI	0044	=	1158 12 1157 1158	NRMNVBIT	4744	=	72
NOGUESS	12,3467	1196	1 1194	NOROTAT	17,2777	1454	3 1453 1458	NRMNVFLG	0103	=	72 1 1366
NOIRNKSX	6063	1003	1 1044	NORRSMON	06,3132	=	189 7 183 187	NRTERM	0020	=	1268 2 1277
NOINT	13,2653	1210	1 1209	NORRMBIT	4750	=	75 2 186 220	NRTRAPS	E6,1435	=	130 4 1412 1427
NOKILL	43,3115	290	1 291	NORRMON	0126	=	75 8 270 514	NRUPTBIT	4750	=	73
NOLITE	33,3607	891	2 890	NOR29FLG	0061	=	70 2 850 863	NRUPTFLG	0107	=	73
NOLOKON	23,2026	271	1 271	NOR29NOW	33,2570	876	6 596 876	NR29&RDR	5014	=	595 1 876
NOLRRBIT	4742	=	84 2 872 884	NOSHOFT	10,3770	1402	6 1401	NR29FBIT	4741	=	70 3 220 605
NOLTFEAD	0252	=	84 1 895	NOTALLOW	21,3417	1480	2 1479	NSAMP	1111	=	103 3 554 556
NOMONLST	05,2172	=	193	NOTBIT12	40,3673	471	2 470 471	NSRCHPNT	E7,1736	=	144 5 144 592
NOMINIMP	43,3006	285	1 263	NOTHR3IT	4740	=	74 1 739	NSTEER	36,3672	762	
NOMOPE	25,3174	555	2 555 560	NOTHR3ITL	0116	=	74 5 754 785	NTARGBIT	4751	=	76
NOMTPI	E4,1716	=	117 9 627 677	NOTIME	13,3662	1225	2 1223 1224	NTARGCHK	35,3550	678	1 678
NONAVKEY	05,3102	218	3 215 218	NOTMIN	17,3032	1454	2 1454	NTARGFLG	0146	=	76 3 678
NOPIF	35,3350	673	1 673	NOTMUCH	20,3432	1500	1 1498	NTP/2	34,2376	636	2 636
NOQ3RSM	5274	1129	1 1428	NOTPLAN	15,2523	961	1 961	NUCHANG2	01,3011	1110	1 1116
NOQ3SM	5272	1129	1 1458	NOTP20	25,3041	552	1 551	NUDIRECT	01,3225	1116	1 1116
NOQATES	30,2502	847	1 847	NOTSHIFT	24,3321	565	1 565	NULLCLOK	36,3015	746	3 746 747

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 3D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
NUM	40,2175	399	9 398 399	N45PROC	35,3654	681	1 680	OCT217	5714	1383	
NUMBERT	E6,1743	= 131	19 1429 1469	N49DSP	24,2644	507	1 506	OCT220	04,3273	1333	1 1332
NUMGRPS	4756	= 223	2 216 217	N49FLAG	E7,1746	= 145	5 152 507	OCT23	4360	= 1099	2 747 1008
NUVCSM	E3,1600	111	1 578	N89DISP	14,2446	933	2 932 973	OCT23146	21,3327	1478	1 1479
NUVLEM	E3,1652	111	1 578	N99LODP	31,2034	608	1 608	OCT24	6007	224	7 231 867
NVPKTEM	1040	102	1 452	=====	=====	=====	=====	OCT24100	10,3254	1368	1 1356
NVBUSMSK	10,3516	1372	1 1367	DANB	04,2536	249	3 248 958	OCT25	4362	= 1099	
NVCADF	10,3507	1372	1 1368	DBLATE	11,3022	1234	2 1230 1231	OCT26	04,2326	232	2 230
NVCAM	40,2357	402	1 402	DCCDS	14,2575	936	2 935	OCT27	12,3775	1246	1 1231
NVDSP	10,3070	1365	2 1366 1372	DCCULT	14,2740	937	2 938 939	OCT272	06,2776	181	1 174
NVDSP1	10,3117	1365	1 1365	DCTAL27	05,3477	832	1 831	OCT27470	05,3356	223	1 220
NVMONOPT	4155	452	1 1365	DCTAL3	6245	1008	1 1099	OCT30000	4355	= 218	
NVQTEM	1037	102	2 452	DCTBACK	41,3411	443	1 445	OCT30001	05,3360	223	1 219
NVSATVE	0371	100	3 211 1771	DCT00010	4750	= 232		OCT30002	6471	= 1099	
NVSBBNK	4201	452	2 452	DCT00012	24,2311	499	1 493	OCT305	04,2325	232	1 231
NVSBOM	4164	452	1 464	DCT00240	21,3440	1480	1 1479	OCT31	6010	224	4 209 1480
NVSBENDL	40,3441	446	2 446 448	DCT02100	06,3131	187		OCT32001	05,3354	222	1 220
NVSBWAIT	4445	464		DCT05776	06,3033	183	1 182	OCT32002	06,3127	187	1 186
NVSBWT1	4455	464	1 464	DCT10000	4737	= 218		OCT33	4764	1096	3 224 1096
NVSUB	4154	452	3 263 1372	DCT10001	7663	= 1099	1 182	OCT34	07,2624	260	1 254
NVSURD	41,2000	406	1 452	DCT10002	33,2250	860	1 876	OCT34BAR	42,3600	436	2 436
NVSUBCOM	4170	452		DCT10200	10,3540	1373	1 1359	OCT3400	10,3512	1372	1 1362
NVSUBEND	4202	452	4 446 454	DCT11	4320	= 1095		OCT34300	10,3521	1372	1 1355
NVSUBSY1	04,2647	464	1 464	DCT1103	5710	1383		OCT35	4765	1096	3 745 1383
NVSUBUSY	4442	464	2 464 1368	DCT11276	21,3634	1484	1 1482	OCT37667	04,2367	233	1 228
NVSUT1	41,3544	453	2 406 452	DCT120	4775	= 1099	2 230 231	OCT37737	06,2162	160	1 170
NVSUR2	41,3571	453	1 453	DCT13	15,2217	931	1 931	OCT37766	7727	1098	2 155 1413
NVTEMP	0123	= 96	9 452 464	DCT14	5751	1384	7 181 1487	OCT37771	37,3540	859	1 858
NVWORD	0367	100	6 745 1371	DCT140	4776	= 1099	1 255	OCT37774	7730	1098	1 832
NVWORD1	1067	103	3 745 1367	DCT1400	5007	1096	12 460 1429	OCT37776	7731	1098	3 159 1369
NVSDSP	10,3120	1365	3 1357 1367	DCT14000	5024	= 1300	2 1299 1300	OCT40001	6107	1004	2 1099 1122
NWAITBIT	4742	= 72		DCT15	4761	1095	4 179 1073	OCT40010	07,3207	1315	2 1315 1317
NWAITFLG	0101	= 72		DCT15000	5025	= 181	1 179	OCT40072	04,2370	233	1 228
NXAX	15,2420	959	1 958	DCT16	4317	= 1073	1 1073	OCT40200	7735	1098	
NXPDSVEL	31,2137	609	1 610	DCT1601	37,3054	388	1 388	OCT40201	01,3370	1125	1 1122
NXTBNK	43,3633	1292	2 290 1293	DCT1720	06,3000	181	1 177	OCT40400	5642	1383	3 1358 1384
NXTFL33	06,2432	168	7 177 178	DCT176	00,2126	1050	2 1056	OCT40420	10,3536	1373	
NXTIBT	06,2420	168	3 168	DCT177	6074	= 1309	1 1305	OCT41000	43,2321	270	2 269 270
NXTIFAIL	06,2225	162	11 171 176	DCT17770	5030	1097	2 1298 1300	OCT50	4771	1096	4 304 1371
NXTIFBIT	06,2213	162	3 162	DCT20	4747	= 749		OCT500	04,2324	232	3 230 231
NXTRRIAX	25,2252	534	1 534	DCT20002	06,3130	187	1 187	OCT501PV	24,3204	514	1 514
NXTST	05,3030	217	1 217	DCT201	24,2306	499	1 497	OCT51	43,3204	298	1 297
NXTSUPR	43,3660	1292	1 1292	DCT20100	10,3542	1373	1 1358	OCT523	33,3720	895	1 895
NXTGDR	E6,1465	130	5 219 1456	DCT203	26,2253	475		OCT54	06,2774	181	1 165
NZACCDOT	0063	= 1478	3 1479	DCT205	24,3205	514	1 513	OCT55000	41,3730	469	1 468

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN	UNDEFINED	=	DEFINED BY EQUALS	J	DEFINED BY JOKER OR ERASE ANYWHERE	MD	MULTIPLY DEFINED
CD	ONLY DEFINED	CD	DEFINITION ASSOCIATED WITH CONFLICT	XX	MISCELLANEOUS TROUBLE		

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
JCTSC000	4101	= 1099	2 1300 1369	OLDPMIN	E6,1460	130	4 1412 1431	OPTCADR	1305	= 106	1 222
JCT62	4774	= 1335	1 1335	OLDPRIO	5402	1299	1 1302	OPTCGARV	43,2226	= 269	1 269
JCT63	17,2320	1446	1 1445	OLDQRMN	E6,1461	130	4 1412 1445	OPTIONVM	22,3316	714	1 713
JCT67777	10,3535	1373		OLDSENSE	E6,1745	= 1509	4 1508 1509	OPTIJNX	1051	= 102	13 271 714
JCT7	4757	= 1374	3 1298 1303	OLDTIME	32,3724	835	1 835	OPTION1	1144	104	8 305 1362
JCT700	04,2371	233	2 229 230	OLDXFDRP	E6,1440	130	5 130 1423	OPTION2	1145	104	17 493 980
JCT740	06,3001	181	1 175	OLDYFDRP	E6,1441	= 130	2 1423	OPTION3	1146	104	
JCT74160	05,3357	223	1 220	OLDZFDRP	E6,1442	= 130	3 1412 1424	OPTNBIT	4745	= 69	
JCT75	06,2775	181	1 180	OMEG/MS	37,2000	44	1 390	OPTNREG	E5,1463	= 127	
JCT77000	06,3002	181	1 174	OMEGA	E7,1502	= 145	9 145 1153	OPTNSW	0046	= 69	3 725 726
JCT7777	05,3057	218		OMEGAD	E7,1734	= 144	3 316 515	OPTNL	34,3344	725	1 725
JCT77770	5660	1383	5 232 1384	OMEGAM1	E5,1712	= 126	3 126 1154	OPTN2	34,3424	726	1 726
JC24100	43,2127	264	1 263	OMEGAM2	E5,1720	= 126	3 126 1154	OPTSTALL	07,3712	= 1330	1 942
JC40010	06,2773	181	1 180	OMEGAM3	E5,1726	= 126	3 126 1155	OPT4	15,2105	928	1 928
JFFCALC	26,3561	590	1 592	OMEGAP	E6,1421	129	15 129 1438	ORBCHGO	24,2007	493	1 493
JFFRDT	27,3307	851	1 851	OMEGAPD	E6,1643	134	12 134 1438	ORBCHG1	24,2021	493	1 493
JFFSTFAC	26,3706	593	1 590	OMEGAQ	E6,1422	= 129	13 732 1447	ORBCHG2	24,2033	493	1 493
JFFTUNIT	10,3766	1402	1 1402	OMEGAQD	E6,1644	= 134	7 369 1441	ORBCHG3	32,2217	493	1 493
JGC	E5,1737	= 123	16 123 1254	OMEGAR	E6,1423	= 129	8 1411 1447	ORBITAL	11,2000	= 29	1 1227
JGCPL	37,2475	381	1 398	OMEGARD	E6,1645	= 134	7 369 1441	ORBITAL1	12,2000	= 29	1 1246
JGCT	E5,1747	= 124	2 124 971	OMEGAV	E6,1426	129	12 129 1452	ORBITAL2	13,2000	= 30	2 46 1247
JGF	E6,1717	= 135		OMEGAV	E6,1427	= 129	2 130 133	ORBMANAD	32,3767	837	
JHWELL1	04,3422	1389	5 1389 1390	OMEGCALC	26,3610	591		ORBMANUV	0003	= 236	5 235 837
JHWELL2	04,3445	1390	4 1389 1391	OMEGDISP	E7,1734	= 144	3 144 591	ORFWFBIT	4746	= 71	
JKDESNB	25,2507	543	1 543	OMEGMOON	13,2000	46	1 1213	ORFWFLAG	0066	= 71	3 1221 1243
JKDESSM	25,2412	539	1 542	ONE	4753	= 1099	183 157 1509	ORDERBIT	4746	= 79	
JKEXIT	24,3347	572	1 572	ONE/SP	25,3576	566	1 566	ORDERSW	0201	= 79	3 1182 1183
JKMAX	35,3167	669	1 669	ONEB-2	24,2313	499	1 494	ORIG	E4,1515	= 115	
JKPHI	22,2722	362	1 362	ONEBASE	37,3403	707	1 703	ORIGCHNG	11,3401	1239	1 1239
JKTHETA	22,2702	362	1 362	ONEBIT	04,3056	1185	1 1196	ORIGEX	E4,1512	= 114	4 114 1239
JKTOCOPY	10,2536	1359	2 1359 1364	ONEDPP	37,3063	389	1 378	ORIGIN	E5,1773	= 126	
JKTENT	10,3311	1369	1 1371	ONEUCT	26,3710	593	1 590	OTHCONIC	37,3211	704	1 707
JKTOGRAB	13,3460	1220	1 1219	ONEURTWO	5370	1299	1 1301	OTHERS	13,3476	1221	1 1222
JKTOPLAY	10,2577	1360	3 1359 1360	ONESEK	22,3165	367	4 366 368	OTHERV	34,3615	730	1 730
JKU12	22,2256	354	1 354	ONESTO2S	30,3743	924	3 918 922	OTHINT	37,3222	705	1 707
JKU21	22,2232	354	1 354	ONETENTH	20,2434	1419	1 1419	OTHPREC	13,3043	= 37	3 701 714
JKU31	22,2302	355	1 355	ONETHTH	34,2107	632	1 635	OTHSHIP	22,3333	714	
JKZDELAY	00,3752	1377	1 1377	ONLITES	25,3656	613	2 612	OURPERMS	E7,1621	= 149	2 149
OLDATAGD	1113	= 103	4 554 560	ONULLAGE	36,2657	742	1 737	OURRCBIT	4740	= 87	6 1432 1446
OLDATA	21,2272	899	2 899	OP/INERT	43,2174	267	2 265 267	OURRCFLG	0306	= 87	
OLDESBIT	4753	= 66	2 596 598	OPJUMP	6077	1003	1 1003	OURTEMPS	E7,1544	= 149	1 149
OLDESFLG	0016	= 66		OPJUMP2	6247	1009	1 1003	OUT	13,2332	711	1 711
OLDPIPAX	E7,1763	= 151	5 151 817	OPJUMP3	6263	1010	1 1009	OUTGOAVE	22,3707	= 864	
OLDPIPAY	E7,1764	= 151	3 151 817	OPONLY	06,2347	166	1 164	OUTHERE	0161	= 1373	3 1369 1371
OLDPIPAZ	E7,1765	= 151	4 151 817	OPTAXIS	07,2142	248		OUTLINK	0057	= 93	

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 SD SLOWLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
OUTFLIM	24,3166	513	2 513 514	PDB2	E6,1562	= 1505	1 1503	PHSNAME1	E3,1436	109	5 1300 1305
OUTFLPLN	E5,1626	= 122	3 122 738	PDB3	E6,1564	= 1505	1 1503	PHSNAME2	E3,1440	109	1 826
OUTROUTE	1260	= 105	3 228 864	PDB4	E6,1563	= 1505	1 1503	PHSNAME3	E3,1442	109	1 826
OUTSNUFF	43,3224	298	1 262	PDDL	6523	1020	1 1011	PHSNAME4	E3,1444	109	
OUT	0010	= 93	5 156 160	PDSPFBIT	4740	= 72	2 474 475	PHSNAME5	E3,1446	109	2 890
OUT2.1	32,2534	571	2 571	PDSPFLAG	0077	= 72	3 475 519	PHSNAME6	E3,1450	109	
OUT22.2	24,3352	573	1 572	PDVL	6557	1021	1 1011	PHSPART2	01,3763	1308	1 1308
OVERFFIX	37,2275	378	2 376 380	PDXCHNGE	12,2274	1177	2 1177	PHSPRDT1	1054	102	5 1299 1307
OVERFLOW	7017	1028	3 1027 1051	PEGI	16,3300	1435	2 1435	PHSPRDT2	1056	102	3 229 829
OVERFLWY	7014	1028	4 1026 1051	PERFCHEK	10,3135	1366		PHSPRDT3	1060	102	1 232
OVERFLWZ	7011	1028	4 1026 1051	PERFDLAY	E5,1574	= 128	1 374	PHSPRDT4	1062	102	1 232
OVERSUB	16,2310	1422	12 1424 1441	PERFERAS	37,2772	387	1 385	PHSPRDT5	1064	102	
OVERSUB2	20,2435	1419	3 1415 1416	PERFMASK	10,3475	1372	2 1360 1362	PHSPRDT6	1066	102	
OVF+	00,2414	1057	2 1057	PERF2MSK	10,3501	1372	2 1360 1362	PHS2CADR	01,3770	1308	1 1303
OVFINO	0121	96	13 813 1109	PERF4MSK	10,3503	1372	1 1362	PI/16	27,3754	1283	2 1279 1281
OVFLCLR	12,3210	1192	1 1192	PERIAPD	23,2326	695	1 634	PICAPAR	14,2611	937	1 927
OVFLWCK	E5,1576	= 128	3 373 383	PERIAPD1	23,2316	695	5 617 727	PICBXT	14,3013	940	1 940
=====				PERIODCH	12,2112	1175	1 1175	PICEND	14,2766	939	1 938
P	E5,1737	= 125	14 125 1200	PERROR	E6,1464	120	3 154 1438	PICGXT	14,2772	940	1 940
P-RATE	16,2510	1475		PFAILOK	07,3254	1317	1 166	PICKANG1	27,2147	482	1 482
P-RHOCCT	0043	= 92	4 1434	PFAILOK2	07,3247	1317	1 1317	PICKAXIS	27,2170	483	2 481
PACCFUN	E6,1557	= 1505	2 1498	PFLITEDB	20,2142	1407	3 754 840	PICKX	26,2372	483	2 483
PACKOPTN	15,3411	976	2 975	PFRATBIT	4750	= 69	1 927	PICNSWP	14,3011	940	1 940
PACTIVE	05,3036	217	1 217	PFRATFLG	0051	= 69	4 769 944	PIC1	14,2646	938	3 938
PARAM	04,3064	1186	3 1186 1200	PGUIDE	1247	= 105	6 105 882	PIC2	14,2651	938	1 938
PARAM30	35,2017	614		PHASCHNG	5353	1298	120 228 1395	PIC3	14,2661	938	5 938 939
PASSIVE	23,2412	697	4 622 697	PHASETAB	10,2000	= 29	2 1294 1300	PIC4	14,2664	938	1 938
PASTECPT	4132	439	1 439	PHASE1	0753	101	3 217 1302	PIF	E7,1612	= 149	11 149 813
PASTEV3	4124	439	3 439 446	PHASE2	0755	101	2 761 858	PIF0SET	E7,1606	= 149	5 149 796
PASTIT	07,1211	252	1 260	PHASE3	0757	101	1 737	PINACT	05,3043	217	1 217
PAUTNO	30,3164	912	2 911	PHASE4	0761	101	1 862	PINBALL1	40,2000	= 36	2 299 398
PAXADIDL	16,2204	1413	1 1412	PHASE5	0763	101	1 737	PINBALL2	41,2000	= 36	1 406
PAXDIST	E6,1565	= 1505	2 1503	PHASE6	0765	101	1 742	PINBALL3	42,2000	= 36	3 281 421
PAXFILT	16,2647	1428	1 1422	PHASJUMP	5363	1299	1 1298	PINBALL4	04,2000	= 28	1 457
PAXIS	16,2213	1421	2 1413 1506	PHEXIT	13,3176	1216	1 1216	PINBRBIT	4746	= 73	
PAXISADA	20,3765	1506	1 1491	PHI	0024	= 520		PINBRFLG	0105	= 73	1 1365
PBIASX	E3,1452	109	2 109 800	PHIV	E4,1445	= 114	6 114 1241	PINBRNCH	10,3050	1364	7 227 1372
PBIASX	E3,1454	109	1 800	PHSBB1	E3,1437	109		PINIDMSK	10,3347	1369	1 1369
PBIASZ	E3,1456	109	1 800	PHSBB2	E3,1441	109		PINMASK	7740	= 1372	1 1365
PBIT	4742	= 131	4 1432 1435	PHSBB3	E3,1443	109		PINSUPBT	4201	= 452	5 274 456
PBODY	E4,1430	113	18 114 1245	PHSBB4	E3,1445	109		PINSUPER	40,2000	= 36	1 274
PCLTOP	05,2776	216	2 217	PHSBB5	E3,1447	109		PINTEST	43,2002	= 466	
PCONS	E4,1744	= 120	3 120 849	PHSBB6	E3,1451	109		PIPABIAS	E3,1452	= 109	1 326
PDA	0026	= 124		PHSCHNGA	5357	1298	1 228	PIPACHK	37,2126	375	1 374
PDS1	E6,1561	= 1505	1 1503	PHSCHNG2	10,2224	1300	1 1299	PIPAGE	1257	= 105	6 105 871

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF. # OF REFS. PAGE OF FIRST REF. PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
PIFASC	37,3077		389 1 385	PLENTY	25,3211		555 1 555	POSTNV	E5,1520	=	128 2 386 387
PIFASCF	E3,1453	=	109 1 326	PLUSFIRE	21,3713		1509 1 1509	POSTAND	37,3734		1336 2 1335 1336
PIFASCFX	E3,1453		109 1 109	PLUSX	27,2423		769	POSTBURN	36,3223		754 4 241 760
PIFASCFY	E3,1455		109	PMINE	34,2073		632 2 641	POSTCDH	E7,1603		141 3 141 641
PIFASCFZ	E3,1457		109	PMINM	34,2103		632	POSTCOM	37,3763		1337 2 1337
PIFASR	37,3541		969 4 384 962	PMMASK	10,2514		1372 1 1260	POSTCSI	E7,1601		141 2 634 641
PIPATASK	37,2151		375 2 375	POINTER	0156	=	1308 7 1306 1308	POSTHRST	21,3647		1508 5 1509 1510
PIPATMPX	1160		104 4 817 901	POINTVSM	E7,1772	=	146 7 152 956	POSTJUMP	4635		998 61 165 1402
PIPATMPY	1161		104 4 817 901	POLIST	0117		96 39 96 1094	POSTORKEP	E6,1513	=	132 1 195
PIPATMPZ	1162		104 4 817 902	POLLEY	5051		1102 2 1102	POSTORKU	E6,1515	=	132 5 194 204
PIPAX	0037	=	92 15 305 1318	POLY	7222		1034 7 856 1282	POSTORKV	E6,1517	=	133
PIPAY	0040	=	92 5 383 1318	POLYCNT	0140	=	97 4 1034 1035	POSTTPI	E7,1605		141 5 141 727
PIPAZ	0041	=	92 9 383 1318	POLYCOEF	12,3031		1189 1 1191	POSUPDAT	33,3165		884
PIPCTR	1056	=	829 4 598 858	POLYCOH	7232		1034 1 1034	POSVHAXY	21,2703		905 2 905
PIPCTR1	E7,1714	=	829 2 829 898	POLYLOOP	7242		1035 1 1035	POS1/2	4736	=	1099 2 1122
PIPFALL	06,2650		177 1 181	POLYRET	0141	=	97 3 1034 1035	POS1/4	12,3755	=	1246
PIPFEE	07,3310		1318 1 863	POLYTEMP	E6,1741	=	131 10 1430 1458	POS1CHK	33,2531		875 1 874
PIPFEE2	07,3305		1318 1 1318	POLY2	7245		1035 1 1035	POS2CHK	33,2502		874
PIPINDEX	E5,1415	=	127 6 127 379	PON	37,2251		376 1 376	POWERDB	20,2152		1408 1 1407
PIPJOB	37,2166		375 1 375	PON2	37,2240		376	POWFLITE	23,2000	=	32 1 1259
PIPSONE	37,3451		858 1 871	PON4	37,2245		376 1 376	POWFLIT1	23,2000	=	32
PIPSRINE	37,3544	=	962 2 966	POODOO	5652		1383 3 244 1360	POWRSERS	7215		1034 2 824
PIPTEM	E4,1657	=	116 7 119 894	POODOO1	5726		1384 2 1079 1132	PQRBIT	16,3134		1433 1 1433
PIPTIME	1234		105 26 105 1222	POOFIZZ	04,2257		231 1 230	PRATE	E4,1750	=	120 7 120 848
PIPTIME1	E7,1560	=	147 11 147 1224	POOH	04,2163		229	PROTTAB	01,2000	=	239 3 1306 1308
PIPUSE	07,3273		1318	POUKLEAN	05,2647		214 1 230	PREBJUMP	5316		1294
PIPUSE1	07,3277		1318 1 6	POSALARM	33,3703		895 2 895	PREC/TT	34,3554		729 2 725 726
PITCH	E4,1764	=	120 2 316 840	POSALPH	21,3371		1479 2 1479	PRECIBIT	4744	=	71
PITCHANG	E4,1600	=	118 7 118 489	POSCHECK	21,3673		1509 1 1508	PRECIFLG	0064	=	71 6 236 1219
PITCHOFF	27,3260		782 2 781	POSCODE	1242	=	960 6 316 960	PRECSET	23,2360		697 6 622 729
PITFALL	11,2275		820 2 154	POSOLE	12,2620		1183 1 1182	PREDOT	7154		1033 2 1038 1041
PITTIME	E6,1402		129 2 314 781	POSOLEX	12,2246		1177 1 1176	PREDSPAL	40,3416		446 1 417
PJETCTR	E6,1767		137 4 137 1428	POSDRIVE	21,3575		1483 2 1473 1483	PREGUIDE	31,2425		798 1 804
PJETSLEC	16,3356		1436 5 1431 1439	POSEC	42,3414		423 2 423	PREMM1	04,2441		234 2 228 232
PLANET	15,2472		961 7 942 970	POSFNCT1	21,3230		1474 1 1474	PREMON1	11,2316		820 1 821
PLANTIN	24,2000	=	32 1 1141	POSGMBL	37,2064		374	PREMON2	11,2317		820 1 820
PLANTINI	26,2000	=	33 2 1140 1146	POSGN	40,2407		402 1 398	PRENVBSY	4437		464 1 464
PLANTIN2	26,2000	=	33 1 5	POSSOJO	33,3675		895 2 895	PREPOS29	25,3601		597 1 596
PLANTIN3	25,2000	=	32 1 1144	POSITA	15,3700		985 1 986	PREREAD	37,3410		857 1 737
PLANVEC	E7,1553	=	145 5 145 951	POSITB	15,3703		985 1 986	PRERORS	43,3246		1286 3 1287
PLAST	E6,1454		110 5 1424 1434	POSITD	15,3722		986 1 987	PRESINE	00,3525		1082 2 1082
PLAYJUM1	10,2615		1360 3 1365 1372	POSITF	15,3770		987 1 986	PRESTAND	37,3657		1335 1 1335
PLAYTEM1	0155	=	1373 28 1354 1363	POSITF	15,3743		986	PRESTORE	6421		1016 1 1016
PLAYTEM3	0157	=	1373 2 1362 1370	POSITJN	E5,1416	=	127 6 127 381	PRETIMCK	16,2667		1428 2 1427
PLAYTEM4	0160	=	1373 11 1354 1370	POSMAX	4733		1095 46 171 1506	PRIJBORT	10,2575		1360 2 1358 1368

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 3D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF. # OF REFS. PAGE OF FIRST REF. PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
PRIOCHNG	5146	1105	16 275 1369	PROCEEDE	06,2075	158		PUTSFNOR	41,3206	430	1 430
PRIOCH2	01,3072	1112	1 1105	PROCKEY	40,3452	449	1 158	PUTXY	41,2714	426	
PRIODBIT	4736	= 72	1 1365	PROCTNON	06,2242	164	1 164	PUTXYZ	41,2632	425	
PRIDDFLG	0075	= 72		PRODUCT	21,3525	1482		PVALVEST	1276	106	7 191 212
PRIDDSP	10,2507	1358	2 505 507	PROGLARM	5621	1382	1 1381	PWRCNT	0140	= 98	2 824
PRIDDSPR	10,2504	1358	2 515 1382	PROGRAV	15,2654	965	1 965	PWRPTR	0117	= 98	4 823 824
PRIDFNT	5575	1381	2 1382 1384	PROG20	24,2000	492	2 234 492	P00CHK	13,3351	1219	2 1218 1219
PRIDFLAM	10,3562	1382	7 496 895	PROG20A	24,2040	495	3 493 495	P05P06	37,2000	= 36	1 1335
PRIDFCT	10,3531	1373	2 1356 1363	PROG21	24,3505	655	1 234	P06	37,3655	1335	1 234
PRIDPLAY	10,2616	1360	2 1356 1359	PROG22	24,2000	= 492	1 234	P12	30,2000	= 34	1 838
PRIIDITY	0167	99	34 221 1361	PROG25	24,2404	502	1 234	P12A	23,2000	= 32	1 841
PRIIDTINE	1165	104	2 1359 1369	PROG52	15,2050	927	1 233	P12ADRES	30,2320	841	1 839
PRIID1	4742	= 1099		PROJ	0022	= 150		P12IGN	36,2521	740	1 731
PRIID10	4737	= 1099	5 284 781	PROJMAX	31,3754	827	1 812	P12INIT	30,2254	840	3 835 838
PRIID11	5022	1097		PROJMIN	31,3755	827	1 812	P12LM	30,2061	838	1 234
PRIID12	4644	998	3 211 760	PROK	30,2553	848	2 848	P12LMB	30,2122	839	
PRIID13	5023	1097	2 746 966	PRONVBIT	4745	= 73		P12RET	30,2220	840	1 849
PRIID14	5024	1097	3 503 1303	PRONVFLG	0104	= 72	1 1366	P12SPOT	36,2146	= 733	1 731
PRIID15	5025	1097	5 181 1371	PRSHRTMP	4415	462	4 419 421	P12TABLE	36,2022	731	1 841
PRIID16	5026	1097	6 181 741	PRTZCADR	01,3771	1308	1 1305	P20FLGON	35,2361	629	7 621 728
PRIID17	5027	1097	4 735 853	PSEUDO55	E7,1614	= 149	3 149 795	P20LEMA	24,2111	496	3 496 509
PRIID2	4741	= 1099		PSIV	E4,1453	= 114	3 114 1241	P20LEMB	24,2117	496	6 496 497
PRIID20	4736	= 1099	7 269 858	PSKIPADR	16,3623	1441		P20LEMB1	24,2163	497	1 513
PRIID21	5031	1097	4 328 857	PSTHIBIT	4741	= 83	2 874 884	P20LEMB2	24,2166	497	1 497
PRIID22	7710	1097	6 290 876	PSTHIGAT	0251	= 83		P20LEMB3	24,2170	497	2 497 498
PRIID23	7711	1097	2 255 895	PTBAD	05,3054	217	3 216	P20LEMB4	24,2205	498	1 497
PRIID24	7712	1097	1 552	PTIGINC	E7,1402	138	2 666 728	P20LEMB5	24,2135	497	1 505
PRIID25	7713	1097	4 490 862	PTOACSM	13,2705	1211	1 1216	P20LEMB6	24,2153	497	2 497
PRIID26	7714	1097	10 368 605	PTCALEM	13,2760	1212	2 297 1216	P20LEMB7	24,2130	496	
PRIID27	7715	1097	5 192 1411	PULSEFLG	0303	= 87		P20LEMC	24,2217	498	3 505 507
PRIID3	5015	1097	13 252 1099	PULSEIMU	10,3705	1400	1 380	P20LEMC1	24,2244	498	3 240 499
PRIID30	4355	= 1099	12 174 1371	PULSEM	14,3230	945		P20LEMC2	24,2261	499	1 498
PRIID31	7716	1097	4 336 1441	PULSES	4735	= 87	5 284 1444	P20LEMC3	24,2211	498	3 497 509
PRIID32	7720	1097	4 872 1367	PURGECY	16,3463	1438	4 1430 1435	P20LEMC4	24,2216	498	1 500
PRIID33	7721	1097	1 1359	PURRS4	10,2715	1362	2 1361 1362	P20LEMD	24,2264	499	1 498
PRIID34	7722	1097	2 996 1099	PUSH	00,3247	1077	1 1013	P20LEMD1	24,2270	499	2 499
PRIID35	7723	1098	1 1121	PUSHLOC	0166	99	38 252 1109	P20LEMD2	24,2277	499	1 499
PRIID36	7724	1098		PUSHUP	6215	1003	1 1004	P20LEMF	24,2231	498	
PRIID37	7725	1098	8 232 1404	PUTADD	41,2332	411	3 411	P20LEMT	24,2232	498	5 496 519
PRIID4	4740	= 1099	4 274 489	PUTCOM	41,3075	429	8 425 427	P20LEM1	24,2063	496	2 496 516
PRIID5	5017	1097	10 229 1209	PUTCOM2	41,3155	430	4 429 432	P20LMWT1	24,2241	498	
PRIID6	5020	1097	4 536 1429	PUTDCSF2	41,3207	430	1 430	P20REG	04,2327	232	1 231
PRIID7	5021	1097	7 275 717	PUTDECSF	41,3174	430	2 429 430	P20S	24,2000	= 32	8 492 655
PRIIDMIT	33,2702	855	2 848	PUTDPCOM	41,3130	429	1 430	P20S1	25,2000	= 32	3 526 566
PROCEED	10,3411	1370	1 1363	PUTNORM	41,3137	429	1 429	P20S2	25,2000	= 32	

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
P2033	26,2000	=	33 1 575	P33/P73F	35,2325	628	1 628	P41SPOT	36,2151	734	2 732 733
P2054	32,2000	=	34 1 493	P34	35,2545	661	1 234	P41TABLE	36,2053	732	2 749 763
P21	E6,1703	=	135	P34/P74A	35,2550	661	2 661 662	P42ADRES	36,3135	749	1 757
P21ALT	E7,1715	=	148 2 317 657	P34/P74B	35,2572	661	1 661	P42IGN	36,2541	740	4 732 740
P21BASER	E7,1675	=	148 3 148 656	P34/P74C	35,2574	661	1 663	P42LM	36,3410	757	1 233
P21BASEV	E7,1703	=	148 3 148 656	P34/P74D	35,2635	662	1 662	P42SPOT	36,2146	=	733 1 732
P21CONT	24,3550	=	655 1 655	P34/P74E	35,2640	662	1 662	P42STAGE	36,3420	757	1 732
P21DSP	24,3625	=	656 1 656	P35	35,2725	666	1 234	P42TABLE	36,2061	732	1 749
P21FLAG	0004	=	55 2 655 656	P35/P75A	35,2734	666	1 666	P47BJD	36,3504	759	1 759
P21FLBIT	4741	=	65 1 217	P35/P75B	35,2741	666	1 666	P47BODY	36,3513	759	2 758 759
P21GAM	E7,1713	=	148 3 148 656	P38	34,3271	724	1 233	P47LM	36,3436	758	1 233
P21ORIG	1163	=	148 2 656	P39	34,3521	728	1 233	P50S	15,2000	=	31 5 250 964
P21PROG1	24,3515	=	655 1 657	P39/P79A	34,3532	728	1 728	P50S1	14,2000	=	31 2 45 933
P21TIME	E7,1762	=	145 7 145 657	P39/P79B	34,3541	729	1 727	P51	14,3427	950	3 233 951
P21VEL	E7,1711	=	148 4 148 656	P39/P79SW	0176	=	79 4 726 729	P51B	14,3461	950	1 950
P21VSAVE	24,3571	=	656 1 655	P39P79	34,3456	727	1 727	P51C	14,3472	950	1 951
P21VNF	24,2312	=	499 1 493	P39SWBIT	4743	=	79	P51D	14,3510	951	1 950
P25FLAG	0006	=	66 3 237 785	P40/RET	1142	104	4 746 754	P51E	14,3530	951	1 951
P25FLBIT	4743	=	66 2 228 502	P40A/P	35,3751	748	1 748	P51G	14,3552	951	1 951
P25LEMT	24,2435	=	503	P40A/PMD	35,3775	748	1 748	P52A	15,2060	928	2 928
P25LEM1	24,2416	=	502 3 240 503	P40ADRES	36,3133	749	1 753	P52B	15,2062	928	1 928
P25LEM2	24,2443	=	503 1 503	P40ALM	36,3121	748	2 753 757	P52D	15,2143	930	2 930 932
P25LEMT1	24,2437	=	503 1 503	P40AUTO	35,3747	748	2 733 834	P52E	15,2102	928	
P30P7X	35,3704	=	683 1 630	P40IGN	36,2504	739	1 732	P52F	15,2164	950	1 928
P30	35,2000	=	614 1 234	P40IN	36,3200	754	1 758	P52H	15,2153	930	1 928
P30EXIT	E5,1773	=	126 1 126	P40LM	36,3147	753	1 233	P52LS	15,2220	932	1 929
P30N33	35,2004	=	614	P40PHS1	36,3236	755	2 755 759	P52OUT	15,2166	930	1 931
P30S	35,2000	=	35 1 614	P40S	36,2000	=	36 6 38 753	P52T	15,2110	928	2 928
P30S1	34,2000	=	34 1 616	P40SJUNK	36,2366	737	2 732	P52V	15,2130	928	
P30ZERO	35,2417	=	631 11 621 661	P40SPJT	36,2146	733	3 731 733	P52W	15,2137	930	1 928
P31	35,2450	=	652 1 234	P40SXT4	36,3213	754	2 754 756	P57	15,3314	975	1 233
P32	35,2027	=	621 1 234	P40S1	27,2000	=	33 4 38 764	P57A	15,3353	975	
P32/P72A	35,2053	=	621 1 621	P40S2	35,2000	=	35 1 748	P57AA	15,3355	975	1 975
P32/P72B	35,2131	=	622 1 623	P40S3	17,2000	=	31 1 741	P57C	15,3400	976	2 976
P32/P72C	35,2152	=	623 1 641	P40TABLE	36,2036	731	1 749	P57D	15,3402	976	1 976
P32/P72D	35,2156	=	623 1 623	P40ZOOM	17,2015	741	1 739	P57JUMP	15,3561	980	2 972
P32/P72E	35,2160	=	623 1 623	P40ZOOMA	17,2022	741	2 741 742	P57OPT	15,3320	975	2 975
P32/P72F	35,2166	=	623 1 623	P41ADRES	36,3134	749	1 755	P57OPT0	15,3575	981	2 980
P32STRT	35,2032	=	621 1 621	P41BLANK	36,2263	735	1 735	P57OPT1	15,3616	981	1 980
P33	35,2216	=	627 1 234	P41FJET	36,3303	755		P57OPT2	15,3634	982	1 980
P33/P73A	35,2221	=	627 2 627 628	P41FJET1	36,3305	755	1 755	P57OPT3	15,3635	982	1 980
P33/P73B	35,2233	=	627 1 628	P41IN	36,3310	756	1 755	P57POST	15,3206	972	3 971 972
P33/P73C	35,2302	=	628 1 627	P41LM	36,3272	755	1 233	P63ADRES	32,3253	789	1 785
P33/P73D	35,2306	=	628 1 628	P41MANU	36,3215	754		P63DISPS	31,3473	814	2 749 799
P33/P73E	35,2314	=	628 1 628	P41NORM	36,3312	756		P63IGN	36,2455	739	1 733

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
P63IGN1	36,2514	739		QAXIS	E7,1717	= 151	3 840 854	R-OTHER	E3,1717	111	5 120 321
P63LIN	32,2776	785	1 233	QCDUWUSR	E6,1647	= 136	3 136 918	R-RATE	16,2602	1427	2 1426
P63SPOT	36,2151	= 733	1 732	QCHAN	0002	= 93	2 1093	R-RHCCTR	0044	= 92	3 1433 1434
P63SPOT2	32,3215	788	1 788	QDIFF	E6,1450	= 132	3 1472 1477	R-TO-RP	24,3670	1142	6 791 1234
P63SPOT3	32,3235	789	1 789	QERRCALC	17,2626	1451	2 1413 1442	RACCDOT	E6,1512	= 132	4 1411 1476
P63SPOT4	32,3247	789	1 789	QERRCALL	16,3637	1441	1 1441	RACTCADR	05,3062	218	1 217
P63TABLE	36,2076	732	2 749 789	QERRR	E6,1450	= 130	5 132 1452	RACT1	E4,1702	116	11 117 646
P63ZOOM	17,2007	741	1 738	QGIMBITS	5007	= 1429	1 1428	RACT2	E4,1710	116	9 117 647
P64CFED	31,3515	815	1 814	QGIMTIMR	E6,1632	134	9 134 1480	RACT3	E7,1535	141	21 622 727
P64DISPS	31,3477	814	2 799 814	QLAST	E6,1455	130	5 1424 1447	RADARANG	26,3361	586	2 580 581
P65START	31,2621	802	1 798	QMAJ	E5,1746	= 123	17 124 983	RADAREAD	25,3150	555	2 154
P65VERT	31,3534	815		QMIN	E5,1745	= 123	17 123 971	RADARFF	4000	= 28	1 520
P66LOC	32,2000	= 34	1 816	QMINEXIT	15,2765	966	1 969	RADARUPT	25,2000	= 32	3 41 612
P66NOW?	31,2564	801		QOK	26,2605	577	1 577	RADCADR	1306	= 106	4 222 541
P66VERT	31,3543	816	1 815	QPLACE	E5,1417	= 127	7 127 381	RADIN	25,3331	557	1 557
P66VERTA	32,3270	816	1 816	QPLACES	E5,1420	= 127	3 127 380	RADLITES	25,3616	612	2 556 560
P67NOW?	31,2474	800		QPRET	0052	= 93	20 297 1242	RADMODES	0110	= 85	117 154 876
P67VERT	31,3545	816	1 815	QRATEDIF	E6,1436	= 130	2 1447	RADNOOP	25,3530	561	2 537 561
P70	21,2072	830	1 233	QRAXIS	16,3624	1441	4 1429 1437	RADSAMP	25,2003	490	2 277 490
P70	21,2073	830	2 241 830	QRBIT	4741	= 131	4 1433 1448	RADSKAL	1354	108	1 884
P70CADR	04,2401	233	1 233	QRCONTR	E6,1750	= 132	9 1472 1484	RADSTALL	07,3714	1329	15 265 895
P70INIT	32,3563	833		QRCONTRL	17,2200	1444	1 1443	RANGCONV	32,2003	41	1 570
P70NOW?	21,2061	830		QRNDXER	0066	= 1478	9 1479 1480	RANGE	E4,1600	115	10 115 705
P71	21,2075	830		QRTIME	17,2515	1448	2 1448	RANGEBQ	26,2510	576	3 576 583
P71A	21,2076	830	2 242 830	QRUPT	0012	= 92	13 155 1428	RANGEBQ1	26,2520	576	1 576
P71NOW?	21,2046	829		QSAVED	E7,1464	140	2 680 681	RANGEDSP	E5,1624	= 122	3 122 806
P71RET	32,3707	835	1 833	QTEMP	E7,1632	142	5 616 766	RANGEVAR	E3,1770	112	1 577
P72	35,2031	621	1 233	QTEMP1	E7,1665	142	6 142 762	RANGRDOT	E7,1760	= 146	3 146 570
P73	35,2220	627	1 233	QTSN45	23,3533	1257	1 1251	RAPFG	E5,1436	= 121	1 121
P74	35,2547	661	1 233	QUADGUID	31,3121	808		RAPD	0020	= 1274	1 1274
P75	35,2731	666	1 233	QUALITY1	13,3725	1247	1 1235	RAPREC	E7,1477	= 141	2 667 670
P76	13,2207	709	1 233	QUALITY2	13,3732	1247		RASFLAG	0106	= 81	6 1219 1220
P76LOC	13,2000	= 30	1 709	QUALITY3	11,3160	1235		RASTEER1	27,2731	776	1 771
P76SUB1	13,2340	711	1 710	QUARTER	4737	= 1099	4 1081 1086	RATEBIAS	22,3133	367	1 367
P78	34,3274	724	1 233	QUICTRIG	23,3615	1261	5 601 1261	RATEDAMP	16,3220	1434	4 1432 1433
P79	34,3526	728	1 233	QUIKDSP	06,2134	160	1 155	RATEDB1	4767	= 1510	1 1509
=====				QUIKFAZ5	33,3552	890	11 861 889	RATEDONE	16,3136	1433	1 1433
Q	0002	= 92	434 93 1509	QUIKOFF	06,2165	160	1 160	RATEINDX	1325	107	3 212 364
Q+1	6737	1025	6 157 1374	QUIKRUP	06,2144	160	1 160	RATEIM1	4766	= 1510	1 1509
Q+10000	4643	998	1 1000	QUITBIT	4747	= 81		RATEIM2	21,3646	1508	2 1510
Q+2	6741	= 1025	5 521 1379	QUITFLAG	0221	= 81	4 298 1218	RATELOOP	16,3641	1470	2 1428 1470
Q-RATE	16,2544	1426	2 1426	=====				RATERORR	16,3227	1434	1 1434
Q-RHCCTR	0042	= 92	3 1433 1434	R	E7,1520	= 147	23 147 882	RATES	30,2510	847	1 847
Q, INETS	17,2104	1442	1 1442	R(CSM)	E3,1717	= 120	6 598 882	RATESP	05,2027	52	2 986
QACCDOT	E6,1510	= 132	6 1411 1490	R*TL**P	23,3700	1263	2 1264	RATESTOP	31,3443	813	2 813 826

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
RATESTRT	05,3061	218	1 212	READACCS	37,3441	858	1 871	REFSMAT	E3,1733	111	53 194 979
RATTVAR	E3,1772	112	1 578	READCJUD	23,2277	520	1 518	PESCOARS	15,2156	930	1 931
RATT	0000	= 1247	36 339 1224	READCDUK	22,2403	357	2 351 481	REGODSP	10,2465	1358	2 736 745
RATT1	0016	= 1247	11 209 787	READLBIT	4746	= 84	2 872 874	REGODSPR	10,2470	1358	1 814
RBRFG	E5,1402	= 121	2 121 826	READLO	40,2747	420	4 420 422	REGSLEEP	07,3372	1320	1 1320
RCD-13	05,2025	52	1 986	READLJ1	40,2760	420	1 421	REGUP	6233	1008	3 1008
RCDUFAIL	0274	= 86		READLR	0256	= 84	1 879	REINTBIT	4745	= 82	3 1220 1385
RCDJFBIT	4745	= 86	7 184 563	READR3IT	4742	= 71	3 219 605	REINTFLG	0236	= 82	5 711 1392
RCDJFBIT	4737	= 85	5 497 537	READRDOT	32,2404	569	1 571	REJALM	07,2467	257	1 257
RCDJOF LG	0266	= 85		READRFLG	0063	= 71	1 606	REJECT	07,2472	257	1 257
RCNORM	0042	= 125	3 1178 1179	READV	33,3527	889	1 889	REJECT2	07,2505	257	1 257
RCS	E7,1630	= 152	4 152 854	READV3IT	4747	= 84	1 889	RELDSP	4457	464	10 227 836
RCS	17,2107	1442	4 1449 1450	READVEL	0257	= 84	1 889	RELDSPON	4374	461	3 398 464
RCSFLGS	1273	105	55 211 1483	RECALIST	40,3547	458	2 427 448	RELDSP1	4502	465	2 438 450
RCSMON	06,3156	191	1 191	RECAL1	40,3552	458	1 458	RELDSP2	4473	465	2 465
RCSMONEX	5270	= 190	2 191 192	RECAL2	40,3563	458	2 459	RELINTQ	10,3231	1367	2 1363 1367
RCSMONIT	06,3156	= 191	2 159	RECAL3	40,3575	458		RELINUS	26,2217	475	1 240
RCSMONT	06,2000	= 29	1 190	RECPATIO	13,3715	1247	1 1238	RELOADSV	11,3642	1243	1 1242
RCV	E3,1534	= 110	28 110 1240	RECTEST	11,3303	1237	3 1237 1238	RELRET	0144	= 97	4 464 465
RCVDSM	E3,1606	111	1 535	RECTIFY	11,3441	1240	8 1156 1239	RELTAB	4066	155	4 157 443
RCVLEM	E3,1660	111	2 500 585	RECTOUT	13,3200	1216	2 1216 1217	RELTAB11	4101	155	2 156 1099
RDSADEND	25,3562	563	4 546 563	RECYCLE	34,3400	726	1 727	REMARK	07,2577	260	3 257 259
RDCDUS	14,3413	948	1 947	RED-OVER	31,3523	815	1 814	REMDIST	42,2000	46	1 487
RDE	13,3723	1247	1 1234	REDES-OK	31,3525	815	1 814	REMOOBIT	4736	= 85	6 532 596
RDES	1316	= 106	4 106 534	REDESIG	31,2704	804	1 798	REMODE	25,2171	531	2 546 597
RDESGAIN	25,3066	552	2 550	REDESMON	11,2321	820	1 820	REMOOFLG	0265	= 85	
RDESTRED	E5,1755	= 125	3 125 1198	REDES1	31,2755	805	1 805	RENDEND	26,3176	582	1 579
RDG	E5,1402	= 826	2 807 809	REDFLAG	0143	= 76	5 785 815	RENDEZ	22,2000	= 32	1 1157
RDGINS	34,3757	894	1 892	REDFLBIT	4746	= 76	2 804 814	RENDEZVU	0002	= 236	18 235
RDIFF	E6,1452	= 132		REDO	37,2002	373	1 290	RENDNOO	04,2262	231	2 230
RDLONOR	40,2767	421	1 420	REDOCTR	0320	99	3 194 215	RENDRAD	25,3276	557	1 556
RDM	13,3721	1247		REDOMANC	26,2150	474	1 473	RENDVBO	04,2226	230	1 230
RDOT	E7,1473	= 120	4 840 852	REDOMANN	26,2125	473		RENDWBIT	4753	= 75	1 290
RDOTBIAS	25,2001	41	1 558	REDOMASK	10,3504	1372	2 1357	RENDWFLG	0131	= 75	13 236 1243
RDOTCONV	32,2001	41	1 570	REDOPRIO	10,2542	1359	1 1372	RENEWMK	07,2502	257	1 257
RDOTD	E4,1672	= 119	5 119 845	RED02.17	36,2337	736	1 240	REPETE	35,3177	669	1 669
RDOTDNOM	23,2457	842	1 839	RED04.2	36,2342	737	2 241 758	REPIP1	37,3557	870	1 871
RDOTM	E7,1750	= 146	3 146 578	RED05.5	37,3453	858	1 242	REPIP3	37,3565	870	1 871
RDOTMSAV	E7,1746	= 146	4 145 570	RED06.7	36,3350	756	1 243	REPIP4	37,3571	870	4 871
RDJTV	E7,1616	141	4 142 636	REDSPTM	32,2017	207	2 207	REPOSBIT	4741	= 85	8 187 597
RDET	E7,1676	= 145	3 145 586	REFLASH	10,2457	1357	745	REPOSCNT	E7,1423	= 139	4 139 510
RDRLOCS	25,2054	491	1 491	REFFLASHR	10,2462	1357	2 755 814	REPOSMON	0270	= 85	
RDRPTBB	4063	154	1 153	REFMF	15,3506	979	3 792 980	REPOSRT	25,2144	530	1 534
RDRUSECK	42,2642	280	5 265 276	REFSM3IT	4737	= 70	7 206 1332	REPOSTM	E7,1424	= 139	5 139 511
RDS2	E5,1434	= 127		REFSMFLG	0057	= 70	7 680 972	REP4JALM	36,3123	748	2 732 748

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SYMBOL	DEF	H	REFERENCES			SYMBOL	DEF	H	REFERENCES			SYMBOL	DEF	H	REFERENCES			
REQADD	41,2064	407	1	407		RGJDDEND	25,3555	563	6	532	563	RODSCAL1	E7,1756	=	151	3	151 816	
REQCTM	41,2310	411	2	411		RGU	E5,1636	=	122	7	200	809	RODTASK	32,3263	=	816	1 816	
REQDATX	41,2303	411	3	425	426	RGVGCALC	31,3013	806	5	798	805	RODTRAP	20,2000	=	31	1	822	
REQDATY	41,2305	411	3	425	427	RHCACTIV	17,2350	1446	1	1446		ROE	14,2006	=	45	1	935	
REQDATZ	41,2307	411	3	407	427	RHCMOVED	16,3223	1434	1	1432		ROLLOVER	27,3247	=	781	1	782	
REQEXLOC	41,2207	409				RHCSCALE	4745	=	87	1	294	ROLLTIME	E6,1401	=	129	4	295 781	
REQEXI	41,3473	448	1	448		RHCSCFLC	0313	=	87			RONE	E4,1606	=	115	16	115 1277	
REQMM	41,3452	447	1	447		RIGHT	00,2236	1054	1	1056		ROO	04,2143	=	229			
REQNET	1013	102	17	222	456	RIGHT-	00,2332	1056	1	1053		ROUAD	04,2365	=	232	1	228	
REQUESTC	41,3477	448	1	448		RIGHTR	00,2031	1047	1	1055		ROOTCYCL	21,3636	=	1484	3	1482	
REREADAC	37,3614	871	3	242		RIGHT5	4322	460	2	428	429	ROOTHALF	21,3632	=	1484	1	1482	
RERRCALC	17,2646	1451				RIGNX	E5,1474	=	121	2	121	787	ROOTLOUP	31,3624	=	824	2	825
RERROR	E6,1452	=	130	5	132 1452	RIGNZ	E5,1476	=	121	2	121	787	ROOTMU	0020	=	1202	3	1179 1197
RERCO	26,2237	475	1	475		RINIT	E4,1722	118	11	652	766	ROOTPS	0126	=	98	5	823 825	
RESAMPLE	25,3263	556	1	560		RLAST	E6,1456	130	5	1425	1447	ROOTPS+1	0127	=	98			
RESETPT	11,2335	821	2	821		RLM	E4,1604	=	113	16	487	488	ROOTPSRS	31,3553	=	823	1	807
RESETX2	12,3120	1191	1	1189		RLMSRCH	E7,1675	=	144	6	144	592	ROOTSTOR	31,3670	=	825	3	825
RESET22	04,2250	230	2	230		RLMUNIT	0014	=	593				ROPECHK	43,3520	=	1290	1	1287
RESIGN	35,3223	670	1	670		RLS	E4,1422	113	15	196	1212	ROT-TOUV	17,3146	=	1457	4	1442 1497	
RFSO	33,2037	44	1	880		RM	E7,1756	=	146	6	146	606	ROTATE	34,3052	=	643	2	642
RFT	10,3245	1368	1	1365		RMAG	E7,1714	=	143	5	143	777	ROTEMP1	E6,1737	=	131	3	1457
RESTART	01,2000	=	28	4	239 1307	RMAG1	0014	=	1268	4	1271	1280	ROTEMP2	E6,1740	=	131	4	1457
RESTART?	31,2574	801	1	801		RMAX	E4,1404	113	1	586		ROTFLAG	0220	=	81	5	834 851	
RESTARTS	01,3526	1303	1	213		RME	12,2021	=	37	1	1218		ROTFLBIT	4746	=	81		
RESTORDB	20,2123	1407	8	288	1409	RMM	12,2017	=	37				ROTINDEX	E6,1744	=	131	10	1429 1458
RESTTEG	0366	100	4	211	1364	RMODINIT	05,3365	223	1	219		ROTORQUE	16,3716	=	1471	1	1470	
RESTTLEP	10,3251	1368	1	1368		RMODINV	25,2233	532	7	532	543	ROTSENSE	E6,1740	=	133	9	1461 1469	
RESULTCT	E5,1537	=	127	5	375 379	RN	1220	105	16	195	1221	ROT180	26,2350	=	483	1	483	
RESUME	5270	1129	26	160	1413	RND/TST	42,3543	435	3	434	435	ROUND	00,2116	=	1049	1	1013	
RETJADR	E6,1477	131	4	1445	1454	RNDCON	42,3302	422	2	423		ROUNDSUB	7136	=	1032	4	1044 1055	
RETINORE	20,2442	1420	6	1415	1419	RNDREFOR	07,3175	1315	3	174	1335	RP-TJ-R	26,3716	=	1140	9	786 1236	
RETIN	06,2264	164	1	165		RNDVZBIT	4745	=	66	10	185	592	RPAO	23,2314	=	695	4	696 1283
RETNET	0132	=	98	3	823 825	RNDVZFLG	0010	=	66	6	287	1335	RPAOTEM	E4,1602	=	115	6	115 721
RETURN TJ	17,3466	1464	7	1463	1467	RNGEDATA	0260	=	84				RPAOI	23,2314	=	1283		
REVCNT	6242	1008	5	292	1099	RNGEDBIT	4750	=	84	2	884	893	RPASS1	E7,1477	=	141	4	141 642
REVERS	35,3226	570	1	670		RNGSCBIT	4742	=	74	2	571	894	RPASS2	E7,1521	=	141	7	141 647
REVERSAL	21,3610	1483	1	1483		RNGSCFLG	0120	=	74	4	558	894	RPASS3	E7,1551	=	141	12	633 729
REV1645	35,2540	653	2	615	653	RNRAD	0046	=	92	5	555	557	RPASS36	E4,1606	=	118	5	118 701
REV83	37,3155	704	1	706		RNI	E7,1544	=	147	7	147	1224	RPCRTIME	E7,1427	=	138	1	874
RFAICNT	E4,1756	119	2	276	490	ROADBACK	25,2366	537	4	537	562	RPCRTQSW	E7,1430	=	138	1	874	
RFAILS	40,3671	471	1	470		RODCOMP	32,3275	816	1	816		RPER	0016	=	1274	3	720 1274	
RFAILS2	41,3727	469	1	463		RODCOUNT	E7,1746	=	151	5	801	822	RPPREC	E7,1521	=	141	2	667 670
RGEXIT	E7,1665	=	142			RODFLAG	0022	=	67	1	800		RPQFLAG	0170	=	78	6	1215 1238
RGIMBTS	5020	=	1429	1	1429	RODFLBIT	4740	=	67	2	217	801	RPQFLBIT	4735	=	78		
RGIMTMR	E6,1634	=	134	5	1412 1472	RODSKALE	E5,1537	=	122	2	122	800	RPQV	E4,1504	=	114	8	114 1239

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES			
RREFEXIT	0050	=	1148	3 1140 1142	PROUT2	25,2310	535	1 536	RTNHOLD	E7,1607	=	149	4 149 796	
RPRPXXXX	24,3706		1142	1 1140	RRANGE	25,3105	553	3 491 606	RTNLAMB	E5,1710	=	125	8 125 1197	
RPSV	E4,1521	=	114	5 114 1231	RRRDOT	25,3103	553	4 491 605	RTNPRM	E5,1753	=	125	3 125 1187	
RPTORA	26,3733		1140	1 1140	RRRET	1315	106	5 106 534	RTNSAVER	0145	=	98	3 1263 1264	
RPTORB	26,3725		1140	1 1141	RRRSBIT	4751	=	86	1 569	RTNTR	E5,1710	=	125	1 1198
RQVV	E4,1513	=	114	7 114 1231	RRRSFLAG	0300	=	86		RTNTT	E5,1710	=	125	3 1186
RR-AZ	E4,1600	=	118	5 118 315	RRSHAFT	E7,1735	=	146	3 146 580	RTORPA	24,3712		1142	1 1142
RR-ELEV	E4,1602	=	118	2 300 315	RRSONLY	25,2244	533	3 530 532	RTORPB	24,3701		1142	1 1142	
RRANGLES	13,2133		322	1 539	RRSPGAIN	25,2305	534	1 534	RTRN	E7,1465		140	14 650 730	
RRATE	E4,1602	=	115	6 115 705	RRTARGET	1101	=	103	14 103 604	RTRNCADR	01,3565		1303	5 1303 1308
RRATEDIF	E6,1437	=	130	1 1447	RRTONLY	25,2241	533	5 530 597	RTRNMU	10,2022		693	1 693	
RRAUTCHK	06,3006		132	2 159	RRTRKF	4570	524	3 612 613	RTSR1/MU	E4,1716		117	4 117 693	
RRBASIT	E7,1740	=	146	5 146 572	RRTRUN	E7,1733	=	146	5 146 582	RTSTBASE	E4,1753		119	3 277 490
RRDOUCHK	06,3037		184	2 182	RRTURNIN	25,2062	526	1 183	RTSTDEX	E4,1751		119	7 119 491	
RRCHECK	4576		524		RRZERO	25,2343	537	1 265	RTSTLOC	E4,1754		119	8 119 491	
RRDATABT	4750	=	86	1 524	RRZERDK	43,2142	265	1 265	RTSTMAX	E4,1752		119	2 277 490	
RRDATAFL	0277	=	86		RRZEROSB	25,2071	527	2 526 537	RTX1	E5,1776	=	124	14 124 1224	
RRDESOUN	25,3005		551	1 551	RRZ2	25,2370	537	1 537	RTX2	E5,1777	=	124	18 617 1224	
RRDESEND	43,2302		270	1 262	RR21AXIS	25,2246	533	1 533	RUFLAW1	17,3630		1468	1 1461	
RRDESK2	43,2261		269	1 269	RR21AX2	25,2254	534	1 533	RUFLAW12	17,3636		1468	2 1468	
RRDESNB	25,2475		543	3 269 511	RR22GAIN	32,2775	604	2 603	RUFLAW2	17,3664		1468	1 1461	
RRDESNBK	43,2227		269	1 267	RSAMPDT	E4,1755	119	7 276 490	RUFLAW3	17,3672		1469	1 1462	
RRDESSM	25,2373		538	3 509 591	RSBBQ	E3,1432	109	2 195 215	RUFRAFE	17,3743		1469	2 1468	
RECT	E3,1502	=	110	15 110 1240	RSCALE	32,2177	209	1 209	RUFSETUP	17,3712		1469	4 1468 1469	
RECTCSM	E3,1554		110	11 110 1213	RSFLGBT5	05,3066	218	1 216	RUNIT	E7,1743	=	151	8 151 398	
RECTHIS	E3,1626	=	111	4 297 1210	RSPHERE	13,3717	1247	2 1237 1238	RUPDATED	33,3307		886		
RECTLEM	E3,1626		111	3 111 1212	RSTACK	E4,1600	=	118	12 276 490	RUPTAGN	0734		100	6 100 1129
RECTOTH	E3,1554	=	110	1 297	RSTKLOC	E4,1754	=	119		RUPTREG1	0070		95	62 155 1407
RRGIMON	06,3071		186	1 184	RSTOFSTS	21,3524	1482	2 1476	RUPTREG2	0071		95	26 162 1480	
RRIMUDIF	43,2204		268	1 268	RSUBC	1101	=	103	3 494	RUPTREG3	0072		95	19 372 1480
RRINDEX	1317	=	106	3 533 534	RSUBE	14,2004	45	1 935	RUPTREG4	0073		95	7 95 1338	
RRINIT	06,2564		173	1 173	RSUBEM	14,2000	45	2 935	RUPTSTOR	0065	=	95		
RRLEADIN	25,2000	=	32	1 400	RSUBL	E7,1630	=	148	4 148 495	RUPT10BB	4065		154	1 154
RRLIMCHK	4523		522	4 187 542	RSUBM	14,2002	45	1 935	RUTH	16,3120		1432	1 1432	
RRLINB	25,2540		543	2 543	RTARG	E7,1443	139	8 194 776	RUTMXTAB	42,3134		317	1 304	
RRLINCK	4560		523	2 523 544	RTARG1	E7,1471	=	144	11 686 690	RUTMXTEM	0153		98	2 304 428
RRLOSDSP	40,2017		299	2 299 300	RTB	01,2450	1090	1 1090	RVARMIN	E3,1774		112	1 576	
RRLOSVEC	1101	=	571		RTB/SHIZ	01,2447	1090	1 1012	RVSOTH	33,3032		892	1 861	
RRNB	23,2041		324	3 543 591	RTBCODES	10,2000	=	29	1 1397	RVCIN	13,3243		1217	1 1216
RRNBBIT	4746	=	66		RTERM	0022	=	1268	3 1277 1279	RVEC	E5,1654	=	125	11 494 1200
RRNBMPAC	23,2065		324	1 299	RTHETA	E4,1604	=	115	10 115 706	RVQ	00,3274		1077	1 1013
RRNBSS	0011	=	66	5 539 565	RTIG	E7,1641	142	11 142 769	RVSW	0157	=	77	8 494 1186	
RRNB1	23,2054		324	1 324	RTMAG	E7,1722	=	143	5 143 777	RVSWBIT	4743	=	77	
RROUT	25,2303		535	3 534 604	RTMU	E4,1720	117	4 633 693	RWAITK	43,2145		265		
RROUTLIN	25,2335		536	1 535	RTNAPSE	E5,1710	=	125	3 1200	RXZ	E7,1721	=	145	10 145 586

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
R02	04,2000	=	28 1 1332	R21LEM3	24,2742	509		R29LOKON	32,2752	604	1 604
R02BOTH	04,3254		1332 11 309 927	R21LEM4	24,2777	510	1 509	R29NODES	33,2564	876	2 876
R02ZERO	04,3270		1332 1 1332	R21LEM5	24,2705	508	1 508	R29RANGE	24,3443	606	1 606
R04	43,2414		276 1 262	R21LEM6	24,2715	509	1 508	R29RDJOB	24,3413	605	1 605
R04A	43,2446		276 1 277	R21LEM7	24,3036	510	2 510	R29READ	24,3400	605	2 604 605
R04B	43,2470		277 1 277	R21LEM8	24,3043	510	1 510	R29REMOJ	33,2113	597	1 596
R04C	43,2505		277 2 277 279	R21LEM9	24,3075	511	1 511	R29RRR?	24,3466	606	1 606
R04END	43,2603		279 5 277 278	R21STRCH	24,2772	509	1 509	R29SI	25,2000	=	32 1 597
R04FLAG	0063	=	70 5 71 496	R22DISP	0314	=	99 6 314 586	R3D1	4321	460	5 403 457
R04FLBIT	4743	=	71 4 276 555	R22LEM	24,2451	504	3 507	R30LOC	22,2000	=	32 2 44 713
R04K	43,2575		279 1 275	R22LEM11	24,2521	505	1 505	R30OK	27,3766	1283	
R04L	43,2577		279 1 277	R22LEM12	24,2463	504		R31	37,2000	=	36 1 703
R04LR	43,2542		278 3 278	R22LEM2	24,2531	505	2 505	R31CALL	40,3674	703	1 283
R04RT	43,2526		278 2 273	R22LEM3	24,2551	505	2 505	R31LOC	40,2000	=	36 1 703
R04X	43,2463		277 1 279	R22LEM42	24,2627	506	4 499 506	R31SURF	37,3370	707	1 704
R04Y	43,2556		278 2 278	R22LEM44	24,2622	506	1 506	R33	42,2002	275	1 275
R04Z	43,2420		276 1 276	R22LEM45	24,2632	506	2 506	R36	04,2656	701	2 284 702
R1	0040	=	1202 19 635 1200	R22LEM46	24,2640	507	2 506	R36INT	04,2676	701	1 702
R1A	E5,1741	=	125 15 125 1200	R22LEM7	24,2616	506	1 506	R36LM	04,2000	=	28 1 700
R1C	E7,1724	=	143 4 143 778	R22LEM93	24,2566	506	1 582	R36TAG2	04,2765	702	1 702
R101	4317		460 13 403 1073	R22LEM96	24,2572	506	2 586	R47	32,2000	=	34 1 206
R1S	E7,1572	=	147 14 147 390	R22RSTRT	24,2653	507	1 240	R51	14,3015	941	1 930
R1SAVE	1074		103 4 222 1370	R22WAIT	24,2636	507	4 504 506	R51.1	14,3017	941	1 241
R1VEC	E5,1654	=	125 6 125 1193	R23LEM	24,3135	513	1 497	R51.2	14,3055	941	
R10	21,2000	=	31 3 42 898	R23LEM1	24,3143	513	1 514	R51.3	14,3056	941	1 943
R11	21,2006		829 3 240 859	R23LEM11	24,3154	513	1 513	R51.4	14,3145	942	1 942
R10,R11A	21,2021		829 1 872	R23LEM2	24,3176	514	2 513 514	R51C	14,3022	941	2 941 942
R10FLAG	0015	=	66 1 838	R23LEM3	24,3201	514	2 513 514	R51E	14,3053	941	3 941
R10FLBIT	4752	=	66 4 831 907	R24END	24,3230	516	1 515	R51F	14,3042	941	
R11	21,2000	=	31 2 829 835	R24LEM	24,3206	515	1 509	R51I	14,3043	941	1 941
R12LITES	25,3607		612 1 875	R24LEM1	24,3212	515		R51K	14,3134	942	2 942 944
R12STUFF	34,2000	=	34 1 893	R24LEM2	24,3216	515	1 516	R51P63	14,3135	942	1 788
R2	E5,1717	=	125 3 1184	R24LEM3	24,3234	516	1 515	R52	14,3670	955	1 941
R201	4320		460 7 403 1099	R24LEM4	24,3251	516	1 516	R52A	14,3700	955	2 955 956
R1VEC	E5,1662	=	125 10 125 1193	R29	33,2045	596	2 597 876	R52B	14,3706	955	1 955
R21-503	24,2760		509 1 509	R29.LDS	33,2123	597	1 596	R54	14,3256	=	945 2 942 971
R21DISP	24,3121		511 1 509	R29/SERV	33,2000	=	34 1 595	R55	14,3224	945	1 942
R21END	24,2767		509 1 509	R29?	33,2547	876		R55.1	14,3231	945	
R21LEM	24,2674		508 1 498	R29DLOOP	24,3362	599	1 599	R55.2	14,3237	945	1 945
R21LEM1	24,2733		509	R29DOOES	32,2547	600	1 599	R55CDR	14,3255	945	2 944 945
R21LEM10	24,2725		509 2 508 511	R29DPAS1	32,2563	600	1 600	R55RET	14,3251	945	1 945
R21LEM11	24,3105		511 1 510	R29DPAS2	32,2702	603	1 601	R56	14,2611	=	937 1 941
R21LEM12	24,3006		510 1 510	R29DVBEQ	32,2552	600	2 600 602	R59	15,2245	957	4 957 970
R21LEM13	24,3033		510 1 510	R29DVEND	32,2577	600	1 600	R59A	15,2257	957	1 957
R21LEM2	24,2731		509 1 552	R29FXLOC	32,2774	604	1 601	R59ALM	15,2427	959	1 959

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
R59D	15,2375	959	1 959	S-2	7746	= 1286		SCALEDOT	17,3320	1462	1 1462
R59E	15,2445	960	1 960	S-3	7745	= 1286		SCALEE	17,3306	1461	1 1461
R59OUT	15,2455	960	4 957 959	S-4	6112	= 1286		SCALEFAC	31,2005	40	2 796 818
R59RET	15,3054	970	1 960	S-7	5650	= 1286	1 1287	SCALEVEC	32,2132	208	2 207
R60INIT	32,3176	788		SAMETYP	15,3610	981	1 981	SCALLOOP	21,3473	1481	1 1481
R60LEM	26,2123	473	6 340 956	SAMPLIM	1100	103	9 222 561	SCALPREP	37,3714	1336	2 1335 1336
R60VSAVE	15,1630	= 122	4 122 788	SAMPLSUM	1101	103	9 103 893	SCALSAVE	0316	99	3 1335 1336
R61	23,2000	= 32	1 517	SAMPTIME	6013	= 92	5 207 462	SCALSHFT	E7,1720	= 145	4 145 586
R61C+L01	23,2127	517	2 517 519	SAVE	E5,1464	= 127		SCALSTRT	21,3465	1481	1 1481
R61C+L03	23,2133	517		SAVECDUT	E3,1766	= 604	11 601 603	SCAXIS	E7,1764	= 146	27 143 958
R61C+L04	23,2257	519	1 518	SAVEDEN	27,3535	1278	1 1278	SCHZEROS	37,3056	388	4 380 383
R61C+L05	23,2213	518	1 518	SAVEFLAG	1072	= 1372		SELNORM	17,3112	1456	
R61C+L06	23,2236	519	3 518 519	SAVEHAND	E6,1462	130	7 1434 1447	SCNDSOL	34,2776	641	7 633 641
R61C+L1	23,2264	519		SAVELOC	10,2727	1362	1 1362	SCOUNT	1366	= 108	4 108 1290
R61C+L2	23,2252	519	1 519	SAVELOC5	10,2722	1362	2 1358 1361	SCOUTEND	40,2702	419	4 419
R61C+L4	23,2262	519	2 519	SAVESR	E6,1505	= 132	2 1472 1484	SCRATCH	E6,1746	= 132	2 1484
R61FLAG	0024	= 67	2 517	SAVET-30	E7,1477	= 147	8 147 736	SCRATCHX	0160	= 1496	5 1492 1496
R61FLBIT	4742	= 67	1 519	SAVLEMV	E7,1737	= 144	4 589 590	SCRATCHY	0161	= 1496	3 1492 1493
R61LEM	23,2116	517	4 495 516	SAVQR52	E7,1665	= 142	2 955 956	SCRATCHZ	0162	= 1496	4 1492 1493
R61LFM1	23,2137	518		SAX	E5,1730	= 123	5 938 940	SD	22,2365	357	
R61LFM2	23,2175	518		SBAND	42,2000	= 36	4 46 486	SDISPLAY	43,3113	290	1 1293
R61TEST	26,2242	475	1 473	SBANDANT	42,3606	486	2 280 489	SECAD	22,2027	351	
R62	23,2000	= 32	1 485	SBANDEX	42,3745	488	1 488	SECAX	E7,1573	= 141	5 667 669
R62DISP	23,2103	= 485	1 285	SBIT1	4753	= 1285		SECON1	42,3267	421	1 423
R62FLASH	23,2103	485	2 435	SBIT10	4742	= 1285		SECON2	42,3271	421	1 421
R65CNTR	E7,1745	= 146	6 146 576	SBIT11	4741	= 1285	2 1291 1292	SEC01	4777	= 763	
R65LEM	23,2123	517	3 503 576	SBIT12	4740	= 1285	1 1291	SEC15	36,3750	763	
R65WAIT	23,2271	519	2 517 518	SBIT13	4737	= 1285		SEC15DP	36,3747	763	
R77	43,2404	276	1 263	SBIT14	4736	= 1285		SEC30DP	36,3751	763	
R77CHECK	25,3364	558	1 556	SBIT15	4735	= 1285	1 1292	SEC45	36,3754	763	
R77END	43,2617	279	1 263	SBIT2	4752	= 1285		SEC45DP	36,3753	763	
R77FLAG	0117	= 74	2 276 279	SBIT3	4751	= 1285		SELCFSUB	17,3173	1457	3 1443 1454
R77FLBIT	4741	= 74	4 220 558	SBIT4	4750	= 1285	1 1289	SELECTMU	10,2000	693	6 622 729
=====				SBIT5	4747	= 1285		SELECTP	16,3531	1440	2 1436 1440
S(XI)	0032	= 1202	6 1178 1184	SBIT6	4746	= 1285		SELECTYZ	16,3551	1440	1 1429
S+Z-FO	4755	= 1285	9 290 1291	SBIT7	4745	= 1285	1 1292	SELFADRS	43,3245	1286	2 290 291
S+1	4753	= 1285	9 290 1293	SBIT8	4744	= 1285		SELF8ANK	01,3224	1116	1 1116
S+2	4752	= 1285		SBIT9	4743	= 1285	1 1289	SELFCHEC	43,2000	= 36	1 1285
S+3	6245	= 1285		SBNK03	5020	= 1286	1 1291	SELFCHK	43,3336	1287	5 222 1287
S+4	4751	= 1285		SCABRIT	4751	= 84	3 559 612	SELFERAS	1357	108	1 108
S+5	4756	= 1285		SCALADJ	25,3402	559	1 558	SELFRET	1361	= 108	7 108 1287
S+6	6242	= 1285		SCALBAD	0261	= 84		SELF5UPR	40,2000	= 36	
S+7	4757	= 1286	1 1287	SCALCHNG	25,3350	558	1 557	SENDID	05,3753	996	2 992 996
S-Z-FO	4754	= 1236	1 1290	SCALDOME	21,3507	1482	1 1481	SENDPULS	07,3133	1314	1 1313
S-1	7747	= 1286	2 1291 1293	SCALECHK	25,3321	557	1 557	SENSEGET	17,2114	1442	

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
SENSETYP	E6,1500	131	5 1438 1462	SETPD	7613	1044	1 1011	SFTEMP1	0123	= 96	20 304 433
SENSE	17,3724	1469	2 1461	SETPDS	33,3740	396	1 896	SFTEMP2	0124	= 96	2 433 434
SENSTEST	17,3344	1462	1 1462	SETPDS1	33,3721	895	1 789	SGNAGREE	10,3612	1397	6 376 1218
SEPMIN	42,3435	424	2 421 423	SETPDS2	33,3737	896	1 895	SGNCHECK	12,2562	1182	2 1182 1183
SEPMNRET	0144	= 97	2 424	SETPRIO	10,2510	1358		SGNCOM	40,2422	402	1 403
SEPSCRET	0144	= 97	2 423 424	SETPRPOS	33,2104	596	1 596	SGNOVOVF	00,2402	1057	1 1057
SEPSEC	42,3404	423	1 422	SETRAJ	23,2344	696	1 695	SGNOFF	0123	= 96	3 402 403
SEPSECMR	42,3417	423	3 421 423	SETRAJX	23,2357	696	1 696	SGNON	0122	= 96	3 402 403
SEPSEC1	42,3412	423	1 423	SETRE	13,2560	1139	2 1133 1135	SGNRDOT	E5,1754	= 125	2 125 1198
SERV	22,2000	= 34	1 866	SETREX	0051	= 1139	2 1139	SGNTAB	40,2443	403	2 402 403
SERVCADR	36,2105	= 749	1 755	SETROUND	00,2272	1054	3 1054	SGNTO1	40,3070	432	1 431
SERVEXIT	32,3770	866	8 731 866	SETRRCTR	25,2317	535	1 536	SGNTST1	40,2462	403	3 403
SERVICER	33,2206	860	2 242 858	SETRRECR	25,2156	530	3 529 596	SHAFTBQ	26,3011	580	
SERVICES	33,2000	= 34	8 39 894	SETRXX	13,2573	1139	3 1139	SHAFTLIM	25,2564	544	1 544
SERVIDLE	27,3321	865	2 1383 1384	SETSENSE	17,3276	1461	1 1461	SHAFTVAR	E4,1410	113	1 581
SERVOUT	33,2400	863	3 862	SETTIME	17,2566	1449	1 1449	SHFTFACT	32,3534	819	1 818
SERV1	37,2000	= 36	2 857 869	SETTIME4	06,2074	157	1 160	SHFTFLAG	E6,1741	= 132	4 1481 1482
SERV2	22,2000	= 32	1 863	SETTIME5	16,2152	1412	1 1413	SHIFTR1	23,2426	699	11 617 727
SERV3	27,2000	= 33	1 865	SETTRKF	4564	524	2 185 528	SHIFT11	33,3030	881	3 882 883
SERV4	34,2000	= 34	1 894	SETUPDSP	10,2213	1294	1 1294	SHOLTS	41,3661	468	1 467
SETAJG	40,2645	413	1 418	SETUPER1	37,3005	388	1 387	SHORTMP	7307	1036	11 400 1337
SETBANK	13,3036	1213	4 1211 1212	SETUP290	33,2152	598	1 598	SHORTMP2	7313	1036	1 885
SETCJARS	07,3144	1315	2 169 1312	SETUP70	04,2373	233	1 227	SHORTT	00,2017	1047	2 1010
SETCTR	21,3663	1508		SETUP71	04,2372	233	1 227	SHORTV	00,2121	1050	1 1010
SETEBANK	4313	460	2 410 420	SETVAC	41,3510	448	1 448	SHOW	37,2457	380	3 375 377
SETGAMMA	13,2550	1138	2 1133 1135	SETWO	05,3562	992	3 992 994	SHOWSUM	43,3100	290	1 290
SETGLOCK	06,2465	170	4 169 170	SETXFLAG	07,2667	= 851		SHOW1	37,2461	381	1 381
SETGMEX	13,2556	1138	1 1138	SETXTACT	43,2105	263	1 264	SHUTDOWN	16,2163	1413	1 1410
SETIFLGS	13,2644	1210	8 236 1221	SETX2	26,2526	576	1 576	SIDLOOP	43,3267	1286	1 1287
SETINFL	05,2731	215		SEUDOPDO	04,2202	229	1 231	SIGN	7655	1046	1 1011
SETISSW	06,2703	179	7 165 1318	SEVEN	4757	1095	25 155 1495	SIGNADS	0163	= 1506	12 1498 1505
SETITCTR	11,3765	1246	1 689	SFAIL	1357	= 103	4 103 1287	SIGNFIX	40,3031	431	2 431
SETLOC	01,2661	1107	3 1107 1111	SFCOM	42,2145	305	1 305	SIGNLCHK	25,2767	551	2 551
SETMARK	10,2526	1359		SFCONST1	E5,1467	= 127		SIGNMPAC	10,3712	1401	14 353 1280
SETMAXDB	20,2127	1407	2 791 1407	SFCONUM	41,3047	428	2 416 430	SIGNRET	0125	= 96	
SETMGA	06,3730	692	1 692	SFINTAB	42,2464	311	1 305	SIGNTEST	40,2446	403	2 402
SETMINDB	20,2140	1407	6 513 1407	SFINTABR	41,3212	431	1 430	SIM2CADR	05,2454	211	
SETMOD	13,2716	1211	3 1211 1239	SFMIXCAL	40,3060	432	1 432	SINB	E5,1646	= 123	
SETMUR	10,2011	693	1 693	SFNORCAL	40,3063	432	1 432	SINBLANK	40,2572	405	1 405
SETNADD	4311	460	2 407 429	SFOUTAB	42,2556	312	1 305	SINCDO	0736	= 100	6 100 1264
SETNACADR	4303	460	7 407 460	SFOUTABR	41,2600	417	1 417	SINCDOX	0742	= 100	6 478 1266
SETNEGU	21,3363	1479	1 1479	SFRET	41,3064	428		SINCDOY	0736	= 100	5 478 1266
SETNORM	10,2534	1359	1 1357	SFRET1	41,3046	428		SINCDOZ	0740	= 100	7 478 1266
SETOVF	7005	1027	1 1030	SFRUTMIX	41,3034	428	5 410 432	SINE	00,3530	1082	2 1013 1260
SETOVF2	7152	1032	1 1028	SFRUTNOR	41,3026	428	5 416 432	SINESLOC	23,3762	1264	1 1264

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED	= DEFINED BY EQUALS	J DEFINED BY JOKER OR ERASE ANYWHERE	MD MULTIPLY DEFINED
BD BADLY DEFINED	CD DEFINITION ASSOCIATED WITH CONFLICT	XX MISCELLANEOUS TROUBLE	

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
SINGIMLC	26,2375	483	1 481	SMALRATE	17,3654	1468	1 1468	SPSIN	5033	1102	5 188 1261
SINI	26,2002	52	2 1144	SMODE	1362	= 108	7 108 1287	SPSLOOP1	20,3106	1494	1 1495
SINNOI	0010	= 1148	1 1144	SMODECHK	43,3301	1287	3 1287 1290	SPSLOOP2	20,3123	1494	1 1495
SINTH	0022	= 124	21 299 1254	SMPAC+	00,3405	1080	3 1079	SPSRCS	21,3727	1509	2 1438 1452
SINTHETA	E7,1731	= 145	3 146 586	SNAPAGN	05,3633	993		SPSSTART	21,3735	1509	1 1509
SINVEC1	26,2377	433	1 482	SNAPEND	05,3652	994		SPT	5036	1102	1 1102
SINVEC2	26,2401	433	1 482	SNAPLOOP	05,3622	993	1 993	SPVAC	5116	1103	3 232 1361
SINZERO	30,3665	922	1 922	SNGLCD	22,2376	357		SPVACIN	5112	1103	1 1103
SINODEG	05,3502	852	1 852	SNTH	E5,1727	= 125	15 125 1199	SQ	1077	103	2 1102
SINODEG	26,3704	593	2 590	SNUFFBIT	4737	= 74	1 1453	SQRT	00,3207	1076	1 1013
SIX	6242	= 1099	36 169 1487	SNUFFER	0115	= 74	2 298	SQRTABRT	00,3402	1079	2 1079
SIXTY	43,3236	1286	1 1292	SNUFFOUT	43,3221	298	1 262	SQRTNEG	00,3373	1079	1 1079
SIZETAB	01,2002	239	2 1006 1308	SN1	00,3553	1083	1 1082	SQRTNM2	00,3475	1081	1 1081
SIZETST	42,3561	435	2 434 435	SN359+	35,2413	631	1 634	SQRTNORM	00,3502	1081	1 1081
SKALSKAL	1356	108	1 894	SOB	0042	= 1148	4 1143 1144	SQRTSHFT	00,3221	1076	1 1076
SKEEP1	1371	= 108	20 108 1293	SOLNSBIT	4751	= 75		SQRTSUB	00,3343	1079	3 1070 1084
SKEEP2	1372	= 108	10 108 1291	SOLNSW	0127	= 75	5 1193 1199	SR	0021	= 92	30 405 1484
SKEEP3	1373	= 108	14 108 1292	SOMEAUS	20,3444	1500		SRCHOBIT	4736	= 68	1 589
SKEEP4	1374	= 108	14 108 1293	SOMEERRR	37,3040	388		SRCHOPTN	0037	= 68	4 287 515
SKEEP5	1375	= 108	10 108 1292	SOMEKEY	07,2404	255	1 254	SRDOV	00,2024	1047	1 1070
SKEEP6	1376	= 108	6 108 1293	SOMERR2	37,3047	388	1 378	SRTEST	00,3456	1081	1 1080
SKEEP7	1377	= 108	22 215 1292	SOPT	43,3705	1293	1 1293	SR30.1	22,3551	720	2 715 717
SKIPADD	10,2750	1363	1 1363	SOPTION	43,3670	1292	2 1291	SS	E7,1732	= 143	9 777 778
SKIPDB1	20,3372	1499	1 1493	SOPTIONS	43,3312	1287	2 1287	SSP	6620	1021	1 1011
SKIPDB2	20,3456	1500	3 1499 1500	SOPTION1	43,3322	1287	1 1287	STABLE?	31,2557	801	1 800
SKIPDAXS	15,2734	1429	2 1428 1441	SOPTION2	43,3323	1287		STACCDUT	20,2752	1490	2 1490
SKIPSIM	05,2456	211	1 211	SOPTION3	43,3324	1287		STADR	6354	1014	1 1013
SKIPTPE	22,3626	721	1 721	SOPTION4	43,3325	1287		STALL	07,3717	1330	2 1329
SKIPJ	E6,1535	133	9 133 1472	SOPTION5	43,3326	1287		STAR	E5,1730	= 123	9 123 966
SKIPV	E6,1536	= 133	3 1412 1472	SOPTION6	43,3327	1287		STARAD	E5,1706	= 123	45 123 1256
SLAP1	05,2447	211	1 409	SOPTION7	43,3330	1287		STARALGN	0736	100	2 100
SLCTWU	10,2000	= 29	1 693	SOPTION10	43,3331	1287		STARCODE	0735	100	4 100 956
SLEEP1E	37,3024	383	2 383 387	SOUPLY	37,3071	389		STARIND	E5,1757	= 124	16 124 970
SLEFT5	4340	461	1 444	SOUTION	E5,1421	= 127	3 127 376	STARM	0040	= 124	
SLIND	6501	1019	1 1011	SPARCSIN	30,3673	923	3 807 922	STARSAV1	E5,1760	= 124	12 124 982
SLIND2	6055	1002	5 1019 1401	SPARE	0007	= 193	11 194 204	STARSAV2	E5,1766	= 124	8 124 981
SLOPEBIT	4751	= 68		SPCOS	5032	1102	5 188 1261	STARTAB	14,2000	= 31	1 47
SLOPETHI	00,2014	1055	1 1080	SPECSTS	37,2572	384		STARTDAP	16,2046	1411	
SLOPULO	00,3007	1069	1 1081	SPECTEST	01,2651	1107	1 1111	STARTDES	25,2432	540	2 539 543
SLOPSW	0033	= 68	2 1182 1193	SPEEDRUN	21,2374	901	1 900	STARTEB	5007	= 223	1 220
SMALL	00,3133	1073	1 1070	SPIRAL	1240	= 950	4 261 959	STARTMNV	26,2172	474	
SMALLEPS	27,2366	766	1 766	SPLRET	22,3541	= 718	1 37	STARTPIP	37,2161	375	1 375
SMALLTJU	16,3707	1470	1 1470	SPNDX	1272	105	8 365 366	STARTP47	36,3447	758	1 758
SMALLZ	00,3062	1070	1 1073	SPSCODE	4743	= 1309		STARTP64	31,2630	802	1 798
SMALPDIF	16,2507	1425	2 1425	SPSCONT	20,2712	1490	1 1496	STARTP66	31,2477	800	1 801

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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BD	BADLY DEFINED	CD	DEFINITION ASSOCIATED WITH CONFLICT	XX	MISCELLANEOUS TROUBLE		

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
STARTP67	31,2551	801	1 800	STJREMIN	12,2152	1175	1 1175	SURFSTOR	07,2521	258	1 255
STARTSBI	05,3116	219	1 216	STJRETGO	27,2666	775	2 775	SURFSUP	15,3151	971	1 971
STARTSB2	05,3146	219	1 216	STOREI	6623	1021	1 1052	SVCT3	5240	1121	2 1121
STARTSIM	05,2452	211		STOREIS	26,3667	592	1 592	SVCT3X	5256	1121	3 1121
STARTSTO	6434	1017		STORHAPO	22,3600	720		SVDWN1	13,2114	321	3 297 1210
STARTSU3	05,3107	219	4 211 218	STORHPER	22,3612	721		SVDWN2	13,2070	320	2 1156 1212
STARTSW	05,2451	211		STORJUMP	6372	1015	1 1014	SVEXITAD	05,3474	832	1 831
STATE	0074	95	44 65 1093	STORLP71	04,3647	1393	2 1393 1394	SVEXTADR	27,3356	866	1 865
STATEBIT	4747	= 71	1 1385	STORTORK	16,3702	1470	1 1471	SW/	01,2516	= 1094	1 1012
STATEFLG	0067	= 71	9 575 1243	STORV	20,3612	1502	1 1502	SWANDBIT	4741	= 77	3 739 898
STATEINT	13,2604	1209	3 239 1210	STORY	27,2431	769	1 769	SWANDISP	0155	= 77	1 863
STATEUP	13,2026	236	1 1210	STRAT	14,2722	939	1 939	SWBIT	0131	= 97	5 1092 1094
STATEXIT	E4,1516	= 115		STRATGY	14,2714	939		SWBRANCH	6715	1024	1 1094
STATINT1	13,2613	1239	2 240 1209	STRGYRO	07,3405	1321	2 1319 1324	SWCALL	4622	998	5 217 1090
STATQUO	04,2304	231	2 231	STRGSYR2	07,3411	1321	4 1322 1326	SWCHCLR	35,2625	662	1 662
STBLEDRB	34,2000	= 34	1 724	STRIDLE	5701	1383	1 1383	SWCHSET	35,2603	662	1 662
STCLOK1	36,2663	743	1 742	STRTP66A	31,2505	800	1 801	SWINIT	05,3366	223	9 213
STCLOK2	36,2664	743	2 734 788	STSHOSUM	43,3522	1290	2 290 291	SWITCHES	01,2516	1092	1 1094
STCLOK3	36,2665	743		SUBDIVDE	16,2263	1422	3 1424	SWRETURN	4631	998	10 244 1333
STCTR	20,2544	1487	1 1488	SUBEXIT	E7,1470	140	25 621 726	SWSKIP	01,2577	1094	2 1094
STCTO1	20,2547	1487	1 1489	SUBLIST	0337	= 994	12 991 994	SWSTORE	01,2553	1093	2 1093
STDESIG	25,2602	546	3 511 546	SUBTR	00,3702	1085	1 1086	SWWORD	0130	= 97	2 1092 1093
STDESIG1	25,2616	546		SUFFCHEK	12,3450	1196	3 1195 1196	SXA	01,2364	1087	1 1012
STEER?	31,3432	813	2 798 812	SUHALFA	22,2677	362	1 362	SYNCT4	06,2154	160	1 160
STEERBIT	4741	= 69	3 813 861	SUHALFAP	22,2717	362	1 362	SYSTEST	43,3064	290	1 263
STEERING	36,3666	762	2 732	SUPDACAL	4651	999	2 440 1291	SI	0050	= 93	30 357 1255
STEERSW	0042	= 69	2 771	SUPDXCHZ	5165	1116	6 283 1116	S10BITS	5012	= 1286	2 1288
STERN	31,2470	800		SUPERADR	16,2665	1428	1 1428	S13BITS	43,3240	1286	1 1292
STIKLOAD	01,2206	293	1 293	SUPERBNK	0007	= 93	27 215 1381	S2	0051	= 93	45 322 1255
STIKSENS	E6,1444	130	8 212 1447	SUPERJOB	16,2666	1428	2 1428	S24.9SEC	36,3144	749	1 736
STIKSTR	05,3060	218	1 212	SUPERSW	4727	1001	3 1364 1383	S30.1	34,2000	616	1 614
STILBADH	E7,1674	= 150	4 150 895	SUPERO11	4773	1096	3 857 1311	S32.1F1	0132	= 75	4 632 641
STILBADV	E7,1675	= 150	4 150 895	SUPERIOO	4745	= 1096		S32.1F2	0133	= 75	4 632 641
STILLRCS	17,2661	1452	3 1446 1452	SUPERIO1	4775	1096	1 1099	S32.1F3A	0134	= 75	8 633 641
STAIN-	20,3527	1501	2 1505	SUPER110	4776	1096	3 598 1099	S32.1F3B	0135	= 75	8 633 641
STMP	0020	= 987	7 986	SUPRCOON	43,3237	1286	1 1292	S32/33.X	34,3120	646	2 630 645
STOPCLOK	36,3013	746	3 745	SURFASAN	07,2645	261	1 261	S32/33.1	34,3100	645	2 623 628
STOPRATE	20,2165	1403	9 288 1409	SURFDISP	15,3161	972	2 971 974	S32BIT1	4735	= 75	
STORANG	27,2046	481	1 481	SURFEND	07,2641	261	1 261	S32BIT2	4736	= 75	
STORBNDS	12,2140	1175	1 1178	SURFFBIT	4744	= 79	8 213 860	S32BIT3A	4737	= 75	
STORDELT	35,3235	670	2 669 670	SURFFLAG	0177	= 79	16 236 1212	S32BIT3B	4740	= 75	
STORE	6422	1016	6 1015	SURFJOB	07,2604	260	1 258	S33/34.1	35,2764	667	2 627 662
STORE.1	6414	1016	1 1015	SURFLINE	15,3101	971	2 970 981	S34/35.1	35,3274	672	4 666 729
STORE.2	6417	1015	1 1015	SURFREJ	07,2507	257	1 257	S34/35.2	35,3306	673	2 663 666
STOREMAX	12,2077	1175	3 1174 1175	SURFSTAR	15,2000	250	1 253	S34/35.3	35,3377	675	1 679

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
S34/35.4	35,3442	676	1 679	TASKOVER	5261	1129	81 165 1378	TDISP	15,3350	975	1 975
S34/35.5	35,3522	578	2 663 666	TAT	0014	= 1247	16 207 1224	TDISPSET	31,3704	= 825	2 804 808
S3435.23	35,3325	673	1 673	TAU.	E4,1473	= 114	13 114 1233	TDPOS	E5,1756	= 126	1 126
S3435.25	35,3327	673	1 727	TAUROD	E5,1540	= 122	2 122 818	TDVEL	E5,1764	= 126	1 126
S40.1	27,2246	765	2 754 756	TAUVERT	E5,1516	= 121	2 121 815	TEMK	1076	103	10 1102
S40.18	27,2336	766	1 765	TBASE1	1053	102	4 736 1304	TEMP	E5,1441	= 127	
S40.13	27,2540	773	2 240 737	TBASE2	1055	102	6 474 1220	TEMPADD	E5,1440	= 127	
S40.13D	27,2626	774	2 773 774	TBASE3	1057	102		TEMPBB	0064	= 1300	1 1299
S40.13DV	27,2653	775	1 775	TBASE4	1061	102	4 232 744	TEMPBBCN	0073	= 1300	6 1299 1302
S40.131	27,2610	774	1 774	TBASE5	1063	102	1 859	TEMPFLSH	0374	100	3 228 1364
S40.132	27,2616	774	2 774 775	TBASE6	1065	102	1 744	TEMPC	0061	= 1300	8 1299 1302
S40.132*	27,2620	774	1 775	TBUILDFX	4767	1096	1 1510	TEMPC2	0071	= 1300	3 1298 1301
S40.133	27,2647	775		TBUP	E4,1670	= 119	14 119 849	TEMPNM	0063	= 1300	3 1299 1302
S40.134	27,2650	775	2 774 775	TL	E3,1550	= 110	10 110 1240	TEMPNUM	E6,1742	= 131	2 1440
S40.136	27,2006	38	1 774	TCALARM2	43,3264	1286		TEMPOK	06,2525	171	2 171
S40.136	27,2010	38	1 775	TCOSM	E3,1622	111		TEMPOR2	0160	= 1372	10 1356 1366
S40.137	27,2641	775		TC DANZIG	27,3753	= 1282	5 565 1277	TEMPP	0062	= 1300	6 1299 1302
S40.138	27,2661	775	1 775	TCOH	E3,1776	112	11 194 644	TEMPPHS	0154	= 1308	9 1303 1308
S40.2,3	27,2413	769	2 754 755	TCFINDVC	4354	461	1 448	TEMPPR	0070	= 1300	2 1299 1302
S40.8	27,2447	771	1 761	TCGETCAD	00,3761	1377	1 1378	TEMPP2	0072	= 1300	5 1298 1301
S40.9	27,2707	776	1 761	TCGFAPPR	E5,1470	= 121	2 121 825	TEMPR6C	1164	104	7 473 842
S41.1	27,3267	784	4 756 759	TCGFBRK	E5,1434	= 121	2 121 810	TEMPSW	0065	= 1300	8 1298 1301
S50	14,2506	= 935		TCGIAPPR	E5,1471	= 121	1 121	TEMPSWCH	0157	= 1308	3 1303 1308
S52.2	14,3617	953	2 920 947	TCGIBRAK	E5,1435	= 121	2 121 810	TEMPSW2	0066	= 1300	4 1298 1301
S52.2.1	14,3637	953		TCLEM	E3,1674	111		TEMPTIME	E5,1430	= 127	3 127 380
S52.2A	14,3630	953	1 953	TCNOVAC	4351	461	1 448	TEMPVAR	E5,1667	= 126	3 1150 1151
S52.3	14,3650	954	1 920	TCP	E6,1445	130	3 1422 1435	TEMP2G	0155	= 1308	9 1303 1308
S8BITS	4357	= 1286	1 1293	TCPIN	43,3202	298	1 298	TEMP31	E6,1737	= 130	6 1444 1445
T	0036	= 1202	13 494 1196	TCPIHAD	43,3205	298	1 297	TEMX	1254	= 105	8 105 871
T(X)	27,3735	1232	2 1279 1280	TCQ	6742	= 1294	4 264 525	TEMY	1255	= 105	5 105 871
T-OTHER	E3,1579	= 111	1 194	TCQBK00	00,3455	1080	1 1080	TEMZ	1256	= 105	7 105 871
T/2SEC	15,2770	966	1 965	TCQDOW	30,3475	918	1 924	TEM1	0141	97	34 97 1365
TABLNTH	06,2037	157	1 157	TCOR	E6,1457	130	3 1422 1448	TEM2	0142	97	34 97 1399
TABLTTF	E7,1562	= 149	7 149 827	TCST	E7,1633	142	12 194 644	TEM3	0143	97	19 97 1260
TABLTTFL	31,3746	827	1 807	TCSLEEP	00,3772	1378	1 1377	TEM4	0144	97	11 97 922
TAD	7071	1030	1 1011	TCSUBTR	00,3734	1086	1 1084	TEM5	0145	97	6 97 921
TAGSUB	01,2441	1039	4 1087 1088	TCISKUVR	4353	461	1 751	TEN	4363	= 1099	10 208 1431
TALIGN	E5,1774	= 124	9 124 976	TENAIT	4352	461	1 448	TENDAPPR	E7,1424	139	
TANG	1107	103	34 103 603	TDEC	1115	104	9 104 1243	TENDBRAK	E7,1423	138	2 139 811
TANGS	E7,1752	= 146	9 146 606	TDECAY	E7,1740	= 143	1 771	TENSEC	24,3115	511	1 510
TARGET08	E6,1476	= 130	4 1435 1448	TDECAYFX	4770	1096		TEPHEN	E3,1706	111	10 112 1395
TARGETV	12,3541	1197	1 1197	TDEC1	0040	= 1247	62 207 1243	TERMASC	30,3007	854	2 853 854
TARGETDEX	31,2452	799	2 810 825	TDEC2	E7,1573	= 141	3 622 697	TERMATE	10,3372	1370	1 1368
TARGETINE	E4,1706	= 117	2 726 729	TDELTAV	E3,1520	= 110	13 110 1242	TERMEXTV	5472	= 263	4 268 273
				TDESIRE	E5,1670	= 125	5 125 1196	TEPMNVEC	12,3630	1199	1 1199

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
TERBITMP	0157	=	98 3 1264	TGD	E7,1516	=	147 38 147 853	TIMDELT	13,3673		1225 4 1223 1224
TERW40	36,3256		755 3 754 755	TGOCALC	27,2464		771	TIMEDIOL	04,3567		1392 2 1392 1395
TERFLAMB	E5,1757	=	125 2 1195 1196	TGOCOMP	32,3737		836 2 833 835	TIMEDIOR	04,3601		1393 1 243
TEST	01,2565		1094 1 1094	TGOFENOW	21,3413		1480 3 1479 1480	TIMEGNBL	21,3330		1478 2 1450 1491
TESTBIT	40,3527		457 3 457	TGDI	E7,1501	=	835 2 835	TIMEHOLD	1105		103 7 553 606
TESTCOS	32,2672		602	THDUMP	31,2367		796	TIMEINC	13,3645		1224 1 1225
TESTLODX	31,3664		825 1 825	THETA	0024	=	124 11 946 1251	TIMEOVFL	12,2311		1178 1 1176
TESTLOCP	13,3257		1213 6 1216 1244	THETACON	27,2411		767 1 765	TIMEP	0030	=	987 3 985 986
TESTNN	41,2046		407 1 439	THETAD	0321		99 22 99 1313	TIMER	E5,1470	=	127
TESTOFUF	40,3174		434 4 431 441	THETAV	E5,1452	=	128 1 128	TIMERAD	12,3547		1198 1 622
TESTVB	41,2041		407	THIRD	35,3735		684 1 669	TIMESTEP	11,3252		1237 4 1219
TESTXACT	43,2076		263 19 268 1388	THIRTEEN	4761	=	1073 2 1070 1402	TIMETEST	01,3574		1304 1 1307
TESTY	35,3032		667 1 667	THISAXIS	23,2513	=	37 1 37	TIMETHET	12,2732		1186 6 494 729
TEST3979	34,3447		727 1 726	THISPREC	13,3057	=	37 2 701 715	TIMEX	35,3271		670 2 668 670
TFT	E3,1516	=	110 32 110 1239	THISSHIP	22,3356		715 1 714	TIME1	0025	=	92 21 165 1369
TETCSM	E3,1570		111 5 111 1395	THISTPIP	E7,1761	=	151 6 151 818	TIME2	0024	=	92 39 194 1397
TETLEM	E3,1642		111 4 111 1395	THISVINT	13,2066		237 1 1224	TIME2SAV	0314		99 4 99 1337
TETOTHER	E3,1570	=	111	THRDCHK	34,2656		640 2 639	TIME3	0026	=	92 4 219 1128
TETTHIS	E3,1642	=	111 1 710	THREE	6245	=	1099 45 233 1458	TIME4	0027	=	92 4 157 219
TFFENT	1344		107 6 194 831	THREE78	12,3747		1246 1 1232	TIME5	0030	=	92 6 219 1421
TFF	E4,1540	=	115 11 115 721	THREEDEG	32,2545		571 1 571	TIME6	0031	=	92 7 1404 1457
TFF/RTMU	0036	=	1268 6 714 1279	THRESH1	36,2020		40 1 753	TIMQGBL	21,3336		1479 1 1480
TFFALFA	0032	=	1268 6 1272 1279	THRESH2	6000		40 3 758 838	TIMSUBM	0016	=	1148 3 1145
TFFBANK	22,3320		714 1 713	THRESH3	36,2021		40 1 753	TIMSUBO	E3,1706	=	112 1 1145
TFFCALLS	22,3565		720 1 720	THROTLAG	31,2004		40 1 795	TINT	E7,1630	=	144 6 725 726
TFFCONIC	27,3360		1271	THROTTLE	31,2216		793 2 813 819	TINTSCI	E4,1702	=	117 2 725 726
TFFCONMU	27,3361		1271 1 720	THROTJP	32,3746		826 2 834	TITER	E7,1613	=	141 5 667 669
TFFDELO	0012	=	1268 2 1280 1281	THRUST	0055	=	93 5 211 836	TIK	01,2415		1088 1 1012
TFFELL	27,3653		1280 1 1278	TICKTEST	22,3430		716 2 713 716	TJCALC	17,3347		1462 2 1462
TFFEL1	27,3655		1280 1 1273	TICKTFF	22,3420		715 1 715	TJETLAW	17,3252		1461 2 1438 1452
TFFNP	0034	=	1268 6 1271 1280	TICKTPER	22,3410		715	TJETU	E6,1525	=	134 2 1463 1464
TFFQ1	0016	=	1268 5 1277 1280	TIG	E7,1441		139 43 194 976	TJLAW	17,2665		1452 1 1456
TFFRP/RA	27,3427		1274 1 720	TIG-0	36,2403		738 2 241 737	TJLAWADR	17,3113		1456 1 1452
TFFRTALF	0030	=	1268 3 1272 1279	TIG-30	36,2276		736 2 241 735	TJMIN	17,3741		1469 1 1467
TFFSW	0167	=	78 3 1277	TIG-30.1	36,2266		735 1 735	TJP	E6,1524		133 18 133 1470
TFFSWBIT	4753	=	78	TIG-30A	36,2273		736 1 735	TJU	E6,1525	=	133 19 134 1509
TFFTEM	0044	=	1268 13 1277 1281	TIG-35	36,2240		735 3 241 734	TJV	E6,1526	=	133 3 1411 1455
TFFTICK	22,3453		715	TIG-5	36,2352		737 4 240 743	TJZERO	21,3766		1510 2 1510
TFFVSQ	0024	=	1268 1 1271	TIGNOW	36,3241		755 2 741 754	TLAND	E5,1400	=	121 6 121 932
TFFX	0042	=	1268 7 1277 1280	TIGSAVE	E7,1762	=	143 4 761 765	TLIM	06,2514		171 1 162
TFFXTEST	27,3561		1278 1 1278	TIGSAVEP	E7,1764	=	143 2 761	TLOAD	6470		1019 3 357 1099
TFFZEROS	23,2521	=	1283 2 1277 1278	TIGTASK	36,2567		741 1 732	TM	E6,1733	=	135 4 364 367
TFFI/ALF	0026	=	1268 7 1272 1281	TIGTASK1	17,2000		741 1 741	TMANUCHK	22,3064		366
TFFI74	23,2511	=	1283 4 1271 1277	TIMECHK	10,3321		1369 1 1369	TMARK	E5,1432	=	127 4 127 380
TFI	E7,1453	=	139	TIMECHK	22,3075		366 1 366	TMEXITL	05,3704		994

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
TMFAIL2	04,3365	1339	2 1340	TRANSPDS	22,2326	356	1 351	TSSR	00,2025	1047	
TMFI	E6,1703	=	135 9 352 353	TRANSTM	E7,1662	=	148 3 148 495	TSTA3	40,3637	470	1 471
TMIN	34,2111	632	2 641	TRANS4	17,2321	1446	1 1443	TSTART82	E4,1604	=	115 7 339 715
TMINDEX	0336	=	99 7 99 994	TRAPEOP	E6,1430	129	11 129 1425	TSTCON1	41,3656	467	1 467
TMIS	E6,1703	=	135 15 135 351	TRAPEOQ	E6,1431	=	129 6 1411 1426	TSTCON2	41,3657	468	1 467
TMJDE	6477	1019	1 520	TRAPEOR	E6,1432	=	129 6 1411 1426	TSTCON3	41,3660	468	1 468
TMPTOSPT	33,2440	872	1 861	TREDES	E7,1666	=	150 5 804 826	TSTFBANK	27,2232	751	1 751
TMRLSUME	05,3706	994		TREDESCL	31,3751	827	1 826	TSTFDRDP	41,2466	415	1 414
TNEWA	E7,1431	138	2 761	TRG*NBSM	23,3664	1262	5 250 968	TSTLTS1	41,3631	467	1 467
TNONTEST	06,2227	163	1 161	TRG*SMNB	23,3651	1262	2 571 896	TSTLTS2	41,3662	468	1 467
TNUV	E3,1526	=	110 12 110 1242	TRIG1	23,3333	1251	1 1251	TSTLTS3	41,3667	468	1 468
TOBALL	26,2136	473	1 473	TRIG2	23,3344	1251	1 1251	TSTLTS4	40,3471	450	1 468
TOBALLA	26,2140	473	2 474	TRIMACCL	31,2000	39	1 812	TSTORE	6454	1017	1 1017
TOBALLC	26,2161	474	1 474	TRIMONE	01,2323	295	1 782	TSTPOINT	23,3755	1264	
TOCON2	5417	1299	1 1300	TRIMGIMB	27,3217	781	1 295	TSTRLSRM	13,2575	1139	1 1139
TOF-FF	27,2000	=	33 1 1271	TRIPA	E5,1664	=	126 5 126 1151	TSTRT	E7,1611	=	141 3 283 703
TOF-FF1	27,2000	=	33 2 46 1283	TRKFLCDU	06,3070	185	2 185	TTEMP	E6,1707	=	135 8 365 368
TOFAR	25,3574	566	1 566	TRKFLON	4601	525	2 524 613	TTF/8	E7,1642	=	149 20 149 874
TOOBADF	22,2724	363	1 351	TRKMKCNT	E7,1462	139	11 139 1222	TTF/8CL	31,3061	807	3 798
TOOBADI	22,2742	363	1 352	TRMTRACK	43,3024	287	2 262 593	TTF/8TMP	E7,1552	=	149 5 149 803
TOPSEUDO	17,2524	1448	1 1448	TRMTRAK1	42,2054	287	1 287	TTFDISP	E7,1475	=	147 4 147 825
TORJET1	20,2000	42	2 1490	TRANSPSPD	22,2335	356	1 352	TTFINCP	31,2641	803	4 798 802
TORQCONS	20,3145	1495	1 1495	TRUE360X	12,3172	1191	1 1190	TTFSCALE	4740	=	827
TORQNDX	E5,1440	=	128 8 373 388	TRUNBQ	26,3107	581		TTHROT	E7,1617	=	149 3 149 795
TORQUE	37,2117	374	1 388	TRUNVAR	E4,1411	113	1 582	TTO	E4,1666	=	119 4 119 846
TOTATTER	43,2166	266	1 262	TRYCOUNT	25,3166	555	1 555	TTOAXIS	E6,1742	=	153 10 1464 1467
TPAGREE	7257	1036	19 275 1397	TRYGTS	17,2574	1449	1 1442	TTOGO	E7,1453	139	24 139 852
TPASS4	E7,1630	142	11 144 778	TRYSWN	25,2523	543	1 543	TTPI	E7,1635	142	19 194 670
TPDVL	6610	1021	1 1021	TRYSW	25,2461	542	1 539	TTPIO	E7,1637	142	3 623 628
TPERTICK	22,3460	716	1 716	TRYUORV	16,2753	1429	1 1430	TURNITON	35,3766	748	1 748
TIPI	E7,1624	=	149 5 149 803	TSCALE	32,2174	209	1 208	TURNOFFQ	16,2714	1428	1 1428
TIPIOLD	E7,1577	=	149 2 802 803	TSCALINV	4750	=	827 1 825	TURNOFFR	16,2724	1429	1 1428
TPLEFTN	40,3153	433	3 419 433	TSENSE	17,2144	1443	1 1443	TURNON	17,3125	1456	
TPMODE	10,3633	1398	11 576 1191	TSIGHT	E7,1561	=	145 17 258 979	TURNONBT	4753	=	86 1 526
TPREV	E5,1761	=	125 2 1195 1196	TSIGHT1	14,3162	943	1 941	TURNONFL	0302	=	86
TPSL1	4404	462	6 423 433	TSKOVCDR	01,3520	1132	1 1132	TVEC	0032	=	1247 4 1235
TPUSH	00,3272	1077	1 1077	TSL&TCQ	30,3617	921	1 921	TWEEKIT	0050	=	1204 4 1182 1196
TR*CL**P	23,3560	1260	1 1260	TSLC	7616	1044	1 1011	TWELVE	5751	=	1484 1 1481
TRACE1	40,3236	441		TSLCLOOP	00,2201	1052	1 1052	TWIDDLE	5173	1119	26 375 966
TRACE1S	40,3247	441		TSLCTEST	00,2207	1052	1 1052	TWO	4752	=	1099 109 37 1505
TRACKBIT	4747	=	68 14 280 1315	TSLC2	00,2172	1052	1 1044	TWOPI	35,3731	684	5 622 673
TRACKFLG	0031	=	68 6 287 709	TSNEXTP	16,3014	1430	4 1429 1430	TXO	E7,1653	=	152 4 152 851
TRAKFWDV	E7,1703	=	150 2 150 900	TSNEXTS	17,2174	1443		TX789	E7,1471	=	145 3 145 1157
TRAKLATV	E7,1702	=	150 5 150 905	TSNUMBRT	17,2164	1443	1 1446	TYPEP	16,3563	1440	1 1440
TRANSM1	E4,1400	=	117 2 117 386	TSSL	00,2101	1049	3 1047 1056	TYPEPOLY	17,3231	1458	2 1457 1458

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
T1TOT2	E4,1652	116	6 117 641	UNFVLIN	30,3765	925	1 919	UPEND70	04,3723	1395	1 1392
T2A	30,3022	=	855 1 847	UNFVX/2	E6,1667	=	136	UPEND71	04,3632	1393	1 1392
T2TEST	30,2451	846	2 846 853	UNFVY/2	E6,1671	=	136	3 912 913	UPEND72	04,3664	1394 1 1392
T2TOT3	E4,1654	116	5 316 641	UNFVZ/2	E6,1673	=	136	3 912 913	UPEND73	04,3536	1392
T3	30,3024	855	1 847	UNIT	00,3023	1070	3 601 1402	UPENT2	10,3544	1374	4 1363 1368
T3RPTBB	4057	154	1 153	UNIT/R/	E7,1536	=	147 39 147 903	UPERROR	43,3740	1388	1 1388
T3RUPT	01,3407	1128	2 153 154	UNITDV	00,3151	1074	3 1072	UPERRCUT	04,3760	1396	4 1388 1395
T3RUPT2	01,3414	1128	1 1129	UNITGOBL	E7,1520	=	147 2 780 880	UPFLAG	5504	1375	73 266 1392
T4JUMP	06,2116	159	2 158	UNITNORM	04,3154	1188	1 1188	UPFNDVAC	04,3544	1392	1 1391
T4RPTBB	4064	154	1 153	UNITX	23,2517	1100	13 37 1100	UPJOB	04,3551	1392	1 1392
T4RUP	06,2000	=	29 2 155 156	UNITY	23,2515	1100	5 37 896	UPLIM	12,3277	1194	1 1193
T4RJPT	06,2000	155	2 153 154	UNITZ	23,2513	1100	10 37 880	UPLOADNV	04,3516	1391	2 1389 1390
T5ADR	1274	105	5 153 1491	UNKNOWN	0007	=	193	UPLOCBIT	4750	=	78 3 1339
T5TEMP	0061	=	137 1 1419	UNLR/2	0024	=	150	UPLOCKFL	0164	=	78
T6ADR	4055	154	1 153	UNLRB/2	0024	=	150	UPMNSVCD	04,3242	1226	1 1225
T6FURTHA	E6,1470	130	11 1404 1457	UNP36	E4,1614	=	118 3 701	UPNEG	7561	1043	1 1043
T6JOB	17,2033	1404		UNRM	E4,1660	=	117 7 668 677	UPDK	04,3350	1339	
T6JOBCHK	17,2027	1404	2 1404 1405	UNSETR1	10,3360	1369	1 1368	UPOLDMUD	1171	=	104 3 104 1394
T6NEXT	E6,1466	130	12 219 1457	UNSUSPEN	40,3477	450	1 450	UPOUT	04,3711	=	1394 7 1389 1396
=====				UNVEC	E7,1543	=	141 5 647 648	UPOUT4	04,3712	=	1391 3 1390
U=SCAXIS	27,2134	482	1 482	UNWC/2	E6,1661	=	136 10 136 912	UPPART2	04,3401	=	1389 1 1389
UAXDIST	0141	=	1505 2 1502 1503	UNWCLOOP	31,3410	813	1 813	UPPART3	04,3562	=	1392
JAXIS	20,3316	1498		UNWCTEST	30,3523	919	2 913	UPPOS	7551	1043	1 1043
UCSM	E7,1636	=	148 3 148 494	UNX/2	0000	=	136 7 912 919	UPPSV	24,2316	499	2 498 510
JDB1	0135	=	1505 2 1502 1503	UNY/2	0006	=	136 1 913	UPPSV1	24,2336	500	1 500
JDB2	0136	=	1505	UNZ/2	0014	=	136 8 912 913	UPPSV3	24,2370	500	1 500
UDB3	0140	=	1505	UNZ2	06,2313	165	1 166	UPPSV4	24,2351	500	1 501
JDB4	0137	=	1505 2 1502 1503	UPACTOFF	04,3765	1396	2 1395 1396	UPPSV5	24,2333	500	1 500
UPERROR	E6,1751	=	131 3 131 1452	UPBUFF	1174	=	104 29 204 1395	UPRATE	32,3647	834	1 834
UHYP	E7,1717	=	151 7 151 902	UPCOUNT	1173	=	104 5 104 1390	UPRPTBB	4060	=	154 1 153
UHYP	E7,1725	=	151 6 120 903	UPDATBIT	4745	=	67 1 506	UPRPT1	04,3331	1339	
UJETCTR	E6,1770	=	137 4 1412 1509	UPDATCHK	33,3155	884	2 874 875	UPRUPT	04,3317	1339	1 153
ULC	E7,1723	=	145 8 145 585	UPDATEVG	36,3611	761	2 757 762	UPSTORE	04,3520	=	1391 1 1390
JLLAGER	4746	=	88 3 743 1443	UPDATE2	04,2000	=	78 2 1225 1389	UPSVFLAG	E3,1501	=	110 6 110 1226
ULLAGFLG	0314	=	88 2 224 743	JPDATFLG	0027	=	67 15 287 727	UPTEMP	1167	104	12 104 1394
ULLAGOFF	36,2562	740	1 241	UPDATIME	42,2016	275	1 275	UPTTEST	04,3371	1339	2 1339
ULLGNOT	36,2325	736	5 731 736	UPDATNN	41,2320	411	3 439 454	UPTHROT	32,3667	834	
ULLGTASK	36,2346	727	3 239 746	UPDATOFF	43,3061	289	1 263	UPTHROT1	32,3701	834	1 835
ULDS	E4,1710	=	117 6 667 675	UPDATRET	0117	=	93 3 411 412	UPTMFAST	06,2676	178	1 181
JMPAC+	00,3170	1074	2 1074	UPDATVB	41,2340	411	10 404 454	UPVERB	1172	=	104 5 104 1392
UNPAC-	00,3162	1074	2 1074	UPDAT1	41,2345	412	2 411 443	UPVERBSV	1166	104	2 1388 1389
UN	E5,1673	=	125 9 125 1199	UPDNLIST	05,2407	=	193	UPVERIFY	04,3463	1390	3 1390 1391
UNAJUMP	00,2000	1013	1 1010	UPDTCALL	22,3206	368	2 367	UPVRFYNV	04,3517	1391	1 1390
UNFC/2	E6,1653	=	136 19 136 910	UPDTMEND	42,2032	275		UPWAKE	04,3554	1392	
UNFV/2	E6,1667	=	136 5 136 910	UPOTPHAS	4756	=	1391 1 1392	UPI	E4,1660	116	11 117 643

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
JP21	4362	=	1391 1 1390	VACT1	E7.1471	141	4 144 642	VBTERM	40,3450	448	2 409 455
JP70	4755	=	1339 1 1338	VACT2	E7.1513	141	3 636 648	VBSTLTS	41,3613	457	1 409
JP71	4753	=	1389 1 1388	VACT3	E7.1543	141	13 141 697	VBUP	0122	96	71 96 1505
JP72	4752	=	1389 1 1388	VACT4	E7.1565	141	6 142 636	VBZERO	43,2130	265	1 262
JP73	6245	=	1389 1 1388	VACX	E4.1537	=	114 1 114	VB04N12	26,2117	340	1 339
UR	0000	=	489 1 488	VACY	E4.1541	=	114 1 114	VB05N06	15,3651	982	1 976
JRATEDIF	E5.1426	=	130 5 1447 1449	VACZ	E4.1543	=	114 1 114	VB05N09	5006	=	930 3 941 977
JP7	0005	=	489 2 488	VAC1	0401	100		VB06N18	26,2120	340	1 340
JRPV	0016	=	1247 11 1234 1248	VAC1ADRC	05,3353	222	1 221	VB06N98	37,2472	381	1 381
URRECT	E5.1646	=	125 4 125 1179	VAC1USE	0400	100	4 221 1106	VB56CADR	6025	593	1 593
UP1	E5.1721	=	125 11 125 1199	VAC2	0455	100		VB6N5	14,3326	947	1 946
JSEAD0	41,2105	407	1 407	VAC2USE	0454	100	3 221 1106	VB54	43,2700	280	1 262
USECOS	30,3654	922	1 922	VAC3	0531	100		VB67	31,2000	=	34 1 608
JSEJTS	33,2336	862		VAC3USE	0530	100	3 221 1106	VB67A	30,2000	=	34 1 610
USEJETS	33,2375	863	4 862	VAC4	0605	100		VB97DEX	4765	=	745 1 742
USEMAXDT	13,3334	1218	1 1219	VAC4USE	0604	100	3 221 1106	VB99DEX	4760	=	745 1 737
USEPIOS	13,3001	1212	1 1212	VAC5	0651	100	1 1308	VCV	E3.1542	=	110 21 110 1240
USEQRFLG	0304	=	87	VAC5USE	0660	100	3 221 1106	VCVCSM	E3,1614	111	1 578
USEQRJTS	4736	=	87 6 760 1491	VAD	6751	1026	1 1011	VCVLEM	E3,1666	111	2 500 578
JSEPPID	0133	=	1373 3 1359 1369	VALHIS	37,2263	377	1 388	VDB	17,2504	1448	1 1448
USEVF	30,3463	398	1 388	VALTCHK	33,3514	389	3 886 889	VDEF	00,3232	1077	1 1013
USPRCADR	4713	1000	7 601 1260	VAL67	05,2043	52	3 985 986	VDG	E5,1410	=	826 1 809
JT	E7.1672	143	10 143 769	VAPFG	E5.1444	=	121 1 121	VDGVERT	E7,1644	=	150 3 800 818
UTIME	21,3705	1509	1 1508	VAPFG*	E5.1460	=	121 1 121	VDG2TTF	E5.1424	=	826 1 807
JV	0154	=	1506 7 1498 1505	VAPREC	E7.1505	=	141 2 667 670	VD1	4360	461	15 222 1099
UXVECT	E7.1717	=	144 7 144 592	VARADAR	25,2047	491	1 490	VE	E4,1664	=	119 6 119 846
UXVECTPR	0014	=	593 3 590	VARALARM	5744	1384	4 180 1332	VEARTH	E5,1706	=	123 6 123 962
UYVECT	E7.1725	=	144 6 144 592	VARDELAY	5224	1119	11 164 1312	VECAGREE	00,3010	1069	4 1066 1402
JYVCTPR	0022	=	593 2 590	VARIANCE	E5,1706	=	126 12 126 1150	VECAN1	26,2403	483	1 482
UZ	0024	=	1247 2 1234 1235	VATT	0006	=	1247 25 565 1224	VECAN2	26,2405	484	1 482
J1PDS	22,2250	354	1 354	VATT1	0024	=	1247 14 208 806	VECLEAR	27,2045	481	1 481
J2	E5,1711	=	125 5 125 1198	VBA0	33,3665	993	1 892	VECFANG	22,2723	362	2 362
J2PDS	22,2224	354	1 354	VBCARK	43,2171	267	1 262	VECPNT1	27,2032	481	1 518
J3PDS	22,2274	355	1 355	VBFANDIR	41,2146	408	1 408	VECPNT2	27,2035	481	1 481
=====				VBIAS	E5.1630	=	122 3 800 818	VECPNT	27,2040	481	3 340 474
V	E7.1526	=	147 21 147 902	VBPROC	40,3442	448	5 409 456	VECPNT	27,2000	=	33 1 480
V(CSM)	E3.1725	=	120 7 598 882	VBRELDSP	40,3461	450	1 398	VEQTEMP	E6,1725	=	136 4 481 483
V-OTHER	E3.1725	111	5 120 321	VBRESEQ	40,3457	449	1 409	VECSNAG	10,3772	1402	2 209
V/SC	7624	1045	1 1011	VBRFG	E5.1410	=	121 2 121 826	VECSHIFT	23,2416	698	3 634 647
V/SCDV	00,2750	1068	3 1067	VBRFG*	E5.1424	=	121 2 121 826	VECTAB	E4,1531	=	114 10 114 1245
V/SC1	7632	1045	1 1045	VBRQEXEC	41,3466	447	1 409	VECTABND	E4,1574	=	114
V/SC2	00,2654	1063	1 1045	VBRQWAIT	41,3512	448	1 409	VEC1	E5,1722	=	124 7 970 982
VACDSP	10,2657	1361	1 1361	VBSP1LD	41,3006	427	2 425 426	VEC2	E5,1730	=	124 6 970 982
VACFOUND	01,2620	1106	5 1106	VBSP2LD	41,3007	427	2 425 426	VEHUPBIT	4744	=	67
VACSTOR	07,2526	258	1 255	VBSP3LD	41,3010	427	1 425	VEHUPFLG	0026	=	67 13 288 1156

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

J1 J1 DEFINED = DEFINED BY EQUALS J DEFINED BY J1 OR ERASE ANYWHERE MD MULTIPLY DEFINED
 30 BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
VELCHK	25,3231	556	1 556	VINJNDM	23,2455	842	1 839	VPD	0000	=	940
VELCONV	21,2003	42	2 903 904	VINTFBIT	4751	=	71	VPDVL	6573	=	1021
VELDABIT	4745	=	84 2 886 892	VINTFLAG	0071	=	71 27 236 1242	VPPREC	E7,1527	=	141 2 667 670
VELDATA	0255	=	84	VIPRIME	E4,1736	118	9 653 779	VPROJ	7425	1041	1 1011
VELSC	37,3101	389	1 385	VJETCTR	E6,1771	=	137 3 137 1428	VRATEDIF	E6,1427	=	130 3 1448
VELUPDAT	33,3315	386		VLAUN	E5,1510	=	128 5 386 387	VRECT	E3,1510	=	110 11 110 1240
VERB	40,2354	402	1 398	VLAUNS	E5,1462	=	128	VRECTCSM	E3,1562	110	2 841 983
VERBFAN	41,2133	408	7 407 410	VLIGHT	25,3664	613	1 612	VRECTLEM	E3,1634	111	
VERBMASK	4144	=	1372 1 1357	VLITE	4751	=	613 2 613 829	VRIGHT2	00,2242	1054	1 1054
VERBNOUN	E7,1615	141	6 630 730	VLOAD	6505	1019	1 1011	VROTATEX	7420	1040	3 1050 1072
VERBREG	1001	101	20 222 458	VLOAD*	6107	=	1099 1 1018	VROUND	7140	1032	6 1040 1041
VERBSAVE	1041	102	3 407 446	VLOADCOD	4735	=	1099 1 1018	VRTSTART	31,2536	800	1 801
VERBTAB	41,2151	408	1 408	VMAX	E4,1405	113	1 586	VSCALE	32,2201	209	1 208
VERT27	04,2000	=	28 1 224	VMEAS	E7,1652	=	149 4 149 892	VSELECT	E7,1651	=	149 11 149 896
VERT69	43,2037	262	1 262	VMEASCHK	33,3310	886	5 884 890	VSELECT*	0131	=	122 3 388
VERB85	43,3227	298	1 263	VMIN	E5,1570	=	122 3 122 834	VSHRRND	00,2073	1048	4 1050 1086
VERB96	43,3206	298	1 263	VMODE	6521	1019	2 1041 1077	VSHR2	00,2060	1048	1 1048
VERIFBIT	4751	=	78 1 1391	VMONITOR	21,2620	904	1 907	VSQ	00,3245	1077	1 1013
VERIFLAG	0165	=	78	VMOON	E5,1722	=	123 8 123 986	VSQSUB	00,3317	1078	3 1070 1077
VERIFYMK	07,2444	255	1 255	VNI	1226	105	10 195 1221	VSSL	00,2145	1051	3 1050 1056
VERFOR	E6,1752	=	131	VNCON	43,3130	291	1 290	VSSR	00,2127	1050	1 1054
VERTDISP	31,3527	815	1 799	VNDSPCON	40,3316	443	1 443	VSTILBAD	33,3666	893	1 892
VERTDRFT	37,2231	376		VNDSPLY	34,3621	730	4 724 727	VSTORE	6443	1017	
VERTGUID	31,3531	815	3 793 801	VNLDRCDU	43,2260	269	1 269	VSU	6747	1026	1 1011
VERTSKIP	37,2534	383	1 383	VNLDDCDU	43,2225	268	2 268 281	VSUBC	E3,1760	=	112 3 494
VEX	E7,1742	143	3 754 772	VNLDDOT	42,2034	275	1 275	VSUN	E5,1714	=	123 7 123 986
VFAIL	33,3575	890	2 887	VNLDDGYR	43,2357	273	1 273	VTARGET	E5,1702	=	125 4 125 1197
VFLAG	0062	=	70 4 937 940	VNPLANV	15,2562	962	1 961	VTARGETAG	E5,1701	=	125 5 125 1197
VFLAGBIT	4742	=	70	VNPOOH	35,3712	683	16 614 679	VTIG	E7,1647	=	142 8 142 769
VFLSHBIT	4752	=	84 1 829	VN0611	35,2060	621	1 622	VTPRIME	E7,1565	=	142 5 663 727
VFLSHFLG	0262	=	84 2 887 890	VN0641	37,2473	381	1 373	VUPDAT	33,3435	888	1 887
VG	E7,1706	143	6 143 771	VN0655	35,2113	622	1 621	VUPDATED	33,3513	889	
VGAIN*	27,2455	771	1 780	VNI	E7,1552	=	147 7 147 1224	VV/SC	7627	1045	
VGBDDY	E7,1501	=	147 10 147 846	VNI645	35,3606	680	7 623 727	VVARMIN	E3,1775	112	1 578
VGDISP	E7,1663	=	142 5 314 771	VNZ	E7,1656	=	149 4 150	VVEC	E5,1743	=	125 16 125 1200
VGPREV	E7,1700	=	143 8 240 776	VOK	26,2662	578	1 578	VVECT	E7,1706	=	151 16 151 902
VGTIG	E7,1700	=	143 9 143 773	VOK1	26,2723	579	1 579	VVXSC	7404	1040	
VGU	E7,1626	=	149 9 149 815	VOK2	26,2725	579	1 579	VXBEAMN3	E4,1644	=	116 2 116 896
VGVECT	E7,1645	=	152 6 152 846	VONE	E4,1614	=	115 9 705 1271	VXINH	0250	=	83 2 888 891
VHORCOMP	32,3517	819	1 816	VONE*	E4,1567	=	114 3 1271 1277	VXINHBIT	4740	=	83 1 887
VHORIZ	E4,1662	=	119 4 119 819	VOPENED	06,3223	192	1 191	VXM	7337	1038	1 1011
VHY	E7,1704	=	150 4 151 903	VPASS1	E7,1505	141	6 141 642	VXM/MXV	7342	1039	1 1038
VHZ	E7,1705	=	151 4 151 903	VPASS2	E7,1527	141	5 141 647	VXRCM	E7,1703	=	144 3 144 592
VIGN	E5,1472	=	121 2 121 787	VPASS3	E7,1557	141	9 638 729	VXSC	7401	1040	1 1011
VINIT	E4,1730	118	10 652 766	VPASS4	E7,1505	=	144 3 663 727	VXSCAL	33,2016	41	

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
VXV	7460	1042	2 1011 1267	V06N58SR	34.3637	730	1 727	V3	0030	=	940
VYBEAMNB	E4,1636	=	115 3 115 896	V06N59	35.3726	684	1 679	V37	04,2040	=	227 2 298 447
VYSCAL	33,2014	41		V06N60	31,3760	827	1 815	V37BAD	04,2067	227	1 232
VZBEAMNB	E4,1630	=	116 3 116 896	V06N61	36,3146	749	1 745	V37FLAG	0162	=	78 1 864
VZSCAL	33,2012	41	1 886	V06N63	31,3756	827	1 814	V37FLBIT	4746	=	78 3 228 1383
V0	0006	=	940	V06N63*	30,3033	855	1 850	V37KLEAH	05,2652	214	2 230 1383
V00N25	6010	=	209	V06N64	31,3757	827	2 814 815	V37NONO	04,2322	231	1 228
V00N34	4242	=	209	V06N71	07,2625	260		V37N99	04,2037	225	1 225
V01N14	32,2170	209		V06N72PV	24,3134	512	1 511	V37QCAD	04,2364	232	1 231
V01N25	10,3476	1372	2 1360 1362	V06N75	35,2412	631	2 623 628	V37RET	04,2120	228	1 233
V01N46	20,2112	293	1 292	V06N76	30,3034	855	1 839	V37RFTAD	04,2366	233	1 228
V01N70	14,3772	956	1 955	V06N79	15,2464	960	1 959	V37XEQ	04,2350	232	1 232
V01N70*	15,2463	960	1 957	V06N79*	07,2626	260	1 261	V37XEQC	04,2357	232	
V01N71	07,2330	253	1 246	V06N81	35,3727	684	3 614 678	V41K	14,3564	952	1 950
V04N06	10,3502	1372	1 1362	V06N81SR	34,3640	730	1 727	V43K	43,2745	282	1 281
V04N06SR	34,3634	730	1 725	V06N84	13,2336	711	2 709	V47TXACT	43,2367	274	1 262
V04N12X	43,2635	279	1 277	V06N87	14,3773	956	1 956	V50N00	10,3500	1372	1 1367
V04N1272	23,2037	271	1 271	V06N87*	07,2331	253	1 246	V50N00A	32,2171	209	
V05N00M1	10,3515	1372	1 1365	V06N89*	14,2505	933	1 933	V50N16	32,2173	209	1 208
V05N09	5006	1096	6 621 1382	V06N90N	04,3012	702	1 702	V50N25X	43,2636	279	1 277
V06N05	24,2664	507	1 505	V06N92	14,3254	945	1 945	V50N48	01,2336	295	1 295
V06N07	10,3477	1372		V06N93	31,2143	610	1 608	V50PASTE	10,3203	1367	1 1367
V06N11	35,2410	631	1 621	V06N99DS	31,2024	608	1 608	V6N34	24,3665	657	1 655
V06N13	35,2411	631	1 627	V06N9933	31,2051	608	1 608	V6N99PRN	31,2032	608	1 608
V06N16	32,2172	209	2 207	V0647	01,2334	295	1 294	V67	43,3213	298	1 262
V06N16*	04,3011	702	1 701	V1	0014	=	940	V67CALL	31,2007	608	1 298
V06N18	26,2254	475	2 473 474	V1S	E7,1600	=	147 14 147 889	V67CLRF	31,2110	609	1 609
V06N22	5010	1096	4 485 974	V1ST02S	10,3620	1397	4 365 1254	V67FLAG	0160	=	77 3 608 609
V05N33	35,2025	615	2 614 652	V16N20	14,3223	944	1 944	V67FLBIT	4744	=	77
V06N23*	24,2215	499	1 493	V16N40	36,3760	763	1 754	V67SURF	31,2102	609	1 609
V06N33A	30,3035	855	1 838	V16N44	22,3317	714	2 714 717	V67WH	31,2120	609	1 608
V06N33SR	34,3632	730	1 724	V16N45	35,3730	684	1 680	V67XXX	30,2042	610	1 610
V06N34*	15,2170	930	2 928 975	V16N54	37,3407	707	1 703	V70UPDAT	43,3724	1388	1 262
V06N34SR	34,3636	730	1 725	V16N56	40,2076	300	1 299	V71UPDAT	43,3726	1388	1 262
V05N37	35,3723	684	3 622 662	V16N63	14,2445	854	1 853	V72UPDAT	43,3730	1388	1 262
V06N42	35,2026	615	2 614 653	V16N65	43,2633	279	1 278	V73UPDAT	43,3732	1388	4 262 1388
V06N43	24,3664	657	1 657	V16N67	43,2634	279	1 278	V74	43,3045	=	288
V06N43*	31,2215	792	1 791	V16N72	43,2631	279	1 278	V82CALL	22,3242	713	1 283
V06N48	01,2335	295	1 295	V16N78	43,2632	279	1 278	V82CUN	43,2754	283	1 283
V06N49NB	24,2665	507	1 507	V16N80	24,3254	516	1 515	V82EMBIT	4752	=	78
V06N51	42,3767	489	1 489	V16N85B	36,3761	763	4 736 757	V82EMFLG	0166	=	78 7 715 720
V06N55	35,3724	684	2 622 682	V16N85C	30,3017	954	1 854	V82FLAGS	E4,1537	=	115 6 115 716
V06N55SR	34,3633	730	1 724	V1683	36,3762	763	1 759	V82GOFF	22,3247	713	1 713
V06N57SR	34,3635	730	1 725	V2	0022	=	940	V82GOFF1	22,3321	714	1 713
V06N58	35,3725	684	1 663	V2FG	E5,1510	=	121 2 121 815	V82GOFLP	22,3267	713	1 714

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

J1 UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
V82GON	22,3465	717	1 713	WCHVERT	E7,1647	= 150	3 800 815	WSTOR	33,3472	888	3 888
V82GON1	22,3503	717	2 717 718	WDAGAIN	41,3371	= 443	2 443 444	WSURFPOS	E4,1406	113	2 584 609
V82GON2	22,3536	717	1 717	WDCNT	0137	= 97	5 441 444	WSURFVEL	E4,1407	113	2 584 609
V82GON3	22,3541	718	1 718	WDLT	0115	= 96	9 441 444	WTAORT	01,2363	1125	1 1123
V82PERF	43,2746	283	1 263	WEARTH	26,2020	53	1 1146	WTLST2	01,3374	1127	8 1124 1125
V82REDSP	22,3475	717	1 717	WEIGHT/G	1244	= 105	6 765 774	WTLST4	01,3260	1123	1 1127
V82STALL	22,3300	713	1 714	WHATALM	31,2447	799	1 807	WTLST5	01,3310	1124	1 1122
V83CALL	37,3121	703	1 703	WHATDISP	31,2443	799	1 814	WTLICADR	01,3774	1308	3 1304 1307
V83PERF	43,2756	283	1 263	WHATEXIT	31,2441	799	2 811	WTRUN	E4,1403	113	2 585 609
V89CALL	26,2022	339	1 284	WHATGUID	31,2431	798	1 807	WVELSTOR	26,3313	584	1 584
V89CALL1	26,2072	340	1 340	WHATOUT	31,2371	796		WWBIAS	E4,1604	= 115	11 317 610
V89PERF	43,2764	284	1 263	WHCHREAD	E7,1745	= 146	5 314 581	WWPOS	E4,1600	= 115	15 298 610
V89RECL	26,2036	339	1 340	WHEREETO	31,2244	793	1 793	WWVEL	E4,1602	= 115	9 317 610
V90PERF	43,2773	284	1 263	WHICH	E7,1455	139	30 242 862				
V97WOC	10,3541	1373	1 1067	WHICHADR	32,2764	836	1 832	X	0024	= 1202	22 1175 1190
V99FCYC	36,2777	= 745	1 732	WHIMPER	5644	1383	3 865 1384	XACTALM	43,2114	263	1 269
				WHOCARES	E7,1471	= 140	4 486 1361	XACTO	43,2116	264	
	E5,1400	121	34 121 1242	WHOLECON	42,3534	435	3 434 435	XAD	01,2400	1088	1 1012
W.IND	1257	= 107	4 107 584	WIDEDB	20,2151	1408	1 1407	XAD2	01,2403	1088	2 1088
W.INDI	1260	= 107		WITCHONE	10,3205	1367	3 1359 1363	XCHNYLOC	10,3223	1367	1 1363
WAITABIT	36,2563	740	5 731 733	WIXA	1320	106	5 1153 1155	XCHQADD	10,3015	1364	1 1362
WAITADR	0063	= 95	3 1119 1123	WIXB	1321	106	3 1153 1155	XCHSLEEP	10,2764	1363	1 1364
WAITBANK	0062	= 95	1 1122	WLINIT	26,3251	584	2 576 585	XCHTEND	10,3222	1367	3 1359 1362
WAITBB	5220	1119	2 1119 1129	WLOOP	12,3013	1189	1 1189	XCHX	01,2372	1088	1 1012
WAITEXIT	0061	= 95	7 1119 1377	WLSRFPOS	26,3274	584	1 584	XCOMMON	12,3066	1190	1 1192
WAITLIST	5203	1119	46 164 1324	WLSRFVEL	26,3311	584	1 584	XDC	E5,1664	= 122	12 122 1256
WAITHASK	10,2760	1363	1 1363	WM	E4,1724	= 120	5 120 883	XDELBVIT	4744	= 69	
WAITPOOH	01,3523	1132	1 1122	WMATEND	11,3671	1243	1 1241	XDELVFLG	0045	= 69	8 615 771
WAITTEMP	0064	= 95	3 1127	WMATRXNG	43,3073	290	1 263	XDIFF	12,2163	1176	
WAIT2	01,3231	1122	2 1119	WORKTIME	16,2624	1427	1 1427	XDSPBIT	4753	= 73	2 1340 1354
WAKECAD	00,3773	1378	1 1377	WTEST	05,3763	997	1 991	XDSPFLAG	0112	= 73	1 207
WAKECADE	10,3510	1373	3 1363 1364	WZERO	05,3605	992	2 992 997	XI	0030	= 1202	7 1176 1195
WAKEPLAY	10,3024	1364	1 1363	WOL	05,3512	991	1 997	XKEP	E3,1552	= 110	3 125 1240
WAKE	00,3765	1377	1 1373	WPLATI	E5,1560	= 128		XKEPCSM	E3,1624	111	
WAKESTAL	13,3465	1223	2 1220	WPLATO	E5,1464	= 128		XKEPLEM	E3,1676	111	
WAKESTEST	01,3044	1111	1 1111	WPOSTORE	26,3276	584	1 584	XKEPNEW	E4,1527	= 114	3 114 1223
WANGI	E5,1436	= 128	1 374	WRDRET	0115	= 96		XMAX	0012	= 1202	9 1175 1178
WANGP	E5,1434	= 128	1 374	WRENDPOS	E4,1400	113	3 117 609	XMIN	0014	= 1202	6 1175 1178
WANGT	E5,1440	= 128	1 128	WRENDVEL	E4,1401	113	2 584 609	XMKRUPT	07,2416	255	1 255
WANTAPS	36,2322	736	1 732	WRITEP	5754	1404	6 1404 1455	XNB	E5,1664	= 123	12 373 1397
WBANK	26,3331	585	1 584	WRITEU	5760	1405	1 1455	XNBADR	37,2476	381	1 373
WCALC	22,2746	364		WRITEV	5771	1405	1 1455	XNBECADR	10,2035	1265	1 1265
WCENTRAL	E5,1743	= 132	2 1473 1474	WRTDESIR	15,3105	971	1 971	XNBPIP	E4,1545	= 114	11 114 913
WCHPHASE	1351	102	14 739 825	WSHAFT	E4,1402	113	2 585 609	XNBPIPAD	33,2414	863	1 861
WCHPHOLD	E7,1621	= 149	7 149 814	WSIZE	26,3437	586	1 584	XORCHK	33,2710	878	1 874

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED	= DEFINED BY EQUALS	J DEFINED BY JOKER OR ERASE ANYWHERE	MD MULTIPLY DEFINED
BD BADLY DEFINED	CD DEFINITION ASSOCIATED WITH CONFLICT	XX MISCELLANEOUS TROUBLE	

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
XOFFLBIT	4743	=	84 1 874	YSCI	E5,1714	=	123 1 124	ZONE1	17,3562	1466	2 1463 1466
XORFLG	0253	=	84 1 873	YSCREF	E7,1614	=	147 1 769	ZONE2	17,3553	1466	
XDVINFLG	0311	=	87 7 224 878	YSM	E5,1650	=	122 4 122 1253	ZONE2,3	17,3547	1466	1 1463
XDVINHIB	4743	=	87 2 910 1430	YSMD	E7,1614	=	147 6 147 983	ZONE3	17,3555	1466	1 1466
XPREV	E3,1552	=	125 2 1176 1179	YSZERO	07,2177		251 1 251	ZONE3LIM	E6,1556	=	134 1 1466
XRANGE	E7,1642	=	152 5 152 839	YUNIT	12,2002		1101 2 37 968	ZONE3MAX	20,3762	1506	1 1497
XREG	1003		101 5 305 429	YV	1126	=	104 11 104 1243	ZONE4	17,3374	1463	
XREGLP	1006		101 3 401 429	YZCHK	07,2171		251 1 250	ZONE4,5	17,3363	1462	
XROT	26,2366		483 1 483	=====	=====		=====	ZONE5	17,3426	1463	1 1463
XSCI	E5,1706	=	123 1 123	Z	0005	=	92 24 304 1383	ZONE1,2,3	17,3542	1465	1 1462
XSCREF	E7,1606	=	147 3 769	ZACCDOT	20,2751		1490 1 1490	ZOOM	17,2022	=	742 2 240 742
XSM	E5,1642	=	122 24 112 1253	ZAPTJ	21,3667		1509 1 1509	ZOOMTIME	E7,1422		158 5 240 812
XSMADR	37,2477		381	ZATTEROR	20,2153		1408 13 285 1448	ZPRIME	0026	=	124 7 1249 1250
XSMO	E7,1606	=	147 15 147 983	ZAXIS1	E7,1725	=	120 6 840 851	ZREG	1005	101	3 407 435
XSQC(XI)	0034	=	1202 5 1178 1184	ZDATA2	21,2270		899 1 907	ZREGLP	1010	101	2 101 435
XSTORE	01,2346		1087 3 1087	ZDC	E5,1700	=	122 5 123 1256	ZRUPT	0015	=	92 2 1428 1458
XSU	01,2411		1088 1 1012	ZDOT	E4,1712	=	120 3 120 845	ZSCI	E5,1714	=	124
XTRANS	17,3063		1455 3 1445 1453	ZDOTD	E4,1676	=	119 6 119 845	ZSCREF	E7,1622	=	148 1 769
XUNIT	12,2004		1101 8 37 1136	ZERDUMMY	E7,1646	=	149 2 149 150	ZSM	E5,1656	=	122 2 122 1253
XXXALT	E7,1670		142 4 142 695	ZERELINA	1264	=	105 4 106 821	ZSMD	E7,1622	=	147 5 148 983
XYMARK	E7,1551	=	145 18 145 957	ZERO	4755		1095 320 157 1510	ZSPCR	15,2413		959 1 958
XI	0046	=	93 70 252 1400	ZERO/SP	23,2521	=	593 1 566	ZUNIT	12,2000		1101 5 37 1237
XIINPUT	E7,1611	=	142	ZEROANS	00,3376		1079 2 1079	ZV	1134	=	104 8 1238 1243
X2	0047	=	93 29 487 1272	ZERODATA	21,3050		907 1 900	ZITEM	0131	=	1505 4 1501 1502
X789	E3,1700		111 5 196 1157	ZERODP	12,2006	=	1101	Z123	23,2543		1149 1 1150
=====	=====		=====	ZERODENBL	16,3205		1434 2 1434	Z123COMP	17,3526		1465 3 1463 1465
Y	E4,1734	=	120 6 120 854	ZEROHIGH	21,3454		1481 1 1481	ZITEM	0152	=	1506 1 1497
YAW	E4,1762	=	120 3 120 840	ZEROICDU	5457		1309 4 165 1311	ZITEM	0132	=	1505 4 1500 1501
YAWANG	E4,1602	=	118 2 487 488	ZEROING	37,2367		379 2 373 383	=====	=====		=====
YAWJUN	30,2232		840 1 840	ZEROING1	37,2371		379 1 379	0.35356	20,3100	1494	2 1488 1489
YCD	E7,1632	=	152 6 152 848	ZEROLEUP	21,3616		1483 2 1483	OEBANK	43,3341		1288
YCDP	27,3312		854 3 834 845	ZEROLSTY	21,3024		906 7 905 906	003140CT	5774	1405	4 1405 1444
YCDNS	E4,1746	=	120 3 120 849	ZERONDX	E5,1571	=	128 11 373 383	06SEC	23,2276	520	1 519
YDC	E5,1672	=	122 5 122 1256	ZEROO	23,2521	=	1157	074000CT	16,3613	1441	1 1429
YDOT	E4,1710	=	120 5 120 848	ZEROOT	21,3451		1481 2 1481	=====	=====		=====
YDOTD	E4,1674	=	119 3 119 845	ZEROPLUS	20,3014		1492 1 1492	1.2SPOT	01,2016	239	4 239 243
YDIM	E5,1572	=	122 2 122 854	ZEROTJ	17,2571		1449	1.3SPOT	01,2024	239	1 239
YMKRUPT	07,2422		255 1 254	ZEROVEC	12,2006		1101 14 37 1246	1.5SECS	26,3714	593	1 589
YNR	E5,1672	=	123 6 374 1253	ZEROVECS	23,2521		1100 19 37 1157	1.95SECS	33,3143	883	
YNBPIP	E4,1553	=	114 4 114 852	ZI	E5,1642	=	126 25 126 1158	1-CSTH	E5,1733	=	125 4 125 1194
YNBSAV	E4,1636	=	116 4 116 981	ZIXA	1322		106 4 1153 1155	1/.03	4733	=	1506 3 1498 1500
YOK	32,3661		834 1 834	ZIXB	1323		106 4 1153 1155	1/ACCFIX	06,3236	192	1 191
YRATE	E4,1752	=	120 5 120 849	ZNB	E5,1700	=	123 6 374 1253	1/ACCTJOB	20,2454	1486	2 192 1407
YREG	1004		101 3 426 434	ZNBPIP	E4,1561	=	114 1 913	1/ACCTNT	20,3231	1497	2 1489 1491
YREGLP	1007		101 2 101 434	ZNB SAV	E4,1644	=	116 979 981	1/ACCRET	20,2671	1504	2 1491 1503

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF. # OF REFS. PAGE OF FIRST REF. PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
1/ACCS	20,2457	1486	2 863 1486	10VSQRT2	42,3770	489	2 487	2.17SPOT	01,2051	240	
1/ACCSET	20,2447	1486	1 1411	1REV	12,2073	1174	1 1174	2.2SPOT	01,2016	= 239	1 239
1/ACDAST	E6,1573	= 134	1 1462	1SEC	4777	1096	17 270 901	2.21SPOT	01,2054	240	
1/ACDSTP	E6,1553	= 1505	2 1498	1SEC+1	43,2640	279	2 276 278	2.3SPOT	01,2027	239	1 239
1/ACDSTT	0127	= 1505	5 1499 1504	1SECX	4777	= 381		2.5SPOT	01,2032	240	
1/ANET	0160	= 1506	7 1500 1504	1SECXT	E5,1572	= 123	2 383 384	2.7SPOT	01,2035	240	
1/ANET-	20,3712	1504	1 1501	1SEC2D	27,2675	775	1 774	2.7SPT	04,2132	228	1 228
1/ANETP	E6,1551	= 1505	5 1435 1498	1STAR	15,3047	970	2 970 982	2/3	12,3773	= 1246	1 1234
1/ANET1	E6,1567	= 134	13 134 1503	1STAR2ND	10,3160	1366	1 1366	2BLANK	40,2601	405	6 402 458
1/ANET2	E6,1570	= 134	6 1449 1495	1STOTWDS	16,2256	1422	3 1421 1422	2DZERO	12,2006	= 1137	
1/ATEM1	0123	= 1505	22 1501 1506	1STOZS	10,3614	1397	3 373 959	2EBANK	43,3355	1288	1 1289
1/ATEM2	0124	= 1505	4 1500 1501	1TU2&TCQ	30,3652	922	2 922	2INTOUT	40,2732	420	1 417
1/DV0	E7,1570	= 855	2 843	1TU2SUB	10,3644	1398	6 1397 1398	2J	33,2043	45	1 880
1/DV1	E7,1634	= 152	5 152 843	10,11	21,2042	829	2 829	2J3RE/J2	13,2016	46	2 1215
1/DV2	E7,1636	= 152	5 152 843	10SECS	32,3754	836	1 851	2K	4741	= 1099	3 1006 1111
1/DV2	E7,1640	= 152	5 152 843	100CS	33,3146	= 855	2 848 849	2K+3	4444	464	1 464
1/GY2D	06,3507	333	3 328 335	100MPT	7727	= 155		2KFT/SEC	33,2707	878	1 889
1/HJ	0016	= 1202	4 1174 1193	11DSPIN	40,3404	445	4 403 442	2NDPETRN	22,3117	366	2 366
1/NETMIN	20,3720	1504	2 1501 1505	12DD	23,3246	1157	1 1155	2PHSCHNG	5327	1298	10 492 863
1/PIPA	06,3263	326	3 385 966	12MPT	06,2041	157	1 150	2PI+3	27,3215	780	1 778
1/PIPADT	1075	103	10 165 965	12OMS	5751	= 181		2PI/8	26,3440	587	2 580 582
1/PIPA1	06,3272	326	1 326	13-11,1	41,3726	469	1 468	2PISC	04,3054	1185	2 1175 1192
1/PTMU	0022	= 1202	5 1174 1184	13,14,15	7740	1098	5 282 1419	2RNDEND	40,2173	434	
1/PTMU	27,2030	46		13,7,2	4615	525	1 524	2ROUND	40,3163	434	3 431 433
1/RTMUE	22,2002	44	2 714 717	130DEG	35,3745	684	1 661	2SEC(17)	30,3022	855	1 855
1/RTMUM	22,2000	44	1 717	14,11,9	06,2171	160	1 157	2SEC(18)	33,3146	833	2 845 855
1/WLOOP	12,3151	1191	1 1191	14MS	17,3107	= 1446	6 1445	2SEC(28)	33,3150	883	1 887
1/10	01,2341	295	1 294	1406ALM	31,3735	826	2 799	2SEC(9)	30,3031	855	1 843
1/10S	17,2343	1446		1406PJO	31,3733	826	1 799	2SECS	5000	1096	8 278 1316
1/10SEC	16,3132	1433		15/16	12,3761	1246	1 1234	2STARS	15,3045	970	1 982
1/2DEG	31,3753	827	1 807	15ADRERS	01,2427	1089	7 1087 1091	2VEXHUST	E7,1742	= 772	
1/47	16,2620	1441	4 1433 1425	15BITADR	6252	1009	1 1015	2VISTOZS	10,3635	1393	2 323
1/614	14,3771	956	1 955	1500DEC	24,2666	507	2 499 507	20.5DEGS	25,2572	544	1 544
1/100P	26,2407	484		161CT	30,3577	920	1 920	20J	33,2041	45	1 880
1/1	12,2004	= 1148	1 1113	17T020	43,3643	1292		20MPT	7731	= 159	3 157 160
1DEC70	21,2106	830	1 830	17OMS	4361	= 892	1 892	20SEC	32,2176	209	1 208
1DEC71	21,2107	830	1 830	180DEGS	31,3752	827	1 807	20OMS	16,3616	1441	2 1427
1/222	34,2067	632	2 633 635	180WSS	27,3123	779	1 778	201P04	43,2637	279	1 277
1/2223	34,2071	632	2 633 638	180SETUP	36,3633	751	1 761	21/22KEG	0115	= 96	3 398 470
1JACC	E6,1550	133	11 133 1497	=====	=====	=====	=====	25/32	7716	= 1441	1 1435
1JACCCON	20,3212	1496	1 1495	2.0SPT	04,2130	228		25KFT	33,2677	878	2 850 878
1JACCQ	E6,1531	= 133	6 1471 1495	2.11SPOT	01,2040	240		250DEC	24,2304	499	2 498
1JACCR	E6,1532	= 133	6 1471 1495	2.11SPT	04,2131	228		250MS+1	4766	= 279	1 279
1JACCU	E6,1533	= 133	12 1489 1501	2.13SPOT	01,2043	240		26SECS	36,3757	763	
1JACCV	E6,1534	= 133	1 1489	2.15SPOT	01,2046	240		27TC30	43,3651	1292	

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 3D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
=====				4.27SPOT	01,2131	241		504RM	04,2002	45	1 1139
3.2SPOT	01,2016	=	240 1 239	4.3SPOT	01,2073	241	1 239	504RPR	0000	=	1148 4 1140 1142
3.3SPOT	01,2057		240 1 239	4.31SPOT	01,2134	242		526ALARM	24,2102	496	1 565
3.5SEC	27,2677		775 1 774	4.33SPOT	01,2137	242		54DD	23,3244	1157	1 1153
3.5SPOT	01,2062		240	4.35SPOT	01,2142	242		59.99SEC	42,3542	435	1 435
3/32	12,3757		1246 1 1234	4.37SPOT	01,2145	242		59MIN	42,3541	435	1 434
3/4	12,3763		1246 5 958 1245	4.5SPOT	01,2076	241		=====			
3/47P	22,3655		827 2 807 809	4.7SPOT	01,2101	241		6.2SPOT	01,2016	=	243 1 239
3/5	12,3745		1246 1 1234	4.9SEC	36,3145	749	2 735	6.3SPOT	01,2175		243 1 239
3/64	12,3753		1246 1 1234	4SEC(17)	30,3020	855	2 773 846	6.5SPOT	01,2200		243
3/8DP	22,3653		827 1 807	4SEC(28)	33,3152	883	1 817	6.7SPOT	01,2203		243
3AXISBIT	4746	=	74 2 473 474	4SECS	5008	1096	2 165 795	6DD	25,3245		1157 1 1155
3AXISFLG	0124	=	74 7 229 955	4OCYC	16,3133	1433	1 1435	6FAILTAB	06,3252	=	192 2 191 192
3CSECS	13,3671		1225 1 1224	4OCYCL	17,2342	1446	1 1447	6SEC	27,2703		775 2 775
3J20-2NU	13,2074		46	4OFPS	05,3504	852	1 852	6SEC(18)	30,3026		855 1 843
3SECONDS	26,3711		593 1 518	42DEG	15,2772	967	1 963	6SECONDS	26,3713		593 1 589
3SECS	5002		1096 1 793	49FPS	23,2453	842	1 840	6SECS	25,3545		562 1 561
3SECS	24,2354		573 1 572	=====				60DEC	05,3065		218 1 213
300LGCHK	24,3336		572	5.2SPOT	01,2150	242	1 239	60MIN	35,2421		631 6 623 628
30KFT	33,2705		878	5.3SPOT	01,2164	242	1 239	60MS	17,2316		1446 2 1445
30FDMASK	06,2761		181 1 161	5.4SPOT	01,2156	242		60SUNDS	24,2450		503 1 503
33DEC	4254		456 1 456	5.5DEGS	4562	523	2 523 544	600MS	07,3747		1331 1 1314
33RDMASK	5026	=	181 2 167	5.5SPOT	01,2167	242		600SEC	24,3662		657 1 657
34DEC	4242		455 2 209 455	5.7SPOT	01,2172	242		600SECS	13,2630		1210 2 239 1210
35DEG	15,2773		967 1 963	5/128	12,3771	1246	1 1234	63/64+1	7726		1098
35KCHK	33,2721		878 1 874	5/8	13,3711	1247	7 1212 1247	=====			
360-CDU	40,2625		418 2 418 432	5BLANK	40,2536	404	6 404 457	7.5	33,3144		883 1 887
360-CDUE	40,2634		418 1 418	5BLANK1	40,2557	405		7/12	12,3765		1246 1 1234
360-CDUD	40,2623		418 1 417	5B10	01,2476	1091		70DEC	32,3561		833
360CHECK	12,3122		1191 2 1189	5DEGREES	14,2607	936	2 936 971	77DECML	37,3075		389 1 383
360LAMB	12,3463		1196 1 1193	5DEGTEST	15,3145	971	2 971	77001OCT	05,3064		218 1 212
360SW	0206	=	80 3 1189 1191	5FAILTAB	06,3242	192	2 191 192	799ISP	15,2437		959 2 959
360SWBIT	4753	=	80	5MKALARM	07,2454	256	2 255 261	=====			
3990DEC	37,2471		381 1 376	5SEC	36,3756	763	2 735 737	8192AUG	07,3557		1324 1 1324
=====				5SECDP	36,3755	763	1 734	82DEGS	4563		523 1 523
4.11SPOT	01,2104		241	5SLCS	27,2701	775	2 774	89SECS	27,2705		775 1 775
4.13SPOT	01,2107		241	5OFT	33,2703	878		89TEST	40,2161		399 2 398
4.15SPOT	01,2112		241	5OKFT	33,2701	878		=====			
4.17SPOT	01,2115		241	504A7	0022	=	1148 3 1146	9/16	12,3767		1246 1 1234
4.2SPOT	01,2065		240 1 239	504F	0006	=	1148 5 1144 1145	9.6,4	05,3364		223 1 216
4.21SPOT	01,2120		241	504LM	E4,1412	113	3 1140 1234	90SECS	06,3005		181 2 164
4.23SPOT	01,2123		241	504LPL	0016	=	1148 4 1147	99999CUM	32,3255		739 1 786
4.25SPOT	01,2126		241								

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 2D ONLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE
+AZ	11,356	821	AUTRATE1	4753	= 88	CDUREAD1	E5,1442	= 127	DEG60	15,2471	960
+EL	11,2370	821	AUTRATE2	4752	= 98	CDUSCMD	0054	= 92	DELRSPL	22,3541	= 37
=====			AUTRIFLG	0321	= 88	CDUTIMEF	E5,1436	= 127	DELTEE	E7,1611	= 141
-AZ	11,2351	821	AUTR2FLG	0320	= 88	CDUTIMEI	E5,1434	= 127	DELVMID	E7,1575	= 141
-EL	11,2363	821	AUXFLAG	0147	= 76	CHAN	E5,1443	= 127	DELVTEST	27,2252	765
-LOCKENFG	25,2040	271	AVENDBIT	4753	= 81	CHKBIT10	17,2205	1444	DERCOF+1	0153	= 98
-MUOT1	33,2033	44	AVERAGEG	33,2267	861	CHKLIST	05,3532	992	DERCOF-1	0151	= 98
=====			AVFLBIT	4747	= 69	CHKSAB	14,3261	946	DERCOF-2	0150	= 98
?	6001	= 749	=====			CKIMUSE	5244	1121	DERCOF-3	0147	= 98
=====			BADROPT	31,3656	825	CKMDMUR	43,3740	= 1388	DERCOF-4	0146	= 98
ABORT	5644	= 1384	BOTOK	27,2461	771	CKMIDBIT	43,2666	280	DERCOF-5	0145	= 98
ABVAL	00,3201	1075	BHIZ	01,2452	1090	CL1/NET+	20,3462	1500	DERCOF-6	0144	= 98
ACCKFLG	0317	= 88	BIASTEMP	E6,1711	= 135	CNGL	22,2400	357	DERCOF-7	0143	= 98
ACMDRBIT	4737	= 58	BIGADS	20,3741	1493	CNTCHK	07,2235	252	DERCOF-8	0142	= 98
ACDSBRT	00,3723	1086	BIT14+7	25,2252	475	CNTCHK	43,3466	1289	DESIGFLG	0271	= 85
ADDRESS	6103	1004	BIT4H	30,3030	855	CDARFINE	14,3360	947	DEX2	0144	= 98
ADRS+1	43,3625	1292	BIT8,9	17,3111	1456	COFMAXGO	22,2176	353	DFRNT	40,3364	445
AFCU1C2	31,3214	309	BLANKCHK	10,3132	1366	COGAFBIT	4750	= 80	DGUCD?	32,2741	604
AFDIMP	31,2223	793	BLANKRET	0114	= 96	COMPMAT	13,2237	710	DIDFLAG	0020	= 67
AGSRUFFE	E4,1615	= 117	BNKCHK	42,3716	1293	CONTDES2	26,3576	590	DIMORBIT	4753	= 71
AGSDISPX	32,2022	207	BNKOPTN	43,3315	1287	CONV3	42,3625	487	DMENFBIT	4743	= 74
AGSLIST	05,2407	= 193	BRSPOT1	31,2617	802	CPYCYC2	33,2627	877	DNLRALT	1341	= 107
AGSJPDAT	0001	= 136	BRSPOT2	31,2702	804	CRPFJUND	01,2636	1107	DNLSTADD	0332	= 99
ALCCKK	37,2627	325	BRSPOT3	31,3057	807	COUNTFL	E5,1542	= 127	DUALARM	5155	= 1384
ALCOTTHM	21,3142	1473	BRSPOT4	31,3243	810	CSMDKFLG	0305	= 87	DOALIGN	15,3121	971
ALINTX	26,2067	339	BUSYMSK	10,3527	1372	CS359+	35,2415	631	DOONADR	05,3524	991
ALKCS	37,2632	385	BUTTONS	05,2703	215	CULTRIT	4745	= 71	DUDNCHAN	05,3572	992
ALMNCADR	5734	1384	BIT2-1	4356	= 461	CYCLSHFT	43,3475	1290	DORSAMP2	25,2027	490
ALPHATRY	21,3345	1479	B5TO88	01,2465	1090	CIMP	E6,1723	= 135	DOSHIFT	21,3537	1482
ALRM527	24,2775	510	=====			CIPP	E6,1721	= 135	DSTIXBR	01,2424	1088
ALTROUT	21,2167	898	CADRMARK	0373	100	C2MP	E6,1717	= 135	DPAGREE	7255	1036
ALTSCALE	0272	= 85	CALCOTR	E5,1460	= 127	C2PP	E6,1715	= 135	DPSBURN	E6,1750	= 131
AMENLAY	E4,1400	= 113	CALCTHET	27,2255	765	C2SQM	E6,1713	= 135	DPO	0036	= 940
ANTENFLG	0267	= 85	CALC2BIT	4752	= 70	C2SQP	E6,1711	= 135	DP1	0040	= 940
AORBSFLG	0315	= 88	CALC3BIT	4751	= 70	=====			DSKYFLAG	0113	= 73
AOSV	E5,1544	= 133	CALSAN	15,2540	960	DAPDATA3	01,2300	295	DSPDECNR	40,3262	442
APSESBIT	4747	= 79	CDELFFZ	0016	= 1268	DAPLRUPT	E6,1754	= 137	DSPLV	41,3413	443
ARCIMP	21,2176	898	CDPVE	06,2012	156	DSELFLG	0316	= 83	DUMPCNIC	27,3426	1272
ASCSPOT	23,2503	867	CDUANG	E5,1543	= 127	DUDU	E6,1635	= 136	DUMPRPRA	27,3464	1274
ASECXT	E5,1573	= 128	CDUDANG	E5,1440	= 127	DEC-12	12,2016	1101	DUMPTFF1	27,3547	1278
ASEXT7	23,2000	= 32	CDUFLAG	E5,1461	= 127	DEC-6	12,2015	1101	DUMPTFF2	27,3644	1279
ASTNCLK	32,3204	788	CDUINC	10,3660	1393	DEC17	4764	= 1096	DVCNTSET	33,2323	861
ATOPTHIS	13,2734	= 37	CDULIMIT	E5,1443	= 127	DEC29	4765	= 1096	DVMON	33,2314	861
AUTMANV	26,3165	474	CDUINDX	E5,1536	= 127	DEC50	04,2253	1332	DVMONCON	36,2550	740
AUTMODE	0301	= 85	CDUREAD	E5,1441	= 127	DEGINSE2	40,3021	431	DXCRIT+1	0125	= 98

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

JD	NOT DEFINED	=	DEFINED BY EQUALS	J	DEFINED BY JOKER OR ERASE ANYWHERE	MD	MULTIPLY DEFINED
3D	MULTIPLY DEFINED	CD	DEFINITION ASSOCIATED WITH CONFLICT			XX	MISCELLANEOUS TROUBLE

UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE
D21	E5,1705	= 135	ENTPASHI	41,2012	406	GETROOT	21,3303	1475	INTVEC	E5,1462	= 128
D6DR9BIT	4752	= 71	ERADFBIT	4737	= 67	GET22/32	21,2552	903	INTYPBIT	4750	= 71
=====			ERMINUS	40,3647	470	GLOCKBIT	4736	= 70	INTZ	E5,1474	= 128
E/3KCALL	04,2576	370	ERTTEST	17,3327	1462	GMBLBIT	21,3635	1484	IRIGCOMP	06,3330	328
E/CALL	04,2615	371	ETPIBIT	4745	= 69	GN/CCODE	5001	1096	ISSUP	06,2321	165
E/J33WAK	04,2631	372	EXOVFLOW	31,3441	813	GOAGIN	10,3050	= 1372	ISSWOFF	06,2716	179
E/SWITCH	04,2613	370	EXSPOT1	31,3316	811	GOCLOSE	21,3625	1484	ISWCALL	4700	1000
EARTCNTR	14,2522	935	EXVEPT	31,3435	813	GODSP	10,2443	1357	ITRPNT1	32,3354	817
EIGHT	4750	= 1099	EO	E7,1676	= 145	GODSPR1	10,2452	1357	ITRPNT2	32,3510	819
END-E3	E3,1777	= 112	EO2	E4,1636	= 116	GODSP2	10,2444	1357	ITRO	6370	1014
END-E4	E4,1757	= 119	E1	E7,1700	= 145	GOGOMARK	10,2405	1356	ITR1	6357	1014
END-E5	E5,1774	= 128	E3	E7,1704	= 145	GOMARK2	10,2337	1355	ITR10	6142	1005
END-E6	E6,1771	= 137	=====			GOMARK2R	10,2356	1355	ITR11	6202	1006
END-E7	E7,1777	= 152	FALTOP	4370	461	GOMARKS	10,2331	1355	ITR12	6134	1005
END-E7.0	E7,1745	= 152	FAZA1	23,2775	1154	GOPERFS	10,2705	1362	ITR14	6237	1008
END-E7.1	E7,1747	= 152	FAZB1	23,3073	1155	GOPERFS	10,2625	1360	ITR15	6123	1005
END-E7.2	4000	= 152	FDAIY	E4,1745	118	GOPERF1R	10,2703	1362	ITR7	6261	1009
END-E7.3	E7,1630	= 152	FDAI7	E4,1746	118	GOPERF2	10,2630	1360	ITSWBIT	4735	= 77
END-E7.4	E7,1777	= 152	FFTAG11	4000	= 28	GOSERV	33,2274	861	=====		
END-E7.5	E7,1655	= 152	FFTAG12	4000	= 28	GOXDSP	10,2330	= 1372	JAMPROC	4243	456
END-IN/M	E7,1672	= 142	FFTAG13	4000	= 28	GOXDSPR	10,2350	= 1372	JETSON	17,3402	1463
END-JF	1357	= 108	FICTIME	35,3046	668	GRP4OFF	32,3704	835	JSWCHBIT	4736	= 65
ENDBALL	26,2346	478	FINALBIT	4746	= 69	GTSGO+ON	21,3113	1472	=====		
ENDCHKG	37,2366	379	FINEK2	43,2347	273	GUESS	37,2020	373	KAOS	16,2623	1427
ENDDAPT4	5270	= 189	FIREP	16,3041	1431	GUESSBIT	4752	= 68	KEYCOM	04,3303	1338
ENDMISS	42,3606	= 436	FIREPR	17,2225	1444	GUESS1	37,2255	377	KLEENEX	10,2333	1355
ENDLRH	34,3744	893	FIRSTIME	27,3171	779	GUILDEN	31,2467	800	K1	E6,1703	= 135
ENDMANUV	26,2174	474	FIXCLPAS	40,2402	402	GYTOBETQ	E5,1462	= 127	K2	E6,1711	= 135
ENDMARKS	07,2317	253	FLAGORGY	32,3017	785	G21	E6,1707	= 135	K3	E6,1717	= 135
ENDNVBSY	04,2655	464	FLAPBIT	4744	= 81	=====			K3S1	22,2370	357
ENDPASTE	4143	439	FLASHH?	21,2025	829	ICORR2	43,2214	268	K4	22,2372	357
ENDPINBF	4512	= 465	FLPCBIT	4740	= 80	IDADDTM	0142	= 97	K4SQ	22,2374	357
ENDPINS1	40,3674	= 471	FLPIBIT	4741	= 80	IDAD3TEM	0152	98	=====		
ENDPINS2	41,3731	= 469	FLVRBIT	4736	= 80	IDLERET1	10,3301	1368	LASTLADW	E7,1745	= 151
ENDMODEP	4616	= 525	FRELRET	0144	= 97	IG	E6,1725	= 135	LASTTIME	01,3501	1132
ENDPALL	22,2226	369	FSPASBIT	4742	= 65	IGNALG	32,3031	785	LATAZCHK	37,2021	373
ENDQOSAT	41,2316	411	FUTLNEED	E7,1666	= 150	IGNALGRT	32,3202	788	LATFWDV	21,2562	903
ENDQOCT	40,3415	445	FUNCT3	21,3252	1475	IMMEDRET	10,3367	1370	LEMONM	0056	= 93
ENDSTEER	36,3646	761	=====			IMUBACK	37,2005	373	LOS1	E5,1444	= 127
ENDS4C.9	27,2725	776	GDUMP1	31,3453	813	IMUFIN20	07,3210	= 1331	LOS2	E5,1452	= 127
ENDVPUSH	6540	1020	GENMARK	10,3021	1364	IMUSOD	07,3626	1327	LOTEMIN	0124	= 96
END2DEC	40,3305	442	GEOIMUT1	37,2004	373	IMUZERO3	07,2766	1311	LOUNITX	12,2004	= 37
ENGONFLG	0123	= 74	GEORGEK	37,3111	389	INFINBIT	4745	= 79	LOUNITY	12,2002	= 37
ENTERDAT	07,2073	246	GETSTPT4	37,3025	388	INTFLAG	0227	= 82	LOUNITZ	12,2000	= 37
ENTEROR	17,2416	1447	GETAOSUV	20,3242	1497	INTOTHIS	13,2300	710	LRAITFLG	0276	= 86

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN-UNDEFINED = DEFINED BY EQUALS J-DEFINED BY JOKER OR ERASE ANYWHERE MD-MULTIPLY-DEFINED
 3D-BADLY DEFINED CD-DEFINITION ASSOCIATED WITH CONFLICT XX-MISCELLANEOUS TROUBLE

UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE
LRPDSCHK	25,3220	556	NEGTRKU	E6,1516	= 133	ONEGCALC	26,3610	591	POWFLIT1	23,2000	= 32
LRPDSFL3	0275	= 86	NEGTRKV	E5,1520	= 133	OPTAXIS	07,2142	248	PRESJUMP	5316	1294
LRP24.11	26,3471	589	NEGTRKP	E6,1514	= 132	OPTICN3	1146	104	PRECIBIT	4744	= 71
LRUPT	0011	= 92	NEG100	5172	1116	OPTNBIT	4745	= 69	PRIODFLG	0075	= 72
LRVELBIT	4744	= 86	NEG5	41,2115	408	OPTNREG	E5,1463	= 127	PRI01	4742	= 1099
LRVELFLG	0273	= 86	NETZER7	6121	1005	ORFMANAD	32,3767	327	PRI011	5022	1097
LSTPTR	0144	= 97	NEWIBIT	4737	= 79	ORBWFBIT	4746	= 71	PRI02	4741	= 1099
LJN3BIT	4740	= 70	NJETSBIT	4735	= 67	ORDERBIT	4746	= 79	PRI036	7724	1098
=====			NO.VJETS	E6,1523	= 133	ORIG	E4,1515	= 115	PROCEED	06,2075	158
MANUFBIT	4736	= 77	NOBITS	E5,1442	= 127	ORIGIN	E5,1773	= 126	PRODUCT	21,3525	1482
MANJFLAG	0152	= 77	NOMONLST	05,2172	= 193	OTHSHP	22,3232	714	PROJ	0022	= 150
MANUSTAL	22,3067	365	MORESET	07,2430	1321	OURRCFLG	0306	= 87	PRONVBIT	4745	= 73
MARKFORM	10,2340	1355	NORFINAL	13,3300	1218	OUTGAV	22,3707	= 864	PSKIPADP	16,3623	1441
MASKREG	E5,1534	= 127	NORMSBIT	4742	= 77	OUTLINK	0057	= 93	PSTHIGAT	0251	= 83
MASSMON	33,2233	860	NORMSCL	16,3614	1441	=====			PULSEFLG	0303	= 87
MDJTAP5	36,2010	38	NORMTEST	00,3512	1081	P-RATE	16,2510	1425	PULSEM	14,3230	945
METHOD2	22,2216	354	NRMIDBIT	4737	= 72	PARAM30	35,2017	614	PUTXY	41,2714	426
MGLVFBIT	4752	= 75	NRMIDFLG	0075	= 72	PDA	0026	= 124	PUTXYZ	41,2632	425
MIDAVBIT	4752	= 81	NRMNVBIT	4744	= 72	PERFCHEK	10,3135	1366	P12LMB	30,2122	839
MIDFLBIT	4737	= 65	NRUPTBIT	4750	= 73	PHI	0024	= 520	P20LEMB7	24,2130	496
MIDFLBIT	4751	= 81	NRUPTFLG	0107	= 73	PHSBB1	E3,1437	109	P20LEMF	24,2231	498
MKLVFLAG	0110	= 73	NSTEER	26,1672	762	PHSBB2	E3,1441	109	P20LMT1	24,2241	498
MKVAC	07,2014	244	NTARGBIT	4751	= 76	PHSBB3	E3,1443	109	P20S2	25,2000	= 32
MKV852	07,2620	260	NVSBWAIT	4445	464	PHSBB4	E3,1445	109	P21	E6,1703	= 105
MKV853	07,2617	260	NVSUBCDM	4170	452	PHSBB5	E3,1447	109	P25LEMWT	24,2435	503
MND71	05,3500	832	NWAITBIT	4742	= 72	PHSBB6	E3,1451	109	P30N33	35,2004	614
MNDIT1	41,3232	437	NWAITFLG	0101	= 72	PHSNAME4	E3,1444	109	P39SWBIT	4743	= 79
MOONBIT	4740	= 65	=====			PHSNAME6	E3,1450	109	P41FJET	36,3303	755
MRKIDBIT	4735	= 72	OCT00010	4750	= 232	PHSPRDT5	1064	102	P41MANU	36,3215	754
MRKIDFLG	0074	= 72	OCT02100	06,3131	187	PHSPRDT6	1066	102	P41NORM	36,3312	756
MRUPTBIT	4747	= 73	OCT10000	4737	= 218	PINBRBIT	4746	= 73	P52E	15,2102	928
MRUPTFLG	0106	= 73	OCT11	4320	= 1095	PINTEST	43,2002	= 466	P52V	15,2130	928
MJ(2)	0332	= 1247	OCT1103	5710	1383	PIPASCFY	E3,1455	109	P57A	15,3353	975
MUM	13,2004	46	OCT20	4747	= 749	PIPASCFZ	E3,1457	109	P63IGN1	36,2514	739
MUM(-37)	27,2024	44	OCT203	26,2253	475	PIFUSE	07,3273	1318	P65VEPT	31,3534	815
MUMVG	33,3066	832	OCT217	5714	1383	PLUSX	27,2423	769	P66NOW?	31,2564	801
MWAITBIT	4741	= 72	OCT25	4362	= 1099	PMINM	34,2103	632	P67NOW?	31,2474	800
MWAITFLG	0100	= 72	OCT30000	4355	= 218	PON2	37,2240	376	P70INIT	32,3563	833
MXXYZ	26,2757	579	OCT30002	6471	= 1099	POCH	04,2163	229	P70NOW?	21,2061	830
=====			OCT40200	7735	1098	POSGMBL	37,2064	374	P71	21,2075	830
VBD3	06,3606	334	OCT40420	10,3536	1373	POSITF	15,3743	986	P71NOW?	21,2046	829
VBPISPL	37,2012	373	OCT57777	10,3535	1373	POSTORKV	E6,1517	= 133	=====		
VBINB2	23,2513	= 37	OCT7777	05,3057	218	POSUPDAT	33,3165	884	QUADGUID	31,3121	808
VDCPTST	41,2436	415	SGF	E6,1717	= 135	POS1/4	12,3755	= 1246	QUALITY2	13,3732	1247
VFFOLE11	20,2334	1418	OLDESFLG	0016	= 66	POS2CHK	33,2502	874	QUALITY3	11,3160	1235

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 SD SILENTLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

SYMBOL	DEF	H	PAGE	SYMBOL	DEF	H	PAGE	SYMBOL	DEF	H	PAGE	SYMBOL	DEF	H	PAGE
QUITRIT	4747	=	81	R6ILEM1	23,2137		518	SINB	E5,1646	=	123	TDECAYFX	4770		1096
=====				R6ILEM2	23,2175		518	SLOPEBIT	4751	=	68	TEMP	E5,1441	=	127
RCDUFAL	0274	=	86	=====				SNAPAGN	05,3633		993	TEMPADD	E5,1440	=	127
RCDUOFLG	0266	=	95	S+2	4752	=	1285	SNAPEND	05,3652		994	TENDAPPR	E7,1424		138
RDIFF	E6,1452	=	132	S+3	6245	=	1285	SNGLED	22,2376		357	TESTCOS	32,2672		602
RDM	13,3721		1247	S+4	4751	=	1285	SOLNSBIT	4751	=	75	TESTVB	41,2041		407
RDSP	E5,1434	=	127	S+5	4755	=	1285	SOMEAGS	20,3444		1500	TETOTHER	E3,1570	=	111
RECAL3	40,3575		458	S+6	6242	=	1285	SOMEERR	37,3040		388	TFFCNIC	27,3260		1271
REDKANN	26,2125		473	S-2	7746	=	1286	SOPTION2	43,3323		1287	TFFSWBIT	4753	=	78
REMOOFLG	0265	=	85	S-3	7745	=	1286	SOPTION3	43,3324		1287	TFFTICK	22,3453		716
REPOSMON	0270	=	85	S-4	6112	=	1286	SOPTION4	43,3325		1287	TFI	E7,1453	=	139
RECEXLOC	41,2207		489	SAVE	E5,1464	=	127	SOPTION5	43,3326		1287	TGOCALC	27,2464		771
REPCALC	17,2646		1451	SAVEFLAG	1072	=	1372	SOPTION6	43,3327		1287	THDUMP	31,2367		796
RGLXIT	E7,1665	=	142	SBIT1	4753	=	1285	SOPTION7	43,3330		1287	TICKPER	22,3410		715
RHSCFLG	0313	=	87	SBIT10	4742	=	1285	SOPTION10	43,3331		1287	TIMER	E5,1470	=	127
RLMUNIT	0014	=	593	SBIT13	4737	=	1285	SOUPPLY	37,3071		389	TMANUCHK	22,3064		366
RM	12,2017	=	57	SBIT14	4736	=	1285	SPECSTS	37,2572		384	TMEXITL	05,3704		994
RNSDATA	0260	=	84	SBIT2	4752	=	1285	SPSCODE	4743	=	1309	TMRESUME	05,3706		994
RDD	04,2143		229	SBIT3	4751	=	1285	STARM	0040	=	124	TRACE1	40,3236		441
RDDTPS+1	0127	=	93	SBIT5	4747	=	1285	STARTDAP	16,2046		1411	TRACE15	40,3247		441
RDTFLBIT	4746	=	81	SBIT6	4746	=	1285	STARTMNV	26,2172		474	TRUNBQ	26,3107		581
RPAD1	23,2314	=	1283	SBIT8	4744	=	1285	STARTSIM	05,2452		211	TSNEXTS	17,2174		1443
RPQFLBIT	4735	=	78	SCALBAD	0261	=	84	STARTSTO	6434		1017	TSSR	00,2025		1047
RRCHECK	4576		524	SCLNORM	17,3112		1456	STARTSW	05,2451		211	TSTPOINT	23,3755		1264
RRDATAFL	0277	=	86	SD	22,2366		357	STATEXIT	E4,1516	=	115	TTFSCALE	4740	=	827
RRLOSVEC	1101	=	371	SECAD	22,2027		351	STCLOCK3	36,2665		743	TURNON	17,3125		1456
RNN3BIT	4746	=	66	SEC01	4777	=	763	STDESIG1	25,2516		546	TURNONFL	0302	=	86
RRRSFLAG	0300	=	86	SEC15	36,3750		763	STERN	31,2470		800	T6JOB	17,2033		1404
RSTKLOC	E4,1754	=	119	SEC15DP	36,3747		763	STORHAPD	22,3600		720	=====			
RUPDATED	33,3307		886	SEC30DP	36,3751		763	STORHPR	22,3612		721	UAXIS	20,3316		1498
RUPTSTOR	0063	=	95	SEC45	36,3754		763	STRATGY	14,2714		939	UDB2	0136	=	1505
RVSMBIT	4743	=	77	SEC45DP	36,3753		763	SUPER100	4745	=	1096	UDB3	0140	=	1505
RWAITK	43,2145		265	SELSUPR	40,1900	=	36	S32BIT1	4735	=	75	UNFVX/2	E6,1667	=	136
R21LEM1	24,2733		509	SENSEGET	17,2114		1442	S32BIT2	4736	=	75	UNKNOWN	0007	=	193
R21LEM3	24,2742		509	SETCTR	21,3663		1508	S32BIT3A	4737	=	75	UNLR/2	0024	=	150
R22LEM12	24,2463		504	SETINFL	05,2731		215	S32BIT3B	4740	=	75	UNLRB/2	0024	=	150
R24LEM1	24,3212		515	SETMARK	10,2526		1359	S40.133	27,2647		775	UPONLIST	05,2407	=	193
R29?	33,2547		876	SETPRI1	10,2510		1358	S40.137	27,2641		775	UPDTMEND	42,2032		275
R300K	27,3765		1283	SETXFLAG	07,2667	=	851	S50	14,2506	=	935	UPEND73	04,3536		1392
R51.2	14,3055		941	SFCNST1	E5,1467	=	127	S52.2.1	14,3637		953	UPLOCKFL	0164	=	78
R51F	14,3042		941	SFRET	41,3064		428	=====				UPOK	04,3350		1339
R55.1	14,3231		945	SFRET1	41,3046		428	TBASE3	1057		102	UPPART3	04,3562	=	1392
R6CINIT	32,3176		788	SHAFTBQ	26,3011		580	TCALAM2	43,3264		1286	UPRPT1	04,3331		1339
R6IC+LOC3	23,2133		517	SIGNRET	0125	=	96	TCCSM	E5,1522		111	UPTHROT	32,3667		934
R6IC+L1	23,2264		519	SIM2CADR	05,2454		211	TCLEM	E3,1674		111	UPWAKE	04,3554		1392

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

JM UNDEFINED = DEFINED BY EQUALS J DEFINED BY JUNKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 SD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX-MISCELLANEOUS TROUBLE

UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

SYMBOL	DEF	H	PAGE	SYMBOL	DEF	H	PAGE	SYMBOL	DEF	H	PAGE	SYMBOL	DEF	H	PAGE
USEGTS	33,2336		862	V05N71	07,2625		260	=====				30KFT	33,2705		878
USEDRFLS	0304	=	87	VI	0014	=	940	DEBANK	43,3341		1288	36CSWBIT	4753	=	80
=====				V2	0022	=	940	=====				=====			
VACZ	E4,1543	=	114	V3	0030	=	940	1.95SECS	33,3143		883	4.11SPOT	01,2104		241
VAC1	0401		100	V37XEQC	04,2357		232	1/RTMU	27,2030		46	4.13SPOT	01,2107		241
VAC2	0455		100	V5CNC0A	32,2171		209	1/10S	17,2343		1446	4.15SPOT	01,2112		241
VAC3	0531		100	V67FLBIT	4744	=	77	1/10SEC	16,3132		1433	4.17SPOT	01,2115		241
VAC4	0605		100	V74	43,3045	=	288	1BITDP	26,2407		484	4.21SPOT	01,2120		241
VECTABND	E4,1574	=	114	V82EMBIT	4752	=	78	1SECX	4777	=	381	4.23SPOT	01,2123		241
VEHJPBIT	4744	=	67	=====				100MPUPT	7727	=	155	4.25SPOT	01,2126		241
VELDATA	0255	=	84	W.IND1	1260	=	107	120MS	5751	=	181	4.27SPOT	01,2131		241
VFLUPDAT	33,3315		836	WCALC	22,2746		364	17T020	43,3643		1292	4.31SPOT	01,2134		242
VERIFLAG	0165	=	78	WHATOUT	31,2371		796	=====				4.33SPOT	01,2137		242
VEFFDR	E6,1752	=	171	WPLATI	E5,1560	=	128	2.CSPT	04,2130		228	4.35SPOT	01,2142		242
VELTDRAFT	37,2231		376	WPLATO	E5,1464	=	128	2.11SPOT	01,2040		240	4.37SPOT	01,2145		242
VFLAGBIT	4742	=	70	WRDRET	0115	=	96	2.11SPT	04,2131		228	4.5SPOT	01,2076		241
VINTFBIT	4751	=	71	=====				2.13SPOT	01,2043		240	4.7SPOT	01,2101		241
VLWNS	E5,1462	=	128	XACTO	43,2115		264	2.15SPOT	01,2046		240	=====			
VPD	0000	=	940	XDELVBIT	4744	=	69	2.17SPOT	01,2051		240	5.4SPOT	01,2156		242
VPDVE	6573		1021	XDIFF	12,2163		1176	2.21SPOT	01,2054		240	5.5SPOT	01,2167		242
VRECTLEM	E3,1634		111	XKEPCSM	E3,1624		111	2.5SPOT	01,2032		240	5.7SPOT	01,2172		242
VSTORE	6443		1017	XKEPLEM	E3,1676		111	2.7SPOT	01,2035		240	5BLANK1	40,2557		405
VUPDATED	33,3515		359	XSHADR	37,2477		381	2DZERO	12,2006	=	1137	5810	01,2476		1091
VV/SC	7627		1045	XINPUT	E7,1511	=	142	2PNEND	40,3173		434	50FT	33,2703		878
VVXSC	7404		1040	=====				2VEXHUST	E7,1742	=	772	50KFT	33,2701		878
VXSCAL	33,2016		41	ZERODP	12,2005	=	1101	26SECS	36,3757		763	=====			
VYSCAL	33,2014		41	ZEROO	23,2521	=	1157	27T030	43,3651		1292	6.5SPOT	01,2200		243
VO	0006	=	940	ZEROTJ	17,2571		1449	=====				6.7SPOT	01,2203		243
V00N25	6010	=	209	ZONE2	17,3553		1466	3.5SPOT	01,2062		240	63/64+1	7726		1098
V00N34	4242	=	209	ZONE4	17,3374		1463	3J2262MU	13,2024		46	=====			
V0INI4	32,2170		209	ZONE4,5	17,3363		1462	30DEGCHK	24,3336		572	70DEC	32,3561		833
V05N07	10,3477		1372	ZSCI	E5,1714	=	124								

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED	= DEFINED BY EQUALS	J DEFINED BY JOKER OR ERASE ANYWHERE	MD MULTIPLY DEFINED
SD BADLY DEFINED	CD DEFINITION ASSOCIATED WITH CONFLICT	XX MISCELLANEOUS TROUBLE	

ERASABLE & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
0000	92	A	0010	1143	CVECTR	0016	1274	RPER	0027	67	UPDATFLG	0040	1247	TDEC1
0000	136	UNX/2	0010	1148	DVECTR	0017	67	NJETSFLG	0027	92	TIME4	0040	1268	NRMAG
0000	235	COSTALIN	0010	1148	SINNOOI	0017	92	BRUPT	0030	67	NOUPFLAG	0041	68	LOSCMFLG
0000	489	UR	0010	1202	ALPHA	0020	67	DIDFLAG	0030	92	TIME5	0041	92	PIPAZ
0000	940	VPD	0010	1203	COGAMIN	0020	92	CYR	0030	93	CHAN30	0042	69	STEERSW
0000	1148	504RPR	0010	1204	MIN	0020	124	COSTH	0030	940	V3	0042	92	Q-RHCCTR
0000	1247	RATT	0011	66	RRNBSW	0020	936	CSUN	0030	987	TIMEP	0042	93	LVSQUARE
0001	65	JSWITCH	0011	92	LRUPT	0020	987	STMP	0030	1202	XI	0042	125	RCNORM
0001	92	L	0011	93	OSALHOUT	0020	1202	ROOTMU	0030	1204	CUSF	0042	1148	SOB
0001	93	LCHAN	0012	66	LUKONSW	0020	1268	NRTEPH	0030	1268	TFFRTALF	0042	1202	KEPC1
0001	236	AGSUPDAT	0012	92	QRUPT	0020	1274	RAPU	0031	68	TRACKFLG	0042	1268	TFFX
0002	65	MIDFLAG	0012	93	CHAN12	0021	67	ERADFLAG	0031	92	TIME6	0043	92	P-RHCCTR
0002	92	Q	0012	1202	XMAX	0021	92	SR	0031	93	CHAN31	0044	69	IMPULSW
0002	93	QCHAN	0012	1268	TFFDELO	0022	67	KDDEFLAG	0032	92	CDUX	0044	92	K-RHCCTR
0002	236	RENDEZVU	0013	66	NEEDLFLG	0022	92	CYL	0032	93	CHAN32	0044	93	LV
0003	65	MOONFLAG	0013	92	SAMPTIME	0022	124	SINTH	0032	661	DELELO	0044	1158	NORMZI
0003	92	EBANK	0013	93	CHAN13	0022	150	PROJ	0032	1148	BVECTR	0044	1202	KEPC2
0003	93	HISCALAR	0014	66	FREEFLAG	0022	593	UYVECTR	0032	1202	S(XI)	0044	1268	TFFTEM
0003	236	ORBMANUV	0014	93	CHAN14	0022	936	CMOON	0032	1247	MU(P)	0045	69	XDELVFLG
0004	65	P21FLAG	0014	136	UNZ/2	0022	940	V2	0032	1247	TVEC	0045	92	INLINK
0004	92	FBANK	0014	593	RLMUNIT	0022	1143	504AZ	0032	1268	TFFALFA	0046	69	ETPIFLAG
0004	92	LOSCALAR	0014	593	UXVECTR	0022	1202	1/ROOTMU	0033	68	SLOPESW	0046	69	OPTNSW
0004	236	DESASCNT	0014	940	VI	0022	1247	COSPHI/2	0033	92	CDUY	0046	92	RNRAD
0005	65	FSPASFLG	0014	1202	XMIN	0022	1268	RTERM	0033	93	CHAN33	0046	93	X1
0005	92	Z	0014	1203	DCUGA	0023	92	EDUP	0034	68	GUESSW	0047	69	FINALFLG
0005	93	CHANG	0014	1204	DELINDEP	0024	67	RSIFLAG	0034	92	CDUZ	0047	92	GYRUCMD
0005	236	LUNRSALN	0014	1247	TAT	0024	92	TIME2	0034	93	DNTM1	0047	93	X2
0006	66	P25FLAG	0014	1268	RMAG1	0024	124	THETA	0034	1202	XSQC(XI)	0050	69	AVFLAG
0006	92	BRANK	0015	66	PIOFLAG	0024	150	UNLR/2	0034	1268	TFFNP	0050	92	CDUXCMD
0006	93	CHANG	0015	92	ZRUPT	0024	150	UNLR8/2	0035	92	CDUT	0050	93	S1
0006	136	UNY/2	0015	93	MNKEYIN	0024	520	PHI	0035	93	DNTM2	0050	1148	RPREXIT
0006	489	UPP	0016	66	OLDESFLG	0024	1148	AVECTR	0036	68	DRIFTFLG	0050	1204	TWEEKIT
0006	940	VQ	0016	92	BANKRUPT	0024	1148	MATRIX	0036	92	CDUS	0051	69	PFRATFLG
0006	1148	504F	0016	93	NAVKEYIN	0024	1202	X	0036	940	DPO	0051	92	CDUYCMD
0006	1247	VATT	0016	936	CEARTH	0024	1247	UZ	0036	1202	T	0051	93	S2
0006	1300	BB	0016	939	CSS	0024	1247	VATT1	0036	1204	DEP	0051	1139	SETREX
0007	66	IMUSE	0016	1148	TIMSUBM	0024	1268	TFFVSQ	0036	1268	TFF/RTMU	0051	1148	EARTHMX
0007	93	SUPERONK	0016	1148	504LPL	0025	92	TIME1	0037	68	SRCHOPTM	0052	70	CALCMAN3
0007	193	ERASZERO	0016	1202	1/MU	0026	67	VEHUPFLG	0037	92	PIPAZ	0052	92	CDUZCMD
0007	193	SPARE	0016	1203	COGAMAX	0026	92	TIME3	0040	68	ACMODFLG	0052	93	QPRET
0007	193	UNKNOWN	0016	1204	MAX	0026	124	PDA	0040	92	PIPAY	0053	70	CALCMAN2
0010	66	NOVZFLG	0016	1247	RATT1	0026	124	ZP TIME	0040	124	STARM	0053	92	CDUTCMD
0010	92	ARUPT	0016	1247	URPV	0026	987	GTMP	0040	940	DPI	0054	70	NODOFLAG
0010	93	OUTO	0016	1268	COELF/2	0026	1204	ITERCTR	0040	1148	COB	0054	92	CDUSCMD
0010	1138	GAMRP	0016	1268	TFFQ1	0026	1268	TFFI/ALF	0040	1202	CL	0055	93	TH-UST

ERASABLE & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
0056	70	GLCKFAIL	0070	1300	TEMPPR	0113	73	DSKYFLAG	0124	98	DXCRIT	0140	97	MATING
0056	93	LEADON	0071	71	VINTFLAG	0113	96	LASTXCMD	0124	1505	1/ATEM2	0140	97	MAXDVSW
0057	70	REFSNFLG	0071	95	RUPTREG2	0114	96	BLANKRET	0125	96	MIXTEMP	0140	97	MIXER
0057	93	OUTLINK	0071	1300	TEMPO2	0114	96	DSEXIT	0125	96	SIGNRET	0140	97	POLYCNT
0060	70	LUNAFLAG	0072	71	D6JR9FLG	0114	96	EXITEM	0125	98	DXCRIT+1	0140	98	PWRCNT
0060	93	ALTM	0072	95	RUPTREG3	0114	96	INTBIT5+	0126	75	NORMON	0140	1505	UDB3
0061	70	NOR29FLG	0072	1300	TEMPP2	0114	1506	DBVAL2	0126	98	ROOTPS	0141	76	MUNFLAG
0061	95	EXECTEM1	0073	71	DIMCFLAG	0115	74	STUFFE	0127	75	SPENSW	0141	97	DSREL
0061	95	ITEMP1	0073	95	DSRUPTEM	0115	96	DECRET	0127	98	ROOTPS+1	0141	97	POLYRET
0061	95	WAITEXIT	0073	95	KEYTEMP1	0115	96	INTBIT15	0127	1505	1/ACOSTT	0141	97	TEM1
0061	137	T5TEMP	0073	95	RUPTREG4	0115	96	WDRET	0130	75	MGLVFLAG	0141	98	DERPTR
0061	1300	TEMPPG	0073	1300	TEMPBBCN	0115	96	WRDRET	0130	96	BUF	0141	1505	UAXDIST
0061	1413	COSMG	0074	65	FLAGWRD0	0115	96	21/22REG	0130	97	INDEXLOC	0142	97	DSMAG
0062	70	VFLAG	0074	72	MRKIDFLG	0115	1506	DBVAL3	0130	97	SWWORD	0142	97	IDADDTM
0062	95	EXECTEM2	0074	95	STATE	0116	74	NOTHROT	0130	122	ABVEL*	0142	97	TEM2
0062	95	ITEMP2	0075	66	FLAGWRD1	0116	96	ADDRWD	0130	122	L*WCR*T	0142	98	DERCOF-8
0062	95	WAITBANK	0075	72	PRIDDFLG	0116	1506	DRIFTER	0131	75	RENDWFLG	0142	98	DEXDEX
0062	1300	TEMPP	0076	68	FLAGWRD2	0117	74	R77FLAG	0131	97	SWBIT	0143	76	REDFLAG
0063	70	RO4FLAG	0076	72	NRMIDFLG	0117	96	CHAR	0131	122	H*GHCR*T	0143	97	COUNT
0063	71	READRFLG	0077	70	FLAGWRD3	0117	96	DECOUNT	0131	122	VSELECT*	0143	97	TEM3
0063	95	ITEMP3	0077	72	PDSPFLAG	0117	96	ERCNT	0131	1505	ZITEM	0143	98	DERCOF-7
0063	95	NEWPRIO	0100	71	FLAGWRD4	0117	96	POLISH	0132	75	S32.1F1	0143	98	DEX1
0063	95	RUPTSTOR	0100	72	NWAITFLG	0117	96	UPDATRET	0132	98	RETROOT	0143	98	DEX1
0063	95	WAITADR	0101	72	NWAITFLG	0117	98	PWRPTP	0132	1505	Z5TEM	0143	1505	DBB1
0063	137	DINDX	0101	73	FLAGWRD5	0117	1506	ACCETPN	0133	75	S32.1F2	0144	97	OSPWRRET
0063	1300	TEMPVM	0102	72	MRKNVFLG	0120	74	RHGSCFLG	0133	97	BUF2	0144	97	FREERET
0063	1478	NZACCDOT	0102	75	FLAGWRD6	0120	96	FIXLOC	0134	75	S32.1F3A	0144	97	LSTPTR
0064	71	PRECIFLG	0103	72	NRMNVFLG	0121	74	DMENFLG	0135	75	S32.1F3B	0144	97	RELRET
0064	95	ITEMP4	0103	77	FLAGWRD7	0121	96	OVFIND	0135	97	DMPNTEMP	0144	97	SEPMNRET
0064	95	LOCCTR	0104	72	PRONVFLG	0122	96	DECTEM	0135	97	MPTEMP	0144	97	SEPSCRET
0064	95	WAITTEMP	0104	78	FLAGWRD8	0122	96	DISTEM	0135	1505	UDB1	0144	97	TEM4
0064	1300	TEMP32	0105	72	PINRFLG	0122	96	NDUNTEM	0136	97	DOTINC	0144	98	DERCOF-6
0065	71	CULTFLAG	0105	80	FLAGWRD9	0122	96	SGNON	0136	97	DVSIGN	0144	98	DEX2
0065	95	ITEMP5	0106	73	MRUPTFLG	0122	96	VBUF	0136	97	ENTRET	0144	1505	DBB2
0065	95	NEWLOC	0106	81	RASFLAG	0122	1505	ACCSW	0136	97	ESCAPE	0145	97	NOUNADD
0065	1300	TEMPSW	0106	82	FLGWRD10	0123	74	ENGONFLG	0136	406	ENTEXIT	0145	97	TEM5
0066	71	OR3WFLAG	0107	73	NRUPTFLG	0123	96	HITEMIN	0136	1505	UDB2	0145	98	DERCOF-5
0066	95	ITEMP6	0107	83	FLGWRD11	0123	96	NVTIMP	0137	76	GMBDRVSW	0145	98	PTNSAVER
0066	1300	TEMPSW2	0110	73	MRKOVFLG	0123	96	SFTMP1	0137	97	DJRET	0145	1505	DBB4
0066	1476	CHNL12	0110	85	FLGWRD12	0123	96	SGNOFF	0137	97	DVNORMCT	0146	76	NTARGFLG
0066	1478	QRNDXER	0110	85	RADMODES	0123	1505	1/ATEM1	0137	97	ESCAPE2	0146	97	NNADTEM
0067	71	STATEFLG	0111	86	DAPBOOLS	0124	74	3AXISFLG	0137	97	INREL	0146	98	DERCOF-4
0067	95	NEWJOB	0111	87	FLGWRD13	0124	96	CODE	0137	97	WDCNT	0146	1505	DBB3
0070	71	INTYPFLG	0112	72	XDSPFLAG	0124	96	LCTEMIN	0137	1505	UDB4	0147	76	AUXFLAG
0070	95	RUPTREG1	0112	96	LASTYCMD	0124	96	SFTEMP2	0140	97	DSPMMTEM	0147	97	NNTYPTM

EASABLE & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
0147	98	DERCOF-3	0161	1496	SCRATCHY	0221	81	QUITFLAG	0314	99	R22DISP	0660	100	VAC5USE
0147	1505	AXOSTEM	0161	1506	ARET	0223	81	MIDIFLAG	0314	99	TIME2SAV	0661	100	VAC5
0150	76	ATTFLAG	0162	78	V37FLAG	0224	81	MIDAVFLG	0315	88	ACRBSFLG	0705	1308	GOLOC
0150	97	IDAD1TEM	0162	420	MPAC+6	0225	81	AVEMIDSW	0316	88	DBSELFLG	0734	100	KEYTEMP2
0150	98	DERCOF-2	0162	1377	GENMASK	0227	82	INTFLAG	0316	99	SCALSAVE	0734	100	PUPTAGN
0151	77	ITSWICH	0162	1496	SCRATCHZ	0230	82	APSFLAG	0317	88	ACCOKFLG	0735	100	AOTCODE
0151	97	IDAD2TEM	0162	1506	ABSASUS	0236	82	REINTFLG	0320	88	AUTR2FLG	0735	100	STARCODE
0151	98	DERCOF-1	0163	78	AVEGFLAG	0245	83	LRBYPASS	0320	99	REDGCTR	0736	100	SINCDU
0151	1506	FLATEMP	0163	99	MODE	0250	83	VXINH	0321	88	AUTR1FLG	0736	100	SINCDUY
0152	77	MANUFLAG	0163	1377	USERPRIO	0251	83	PSTHIGAT	0321	99	CPHI	0736	100	STARALGN
0152	98	DERCOFN	0163	1506	SIGNAJS	0252	84	NOLPREAD	0321	99	THETAD	0740	100	SINCDUZ
0152	98	IDAD3TEM	0164	78	UPLDCKFL	0253	84	XORFLG	0322	99	CTHETA	0742	100	SINCDUX
0152	1506	Z3TEM	0164	99	LOC	0254	84	LRINH	0323	99	CPSI	0744	100	COSCDU
0153	77	IGNFLAG	0164	1373	COPINDEX	0255	84	VFLDATA	0324	99	DELV	0744	100	COSCDUY
0153	98	DERCOF+1	0164	1506	-SIGNAOS	0256	84	READER	0324	99	DELVX	0746	100	COSCDUZ
0153	98	RUTMXTEM	0165	78	VERIFLAG	0257	84	READVEL	0326	99	DELVY	0750	100	COSCDUX
0154	77	ASTNFLAG	0165	99	BANKSET	0260	84	RNOCDATA	0330	99	DELVZ	0752	100	-PHASE1
0154	99	MPAC	0165	1372	MPAC2SAV	0261	84	SCALBAD	0332	99	DNLSTADP	0753	101	PHASE1
0154	1308	TEMPPHS	0165	1506	HOLD	0262	84	VFLSHFLG	0332	99	DNLSTCOD	0754	101	-PHASE2
0154	1373	FACEREG	0166	78	V32EMFLG	0263	85	HFLSHFLG	0333	99	DUMPCNT	0755	101	PHASE2
0154	1506	UV	0166	99	PUSHLOC	0264	85	CDSEFLAG	0334	99	LDATALST	0756	101	-PHASE3
0155	77	SWANDISP	0167	78	TEFSW	0265	85	REMOFLG	0334	994	CTLIST	0757	101	PHASE3
0155	1308	TEMP2G	0167	99	PRIORITY	0266	85	RCDOUFLG	0335	99	DNTMGUTO	0760	101	-PHASE4
0155	1373	PLAYTEM1	0170	78	RPOFLAG	0267	85	ANTENFLG	0336	99	DUMPLUC	0761	101	PHASE4
0155	1496	-EPSILON	0172	79	NLWIFLG	0270	85	REPOSMON	0336	99	TMINDEX	0762	101	-PHASE5
0155	1496	EPSILON	0173	37	MOONCTH	0271	85	DESIOFLG	0336	994	DNECADR	0763	101	PHASE5
0156	77	NORMSW	0173	79	CMOINFLG	0272	85	ALTSCALE	0337	99	DNQ	0764	101	-PHASE6
0156	1308	POINTER	0174	37	MOONTHIS	0273	86	LRVELFLG	0337	994	SUBLIST	0765	101	PHASE6
0157	77	WVSW	0174	79	LMOONFLG	0274	86	RCDOFAIL	0340	99	DNTMBUFF	0766	101	COUSPOT
0157	98	TERMITMP	0175	79	FLUNDISP	0275	86	LRPOSFLG	0366	100	RESTREG	0766	101	COUSPOTY
0157	1308	TEMPSWCH	0176	79	P39/79SW	0276	86	LRALTFLG	0367	100	NVWORD	0770	101	COUSPOTZ
0157	1372	COPMPAC	0177	79	SUMFFLAG	0277	86	RCDATAFL	0370	100	MARKNV	0772	101	COUSPOTX
0157	1373	PLAYTEM3	0200	79	INFIFLG	0300	86	RRASEFLG	0371	100	NVSAVE	0774	101	MINDEX
0157	1496	DUCKTEMP	0201	79	ORDERSW	0301	86	AUTOMODE	0372	100	CADRFLSH	0775	101	MMNUMBER
0157	1506	ANET	0202	79	APSESW	0302	86	TURNONFL	0373	100	CADRMARK	0776	101	DSPCNT
0157	1506	FUNTEM	0203	79	COGAFLEG	0303	87	PULSEFLG	0374	100	TEMPFLSH	0777	101	DSPCOUNT
0160	77	V67FLAG	0205	80	INITALGN	0304	87	USEQRFLG	0375	100	FAILREG	1000	101	DECBRNCH
0160	1372	TEMPORZ	0206	80	360SW	0305	87	CSMOKFLG	0400	100	VAC1USE	1001	101	VERBREG
0160	1373	PLAYTEM4	0210	80	FLVR	0306	87	OURRCFLG	0401	100	VAC1	1002	101	NOUNREG
0160	1496	COEFCTR	0212	80	FLPC	0307	87	ACC4-2FL	0454	100	VAC2USE	1003	101	XREG
0160	1496	SCRATCHX	0213	80	FLPI	0310	87	APRSTFLG	0455	100	VAC2	1004	101	YREG
0160	1506	1/ANET	0214	80	FLRCS	0311	87	XOVINFLG	0530	100	VAC3USE	1005	101	ZREG
0161	78	IDLEFLAG	0215	81	LEFTABRT	0312	87	DRIFTDFL	0531	100	VAC3	1006	101	XREGLP
0161	1373	OUTHERE	0216	81	FLAP	0313	87	RHSCFLG	0604	100	VAC4USE	1007	101	HITEMJUT
0161	1496	MASSTF	0220	81	RUTFLAG	0314	88	ULLAGFLG	0605	100	VAC4	1007	101	YREGLP

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
1010	101	LOTEMOUT	1072	1372	SAVFFLAG	1166	104	UPVERBSV	1302	106	IMODES30	1360	108	ERESTORE
1010	101	ZREGLP	1073	103	MARK2PAC	1167	104	ESUFZ	1303	106	IMODES33	1361	108	SELFRET
1011	101	MODREG	1074	103	RISAVE	1167	104	INTWAK1Q	1304	106	IMUCADR	1362	108	SMODE
1012	102	DSPLOCK	1075	103	1/PIPADT	1167	104	UPTMP	1304	106	MODECADR	1363	108	ALMCADR
1013	102	REQRET	1076	103	TEMK	1167	1225	INTWAKUQ	1305	106	OPTCADR	1365	108	ERCOUNT
1014	102	LOADSTAT	1077	103	SO	1170	104	COMPNUMB	1306	106	RADCADR	1366	108	SCOUNT
1015	102	CLPASS	1100	103	SAMPLIM	1171	104	UPOLDMOD	1307	106	ATTCADR	1371	108	SKEEP1
1016	102	NDUT	1101	103	RRTARGET	1172	104	UPVERB	1311	106	ATTPTIO	1372	108	SKEEP2
1017	102	NDUNCADR	1101	103	RSUBC	1173	104	UPCOUNT	1312	106	MARKSTAT	1373	108	SKEEP3
1020	102	MONSAVE	1101	102	SAMPLSUM	1174	104	UPBUFF	1313	106	DSPUPTSW	1374	108	SKEEP4
1021	102	MONSAVE1	1101	571	RELDSVEC	1220	105	RM	1314	106	LGYRO	1375	108	SKEEP5
1022	102	MONSAVE2	1101	604	LOSSM	1226	105	VN	1315	106	RRPET	1376	108	SKEEP6
1023	102	DSPTAB	1105	103	TIMEHOLD	1234	105	PIPTIME	1316	106	RDES	1377	108	SKEEP7
1037	102	NVQTEM	1107	103	MODEA	1236	105	GDT/2	1317	106	RRINDEX	E3,1400	109	LST1
1040	102	NVBKTEM	1107	103	TANG	1236	960	CURSOR	1320	106	WIXA	E3,1410	109	LST2
1041	102	VERBSAVE	1111	103	MODEB	1240	960	SPIRAL	1321	106	WIXB	E3,1432	109	RSBBQ
1042	102	CADRSTOR	1111	103	NSAMP	1242	960	POSCODE	1322	106	ZIXA	E3,1434	109	LONGEXIT
1043	102	DSPLIST	1113	103	DESRET	1244	105	MASS	1323	106	ZIXB	E3,1436	109	PHSNAME1
1044	102	EXTVBACT	1113	103	OLDATAGD	1244	105	WEIGHT/G	1324	107	AGSWORD	E3,1437	109	PHSBB1
1045	102	DSPTEM1	1114	103	DESCOUNT	1246	105	ARDELV	1325	107	RATEINDX	E3,1440	109	PHSNAME2
1045	102	NORMTEM1	1115	104	TOEC	1247	105	PGUIDE	1326	107	DELAYLOC	E3,1441	109	PHSBB2
1050	102	DSPTEM2	1117	104	COLREG	1251	105	DVTHRUSH	1331	107	LEMMASS	E3,1442	109	PHSNAME3
1051	102	DSPTEMX	1120	104	LAT	1252	105	AVEGEXIT	1332	107	CSMMASS	E3,1443	109	PHSBB3
1051	102	OPTIOHX	1122	104	LONG	1252	105	AVGEXIT	1333	107	DNRRANGE	E3,1444	109	PHSNAME4
1053	102	TBASE1	1124	104	ALT	1254	105	TEMX	1334	107	DNRRDUT	E3,1445	109	PHSBB4
1054	102	PHSPRDT1	1126	104	YV	1255	105	TEMY	1335	107	DNINDEX	E3,1446	109	PHSNAME5
1055	102	TBASE2	1134	104	ZV	1256	105	TEMZ	1336	107	DNLRVELX	E3,1447	109	PHSBB5
1056	102	PHSPRDT2	1142	104	P40/RET	1257	105	PIPAGE	1337	107	DNLRVELY	E3,1450	109	PHSNAME6
1056	829	PIPCTR	1143	104	GENRET	1257	107	W.IND	1340	107	DNLRVELZ	E3,1451	109	PHSBB6
1057	102	TBASE3	1144	104	OPTION1	1260	105	OUTROUTE	1341	107	DNLRALT	E3,1452	109	PBIASX
1060	102	PHSPRDT3	1145	104	OPTION2	1260	107	W.IND1	1342	107	BALLEEXIT	E3,1452	109	PIPABIAS
1060	232	MMTEMP	1146	104	OPTION3	1262	105	CH5MASK	1343	107	DAPDATER	E3,1453	109	PIPASCF
1061	102	TBASE4	1147	104	LONGCADR	1263	105	CH6MASK	1344	107	TEVENT	E3,1453	109	PIPASCFX
1061	232	BASETEMP	1151	104	LONGBASE	1264	105	DTHETASM	1346	107	DB	E3,1454	109	PBIASY
1062	102	PHSPRDT4	1153	104	LONGTIME	1264	105	ZERLINA	1346	1506	DBVAL1	E3,1455	109	PIPASCFY
1063	102	TBASE5	1155	104	COUTEMPX	1265	106	ELVIRA	1347	107	AZ	E3,1456	109	PBIASZ
1064	102	PHSPRDT5	1156	104	CDUTEMPY	1266	106	AZINCR1	1350	108	EL	E3,1457	109	PIPASCFZ
1065	102	TBASE6	1157	104	CDUTEMPZ	1267	106	ELINCR1	1351	108	WCHPHASE	E3,1460	109	NBDX
1066	102	PHSPRDT6	1160	104	PIPATMPX	1272	105	SPNDX	1352	108	E3J22R2M	E3,1461	109	NBDY
1067	103	NVWORD1	1161	104	PIPATMPY	1273	105	RCSFLAGS	1353	108	E32C31RM	E3,1462	109	NBDZ
1070	103	EBANKSAV	1162	104	PIPATMPZ	1274	105	T5ADR	1354	108	RADSKAL	E3,1463	110	ADIAAX
1070	1372	DSPFLG	1163	104	DISPDEX	1276	106	PVALVST	1356	108	SKALSKAL	E3,1464	110	ADIAAY
1071	103	MARKEBAN	1163	148	P21ORIG	1277	106	DELPORR	1357	108	END-UE	E3,1465	110	ADIAZ
1071	1372	MARKFLAG	1164	104	TEMPROD	1300	106	DELPORR	1357	108	SELFERAS	E3,1466	110	ADSRAX
1072	103	EBANKTEM	1165	104	PRIOTIME	1301	106	DELPORR	1357	108	SFAIL	E3,1467	110	ADSPAY

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E3,1470	110	ADSRAS	E3,1715	111	AXO	E4,1477	114	H	E4,1602	119	YAWANG	E4,1700	119	/R/MAG
E3,1471	110	COMMAND	E3,1717	111	R-OTHER	E4,1501	114	CMODE	E4,1604	115	RTHETA	E4,1702	116	RACT1
E3,1471	110	GCOMP	E3,1717	120	R(CSM)	E4,1502	114	IPETURN	E4,1604	115	TSTART82	E4,1702	117	DELTAR
E3,1474	110	CDUINO	E3,1725	111	V-OTHER	E4,1503	114	NORMGAM	E4,1604	115	WWBIAS	E4,1702	117	DVLOS
E3,1477	110	GCOMP SW	E3,1725	120	V(CSM)	E4,1504	114	RPQV	E4,1604	118	RLM	E4,1702	117	TINTSOI
E3,1500	110	DIF EQCNT	E3,1733	111	REFSMAT	E4,1504	115	BASETHV	E4,1606	115	RUNE	E4,1702	119	LAXIS
E3,1501	110	UPSVFLAG	E3,1755	111	ACTCENT	E4,1512	114	KEPRTH	E4,1606	118	RPASS36	E4,1704	117	DELTIME
E3,1502	110	KRECT	E3,1757	112	LS2IX	E4,1512	114	ORIGEX	E4,1614	115	VONE	E4,1706	117	TAPGTIME
E3,1510	110	VRECT	E3,1760	112	LPSVEL	E4,1513	114	KQVV	E4,1614	118	UNP36	E4,1710	116	RACT2
E3,1516	110	TET	E3,1760	112	VSUBC	E4,1513	115	BASETIME	E4,1615	117	AGSBUFFE	E4,1710	117	ULOS
E3,1520	110	TDELTAV	E3,1760	504	LDSVDI74	E4,1515	115	ORIG	E4,1622	116	DELVOV	E4,1710	120	YDOT
E3,1526	110	TNUV	E3,1766	112	MLOSV	E4,1516	115	STATEXIT	E4,1630	116	EO1	E4,1712	120	ZDOT
E3,1534	110	RCV	E3,1766	604	SAVECDUT	E4,1517	114	HAPOX	E4,1630	116	GSAV	E4,1714	120	GEFF
E3,1542	110	VCV	E3,1770	112	RANGEVAR	E4,1517	115	BASEDTV	E4,1630	116	KEL	E4,1716	117	HAPO
E3,1550	110	TC	E3,1772	112	RATEVAR	E4,1521	114	HPERX	E4,1630	116	MFI	E4,1716	117	NOMTPI
E3,1552	110	XKEP	E3,1774	112	RVARMIN	E4,1521	114	RPSV	E4,1630	116	MFS	E4,1716	117	RTSP1/MU
E3,1552	125	XPRFV	E3,1775	112	VVARMIN	E4,1527	114	XKEPNEW	E4,1630	116	VZBEAMNB	E4,1716	120	G(CSM)
E3,1554	110	RECTCSM	E3,1776	112	TCDH	E4,1531	114	VECTAR	E4,1636	116	EO2	E4,1720	117	HPER
E3,1554	110	RECTOTH	E3,1777	112	END-LS	E4,1537	114	VACX	E4,1636	116	VYBEAMNB	E4,1720	117	PTMU
E3,1562	110	VRECTCSM	E4,1400	113	AMEMORY	E4,1537	115	BASEOTP	E4,1636	116	YNBSAV	E4,1722	118	RINIT
E3,1570	111	T-OTHER	E4,1400	113	WRENDPOS	E4,1537	115	V82FLAS	E4,1644	116	VXBEAMNB	E4,1724	120	WM
E3,1570	111	TETCSM	E4,1400	117	TRANSM1	E4,1540	115	TFF	E4,1644	116	ZNBSAV	E4,1730	118	VINIT
E3,1570	111	TETOTHER	E4,1401	113	WRENDVEL	E4,1541	114	VACY	E4,1652	116	LRVTIME	E4,1732	120	/LAND/
E3,1572	111	DEL TACSM	E4,1402	113	WSHAFT	E4,1542	115	-TPER	E4,1652	116	T1TOT2	E4,1734	119	LRXCDUDL
E3,1600	111	NUVCSM	E4,1403	113	WTRUN	E4,1543	114	VACZ	E4,1652	117	+NGA	E4,1734	120	Y
E3,1606	111	RCVCSM	E4,1404	113	RMAX	E4,1545	114	XNBPIP	E4,1654	116	LRXCDU	E4,1736	119	LRXCDUDL
E3,1614	111	VCVCSM	E4,1405	112	VMAX	E4,1553	114	YNBPIP	E4,1654	116	T2TOT3	E4,1736	118	VIPRIME
E3,1622	111	TCC SM	E4,1406	113	WSURFPOS	E4,1561	114	ZNBPIP	E4,1655	116	LRXCDU	E4,1736	119	LPZCDUDL
E3,1624	111	XKEPCSM	E4,1407	113	WSURFVEL	E4,1567	114	VONE	E4,1656	116	ELEV	E4,1736	120	DRDOT
E3,1626	111	RECTHIS	E4,1410	112	SHAFTVAR	E4,1567	115	BASETHP	E4,1656	116	LRZCDU	E4,1737	119	LRVTIMDL
E3,1626	111	RECTLEM	E4,1411	113	TRUNVAR	E4,1574	114	VECTABND	E4,1657	116	PIPTER	E4,1740	120	DYDOT
E3,1674	111	VRECTLEM	E4,1412	112	SC4EM	E4,1576	115	EPSILONT	E4,1660	116	UPI	E4,1742	120	OZDOT
E3,1642	111	TETLEM	E4,1420	113	AGSK	E4,1600	115	HPRMIN	E4,1660	117	UNRM	E4,1744	118	FDAIX
E3,1642	111	TETTHIS	E4,1422	113	RLS	E4,1600	115	RANGE	E4,1662	119	AT	E4,1744	120	PCONS
E3,1644	111	DELTALEM	E4,1422	117	ALFDK	E4,1600	115	WWPOS	E4,1662	119	VHORIZ	E4,1745	118	FDAIY
E3,1652	111	NUVLEM	E4,1430	113	PRODY	E4,1600	117	AGSBUFF	E4,1664	119	ANGTERM	E4,1746	118	FDAIZ
E3,1660	111	RCVLEM	E4,1431	114	ALPHAV	E4,1600	118	ALPHASB	E4,1664	119	VE	E4,1746	120	YCONS
E3,1666	111	VCVLEM	E4,1437	114	BETAV	E4,1600	118	PITCHANG	E4,1666	116	DELVEET1	E4,1747	118	DELVTPE
E3,1674	111	TCLEM	E4,1445	114	PHIV	E4,1600	118	RR-AZ	E4,1666	119	TTO	E4,1750	120	PRATE
E3,1676	111	XKEPLEM	E4,1453	114	PSIV	E4,1600	118	RSTACK	E4,1670	119	TBUP	E4,1751	119	LMPOS
E3,1700	111	X739	E4,1461	114	FV	E4,1602	115	PPADTHM	E4,1672	119	HBEAMNB	E4,1751	119	RTSTDEX
E3,1706	111	TEPHEN	E4,1467	114	ALPHAM	E4,1602	115	PRATE	E4,1672	119	RDOTD	E4,1752	119	RTSTMAX
E3,1706	112	TIMSUD	E4,1471	114	BETAM	E4,1602	115	WWVLL	E4,1674	116	DELVEET2	E4,1752	120	YRATE
E3,1711	111	AZO	E4,1473	114	TATL	E4,1602	118	BETAS	E4,1674	119	YDOTD	E4,1753	119	RTSTBASE
E3,1713	111	-AYO	E4,1475	114	DT/2	E4,1602	118	R-ELEV	E4,1676	119	ZDOTD	E4,1754	119	RSTKLOC

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E4,1754	119	FTSTLOC	E5,1435	121	TCGIBRAK	E5,1474	128	INTZ	E5,1550	122	ABTCOF	E5,1700	123	ZNB
E4,1754	120	ATY	E5,1436	121	RAPFS	E5,1476	121	RIGNZ	E5,1550	123	DELM	E5,1701	125	VTARGETAG
E4,1755	119	RSAMPDT	E5,1436	127	CDUTIMEF	E5,1476	128	ANGY	E5,1560	128	WPLATI	E5,1702	125	VTARGET
E4,1756	119	RFAILCNT	E5,1436	128	WANGI	E5,1500	121	KIGNX/B4	E5,1562	128	GEUCUMPS	E5,1706	123	GACC
E4,1756	120	ATR	E5,1440	127	CDUDANG	E5,1500	128	ANGX	E5,1563	128	ERCOMP	E5,1706	123	LANDLAT
E4,1757	119	END-E4	E5,1440	127	TEMPADD	E5,1502	121	KIGNY/B8	E5,1570	122	VMIN	E5,1706	123	STARAD
E4,1757	119	LMVEL	E5,1440	128	TORONDX	E5,1502	128	DRIFTD	E5,1571	128	ZERONDX	E5,1706	123	VEARTH
E4,1760	120	ATP	E5,1440	128	WANGT	E5,1504	121	KIGNV/B4	E5,1572	122	YLIM	E5,1706	123	XSCI
E4,1762	120	YAW	E5,1441	127	COUREADP	E5,1504	128	DRIFTI	E5,1572	128	ISECXT	E5,1706	124	CULTRIX
E4,1764	120	PITCH	E5,1441	127	TEMP	E5,1506	121	LOWCRIT	E5,1573	128	ASECX1	E5,1706	126	VARIANCE
E4,1765	119	DELVEET3	E5,1442	127	COUREADI	E5,1507	121	HIGHCRIT	E5,1574	122	ABTRDUT	E5,1710	123	LANDLONG
E5,1400	121	TLAND	E5,1442	127	NDPITS	E5,1510	121	V2FG	E5,1574	128	PERFDLAY	E5,1710	125	RTNAPSE
E5,1400	121	W	E5,1442	128	DRIFTT	E5,1510	128	VLAUN	E5,1575	122	COSTHFT1	E5,1710	125	RTNLAMB
E5,1400	127	AZIMUTH	E5,1443	127	COULIMIT	E5,1512	128	ACQWD	E5,1576	128	OVFLOWCK	E5,1710	125	RTNTR
E5,1402	121	RBRFG	E5,1443	127	CIAN	E5,1516	121	TAUVERT	E5,1600	122	COSTHET2	E5,1710	125	RTNTT
E5,1402	127	LATITUDE	E5,1444	121	VAPFG	E5,1520	121	DELQFIX	E5,1602	122	CG	E5,1711	125	U2
E5,1402	826	ROS	E5,1444	127	LOS1	E5,1520	128	POSIV	E5,1624	122	RANGEDSP	E5,1711	126	GRP2SVQ
E5,1404	127	EXVECTOR	E5,1444	128	ALXIS	E5,1522	121	LRALPHA	E5,1626	122	OUTOFPLN	E5,1712	123	LANDALT
E5,1410	121	VBRFG	E5,1445	128	CNPX1	E5,1522	128	DPIPAY	E5,1630	122	R6OVSAVE	E5,1712	126	OMEGAM1
E5,1410	826	VDS	E5,1446	128	ALK	E5,1523	122	LRBETA1	E5,1630	122	VBIA5	E5,1714	123	GOUT
E5,1412	127	LENGTHDT	E5,1452	121	AAPFG	E5,1524	122	LRALPHA2	E5,1636	122	RGU	E5,1714	123	VSUN
E5,1413	127	LOSVEC	E5,1452	127	LOS2	E5,1525	122	LRBETA2	E5,1642	121	ENDW	E5,1714	123	YSCI
E5,1414	127	NDXCTR	E5,1452	128	THE TAN	E5,1526	122	LRVMAX	E5,1642	122	XSM	E5,1714	124	ZSCI
E5,1415	127	PIINDEX	E5,1460	121	VAPFG*	E5,1526	128	DPIPAZ	E5,1642	125	DELX	E5,1717	125	MAGVECC
E5,1416	121	ABRFG	E5,1460	127	CALCDIR	E5,1527	122	LRVF	E5,1642	126	ZI	E5,1717	125	R2
E5,1416	127	POSITION	E5,1460	128	FILDELV	E5,1530	122	LRWVZ	E5,1644	123	-COSB	E5,1720	126	OMEGAM2
E5,1416	826	ADG	E5,1461	127	CDUFLAG	E5,1530	128	ALTIM	E5,1644	125	DELT	E5,1721	125	URI
E5,1417	127	OPLACE	E5,1462	121	AAPFG*	E5,1531	122	LRWVY	E5,1646	123	SINB	E5,1722	123	VMOON
E5,1420	127	OPLACES	E5,1462	127	GYTOBETO	E5,1531	128	ALTIMS	E5,1646	125	UNRECT	E5,1722	124	VEC1
E5,1421	127	SOUTHOR	E5,1462	128	INTVEC	E5,1532	122	LRWVX	E5,1650	122	YSM	E5,1726	126	OMEGAM3
E5,1424	121	VBRFG*	E5,1462	128	VLAUNS	E5,1532	128	ALDK	E5,1654	125	RVEC	E5,1727	125	SNTH
E5,1424	826	VDG2TTF	E5,1463	127	OPTWEG	E5,1533	122	LRWVZ	E5,1654	125	RIVEC	E5,1730	123	SAX
E5,1426	121	ABRFG*	E5,1464	121	JAPFG*	E5,1534	122	LRWVFY	E5,1656	122	ZSM	E5,1730	123	STAR
E5,1426	826	ADG2TTF	E5,1464	127	SAVE	E5,1534	127	MASKREG	E5,1662	125	R2VLC	E5,1730	124	VEC2
E5,1430	121	JBRFG*	E5,1464	128	WPLATS	E5,1535	122	LRWVFX	E5,1664	122	XDC	E5,1731	125	CSTH
E5,1430	127	TEMPTIME	E5,1466	121	GAINAPPR	E5,1536	122	LRWVFI	E5,1664	123	XND	E5,1733	125	1-CSTH
E5,1430	826	JDS2TTF	E5,1467	127	SFCINST1	E5,1536	127	CDUNDX	E5,1664	126	DELTAX	E5,1734	126	HOLDW
E5,1432	121	GAINBRAK	E5,1470	121	TCGFAPPR	E5,1537	121	RDDSCALE	E5,1664	126	TRIPA	E5,1735	125	CSTH-RHO
E5,1432	127	THARY	E5,1470	127	TIMER	E5,1537	127	RESULTCT	E5,1667	126	TEMPVAR	E5,1735	123	GCTR
E5,1434	121	TCGFBRAK	E5,1470	128	INTY	E5,1540	121	TAURDD	E5,1670	125	TDESIZED	E5,1737	123	OGC
E5,1434	127	CDUTIMEI	E5,1471	121	TCGIAPPR	E5,1542	122	LAG/TAU	E5,1672	122	YDC	E5,1737	125	P
E5,1434	127	GENPL	E5,1472	121	VIGN	E5,1542	127	COUNTPL	E5,1672	123	YNB	E5,1741	123	IGC
E5,1434	127	RDSP	E5,1472	127	DATAPL	E5,1543	127	CDUANG	E5,1672	125	GEOMSGN	E5,1741	125	R1A
E5,1434	128	AINLA	E5,1472	128	ANGZ	E5,1544	122	MINFORCE	E5,1673	125	UN	E5,1743	123	MGC
E5,1434	128	WANGJ	E5,1474	121	RIGNX	E5,1546	122	MAXFORCE	E5,1700	122	ZDC	E5,1743	125	VVFC

SYMBOL & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E5,1745	123	QMIN	E6,1421	129	OMEGAP	E6,1472	130	NEXTP	E6,1545	133	AOSQTERM	E6,1647	136	QCDUWUSR
E5,1746	123	QMAJ	E6,1422	129	OMEGAQ	E6,1473	130	NEXTU	E6,1546	133	AOSRTERM	E6,1650	136	NDXCOW
E5,1747	124	CGCT	E6,1423	129	OMEGAR	E6,1474	130	NEXTV	E6,1547	134	ACCSWU	E6,1651	136	FLAGOODW
E5,1751	125	FCC	E6,1424	129	ALPHAQ	E6,1475	130	-2JETLIM	E6,1547	134	BLCKTOP	E6,1652	136	FLPAUTNO
E5,1753	125	RTNPRM	E6,1425	129	ALPHAR	E6,1476	130	-RATEDB	E6,1550	134	ACCSWV	E6,1653	136	UNFC/2
E5,1754	125	SGNRDOT	E6,1426	129	OMEGAU	E6,1476	130	TARGETDB	E6,1551	1505	1/ANETP	E6,1661	136	UNHC/2
E5,1755	124	BESTI	E6,1426	130	VRATEDIF	E6,1477	131	RETJADR	E6,1553	1505	1/ACOSTP	E6,1667	136	UNFV/2
E5,1755	125	RDESIRED	E6,1427	129	OMEGAV	E6,1500	131	SENSETYP	E6,1555	134	FLAT	E6,1667	136	UNFVX/2
E5,1756	124	BESTJ	E6,1427	130	EDUTP	E6,1501	132	NEGUQ	E6,1556	134	ZONE3LIM	E6,1670	135	COF
E5,1756	126	TOPOS	E6,1427	130	VRATEDIF	E6,1502	134	ALLOWGTS	E6,1557	1505	PACCFUN	E6,1671	136	UNFVY/2
E5,1757	124	STARIND	E6,1427	133	EDDT	E6,1503	132	NEGUR	E6,1561	1505	PDB1	E6,1673	136	UNFVZ/2
E5,1757	125	DELDEP	E6,1430	129	TRAPEDP	E6,1504	132	KQ	E6,1562	1505	PDB2	E6,1675	136	-DELGMB
E5,1757	125	TERRLAMB	E6,1431	129	TRAPEDQ	E6,1505	132	AXISCTR	E6,1563	1505	PDB4	E6,1676	125	BCDU
E5,1760	124	STARSAVI	E6,1432	129	TRAPEDR	E6,1505	132	SAVESE	E6,1564	1505	PDB3	E6,1701	135	KSPNDX
E5,1761	125	DEPREV	E6,1433	129	NPTRAPS	E6,1506	132	KRDAP	E6,1565	1505	PAXDIST	E6,1702	135	KDPNDX
E5,1761	125	TPREV	E6,1434	130	NQTRAPS	E6,1507	132	ACCDUTQ	E6,1567	134	1/ANET1	E6,1703	135	KV1
E5,1763	125	EPSILONL	E6,1435	130	NRTRAPS	E6,1510	132	QACCDUT	E6,1570	134	1/ANET2	E6,1703	135	K1
E5,1764	126	TDVEL	E6,1436	130	EDDTQ	E6,1511	132	ACCDOTR	E6,1573	134	1/ACOST	E6,1703	135	MFISYM
E5,1765	125	COGA	E6,1436	130	QRATEDIF	E6,1512	132	RACCDOT	E6,1575	134	ACCFCTZ1	E6,1703	135	NCDU
E5,1765	125	INDEP	E6,1437	130	EDDTR	E6,1513	132	DOWNTURK	E6,1576	134	ACCFCTZ5	E6,1703	135	P21
E5,1766	124	STARSAV2	E6,1437	130	RRATEDIF	E6,1513	132	POSTURKP	E6,1601	134	FIREDB	E6,1703	135	TNFI
E5,1772	126	EGRESS	E6,1440	130	OLDXFORP	E6,1514	132	NEGOTKP	E6,1603	134	CUASTDB	E6,1703	135	THIS
E5,1773	126	ORIGIN	E6,1441	130	OLDYFORP	E6,1515	132	POSTURKU	E6,1605	134	AXISDIST	E6,1705	135	D21
E5,1773	126	P3DEXIT	E6,1442	130	OLDZFORQ	E6,1516	133	NEGTRKU	E6,1627	134	COEFFQ	E6,1706	135	NEXTIME
E5,1774	124	TALIGN	E6,1443	130	CH3ITEMP	E6,1517	133	POSTURKV	E6,1630	134	COEFFR	E6,1707	135	G21
E5,1774	128	END-E5	E6,1444	130	STIKSENS	E6,1520	133	NEGTRKV	E6,1631	134	CUTRULER	E6,1707	135	TTEMP
E5,1776	124	RTX1	E6,1445	130	TCP	E6,1521	133	NO.PJETS	E6,1632	134	QGIMTIMR	E6,1711	135	BIASTEMP
E5,1777	124	RTX2	E6,1446	130	DXERROR	E6,1522	133	NO.UJETS	E6,1633	134	INGTS	E6,1711	135	C2SQP
E6,1400	129	HIASCENT	E6,1450	130	DYERROR	E6,1523	133	NO.VJETS	E6,1634	134	RGIMTIMR	E6,1711	135	KV2
E6,1401	129	ELLTIME	E6,1450	130	QERROR	E6,1524	133	TJP	E6,1635	134	CDUXD	E6,1711	135	K2
E6,1402	129	PITTIME	E6,1450	132	QDIFF	E6,1525	133	TJU	E6,1635	136	DCDU	E6,1713	135	C2SQM
E6,1403	129	DKTRAP	E6,1452	130	DZERROR	E6,1525	134	TJETU	E6,1636	134	CDUYD	E6,1715	135	C2PP
E6,1404	129	DKOMEGAN	E6,1452	130	RERROR	E6,1526	133	TJV	E6,1637	134	CDUZD	E6,1717	135	C2MP
E6,1405	129	DKKAJSN	E6,1452	132	RDIFF	E6,1527	133	L.PVT-CG	E6,1640	134	DELCUDX	E6,1717	135	KV3
E6,1406	129	LMTRAP	E6,1454	130	PLAST	E6,1530	133	1JACC	E6,1640	136	DELDUDU	E6,1717	135	K3
E6,1407	129	LMOMEGAN	E6,1455	130	QLAST	E6,1531	133	1JACCO	E6,1641	134	DELDUDY	E6,1717	135	OGF
E6,1410	129	LMKAOSN	E6,1456	130	RLAST	E6,1532	133	1JACCR	E6,1641	136	DELDUDU1	E6,1721	135	C1PP
E5,1411	129	DKDS	E6,1457	130	TCOR	E6,1533	133	1JACCU	E6,1642	134	DELDUDZ	E6,1723	135	C1MP
E6,1412	129	IGNAOSQ	E6,1460	130	OLDPMIN	E6,1534	133	1JACCV	E6,1642	136	DELDUDZ2	E6,1725	135	BRATE
E6,1413	129	IGNAOSR	E6,1461	130	OLDQMIN	E6,1535	133	SKIPU	E6,1643	134	OMEGAPD	E6,1725	135	COFSKEW
E6,1414	129	M11	E6,1462	130	SAVEHAND	E6,1536	133	SKIPV	E6,1644	134	OMEGAQD	E6,1725	135	IG
E6,1415	129	M21	E6,1464	130	PEPROR	E6,1537	133	AOSQ	E6,1645	134	OMEGARD	E6,1725	136	VECQTEMP
E6,1416	129	M31	E6,1465	130	NXT6ADR	E6,1541	133	AOSR	E6,1646	134	MIS	E6,1733	135	CAM
E6,1417	129	M22	E6,1466	130	T6NEXT	E6,1543	133	AOSU	E6,1646	136	ECDUW	E6,1733	135	TM
E6,1420	129	M32	E6,1470	130	T6FURTHA	E6,1544	133	AOSV	E6,1646	136	ECDUWUSR	E6,1735	135	AM

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E6,1737	130	TEMP31	E6,1751	131	JEFFOR	E7,1456	139	LOSCOUNT	E7,1526	147	DELVREF	E7,1601	141	POSTCSI
E6,1737	131	ABSEDOTP	E6,1751	132	FUNCTION	E7,1457	139	AIG	E7,1526	147	V	E7,1603	141	HAFPA1
E6,1737	131	ABSTJ	E6,1751	137	DAPTREG5	E7,1460	139	AMG	E7,1527	141	VPASS2	E7,1603	141	POSTCDH
E6,1737	131	ROTEMP1	E6,1752	131	VERBOR	E7,1461	139	AUG	E7,1527	141	VPPREC	E7,1605	141	DELTEEO
E6,1737	132	GTSTEMPS	E6,1752	133	E	E7,1462	139	MARKCTR	E7,1534	147	HCALC	E7,1605	141	LOOPCT
E6,1737	132	K2THETA	E6,1752	137	DAPTREG6	E7,1462	139	TRKMKCNT	E7,1535	141	RACT3	E7,1605	141	POSTTPI
E6,1737	133	EDJTSQ	E6,1753	137	DAPARUPT	E7,1463	140	/AFC/	E7,1536	147	UNIT/R/	E7,1606	147	XSCREF
E6,1737	136	DAPTEMPI	E6,1754	137	DAPLRUPT	E7,1463	140	NORMEX	E7,1543	141	UNVEC	E7,1606	147	XSMD
E6,1740	131	ROTEMP2	E6,1755	137	DAPRQPT	E7,1464	140	QSAVED	E7,1543	141	VACT3	E7,1606	149	PIFPSET
E6,1740	133	ROTSFENSE	E6,1757	137	DAPZRPT	E7,1465	140	FCDD	E7,1544	147	RNI	E7,1607	141	GAMPREV
E6,1740	136	DAPTEMP2	E6,1761	137	AK	E7,1465	140	RTRN	E7,1544	149	LANDTEMP	E7,1607	142	INTIME
E6,1741	131	POLYTEMP	E6,1762	137	AK1	E7,1466	140	NN	E7,1544	149	OURTEMPS	E7,1607	149	RTNHOLD
E6,1741	132	KCENTRAL	E6,1763	137	AK2	E7,1467	140	FP	E7,1546	145	DELTAQ	E7,1610	149	FWEIGHT
E6,1741	132	SHFTFLAG	E6,1764	137	EDRIVEX	E7,1470	140	SUBEXIT	E7,1550	145	MARKCNTR	E7,1611	141	DELDV
E6,1741	133	FIREFCT	E6,1765	137	EDRIVEY	E7,1471	140	E7OVERLA	E7,1551	141	RPASS3	E7,1611	141	DELTEE
E6,1741	136	DAPTEMP3	E6,1766	137	EDRIVEZ	E7,1471	140	WHOCARES	E7,1551	145	XYMARK	E7,1611	141	TSTRT
E6,1742	131	TEMPNUM	E6,1767	137	PJETCTR	E7,1471	141	VACT1	E7,1552	145	MKDEX	E7,1611	142	X1INPUT
E6,1742	132	K2CNTRAL	E6,1770	137	UJETCTR	E7,1471	144	RTARG1	E7,1552	147	VNI	E7,1612	149	PIF
E6,1742	133	TTOAXIS	E6,1771	137	END-E6	E7,1471	145	TX789	E7,1552	149	TTF/8TMP	E7,1613	141	CSIALRM
E6,1742	136	DAPTEMP4	E6,1771	137	VJETCTR	E7,1471	147	ABVEL	E7,1553	145	PLANVEC	E7,1613	141	TITER
E6,1743	131	NUMBERT	E7,1400	138	ATIGINC	E7,1473	120	RDUT	E7,1554	149	ELINCR	E7,1614	147	YSCREF
E6,1743	132	WCENTRAL	E7,1402	138	PTIGINC	E7,1473	147	HDDTDISP	E7,1556	149	AZINCR	E7,1614	147	YSMD
E6,1743	136	DAPTEMP5	E7,1404	138	AOTAZ	E7,1475	147	TTFDISP	E7,1557	141	VPASS3	E7,1614	149	PSEUDO55
E6,1744	131	ROINDEX	E7,1412	138	ADTEL	E7,1477	141	RAPREC	E7,1560	147	PIPTIME1	E7,1615	141	VERBNOON
E6,1744	132	ACENTRAL	E7,1420	138	LRHMAX	E7,1477	141	RPASS1	E7,1560	149	KEEP-2	E7,1615	149	FC
E6,1744	132	ININDEX	E7,1421	138	LRWH	E7,1477	145	GAMMA	E7,1561	145	TSIGHT	E7,1616	141	ROOTV
E6,1744	133	ADRSOIF2	E7,1422	138	ZOONTIME	E7,1477	147	SAVET-30	E7,1562	147	GDT1/2	E7,1616	142	ITCTR
E6,1744	136	DAPTEMP6	E7,1423	138	TENDREAK	E7,1501	147	DELVCTL	E7,1562	149	TABLTTF	E7,1617	149	TTHROT
E6,1745	132	DEL	E7,1423	139	REPOSCNT	E7,1501	147	VGBODY	E7,1565	141	VACT4	E7,1620	141	CENTANG
E6,1745	132	JETPATE	E7,1424	138	TENDAPPR	E7,1501	835	TG01	E7,1565	142	VTPRIME	E7,1620	149	FCOLD
E6,1745	133	HOLDQ	E7,1424	139	REPOSTM	E7,1502	145	OMEGA	E7,1570	147	MASS1	E7,1621	149	E2DPS
E6,1745	136	DAPTREG1	E7,1425	138	DELTTFAP	E7,1505	141	VAPREC	E7,1570	855	1/DVO	E7,1621	149	CURPERMS
E6,1745	1509	OLDSENSE	E7,1426	138	LEADTIME	E7,1505	141	VPASS1	E7,1570	864	DVCNTR1	E7,1621	149	WCHPHOLD
E6,1746	132	AZCENTRAL	E7,1426	139	DELTATM	E7,1505	144	VPASS4	E7,1572	147	RIS	E7,1622	142	DELVIMU
E6,1746	132	JETRATEG	E7,1427	138	RPCRTIME	E7,1507	147	DVTOTAL	E7,1573	141	DELVCSI	E7,1622	147	ZSMD
E6,1746	132	SCRATCH	E7,1430	138	RPCPTQSW	E7,1511	147	GOBLTIME	E7,1573	141	SECMAK	E7,1622	148	ZSCREF
E6,1746	133	ADRSOIF1	E7,1431	138	TNIWA	E7,1513	141	VACT2	E7,1573	141	TDEC2	E7,1622	149	FILLER
E6,1746	136	DAPTREG2	E7,1433	139	DELVLVC	E7,1513	147	ABDVCONV	E7,1573	149	TPIPOLD	E7,1623	149	FLPASS9
E6,1747	132	HALFARG	E7,1433	139	DELVSLV	E7,1515	147	DVCNTR	E7,1575	141	DELEL	E7,1624	149	TPIP
E6,1747	132	JETRATER	E7,1441	139	TIG	E7,1516	147	TGU	E7,1575	141	DELVMID	E7,1626	149	VGU
E6,1747	133	HH	E7,1443	139	RTARG	E7,1520	147	R	E7,1575	141	DELVTPI	E7,1630	142	TPASS4
E6,1747	136	DAPTREG3	E7,1451	139	DELLT4	E7,1520	147	UNITG0BL	E7,1575	141	DVPREV	E7,1630	144	TINT
E6,1750	131	DPSBURN	E7,1453	139	TFI	E7,1521	141	RPASS2	E7,1575	141	KT	E7,1630	148	END-ALIG
E6,1750	132	DECNTR	E7,1453	139	TLOGO	E7,1521	141	RPPREC	E7,1577	141	DIFFALT	E7,1630	148	RSUBL
E6,1750	137	DAPTREG4	E7,1455	139	WHICH	E7,1524	145	BVECTOR	E7,1600	147	VIS	E7,1630	152	END-E7.3

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E7,1630	152	RCO	E7,1665	142	QTEMP1	E7,1711	144	LUSDESRO	E7,1745	146	R65CNTR	4201	452	PINSUPBT
E7,1632	142	QTEMP	E7,1665	142	RSEXIT	E7,1711	148	P21VEL	E7,1745	146	WHCHREAD	4242	209	VOGN34
E7,1632	152	YCO	E7,1665	142	SAVOR52	E7,1711	151	ALTRATE	E7,1745	151	LASTLADW	4303	456	ENDBLFF
E7,1633	142	TCSI	E7,1666	142	COZY4	E7,1712	145	NZ	E7,1745	152	END-E7.0	4317	1073	FOURTEEN
E7,1634	149	LAND	E7,1666	150	FUELNEED	E7,1712	151	ALTSAVE	E7,1746	145	M49FLAG	4317	1073	OCT16
E7,1634	152	1/DV1	E7,1666	150	FUNNYDSP	E7,1713	148	P21GM	E7,1746	146	RDOTMSAV	4320	1095	OCT11
E7,1635	142	TTP1	E7,1666	150	TREDES	E7,1714	143	RMAG	E7,1746	151	PODCOUNT	4320	1099	NINE
E7,1636	148	UCSM	E7,1667	150	LOOKANGL	E7,1714	151	LADQSAVE	E7,1747	152	END-E7.1	4350	1010	FBANKMSK
E7,1636	152	1/DV2	E7,1670	142	XXXALT	E7,1714	829	PIPCRI	E7,1750	146	RDOTM	4350	1099	BANKMASK
E7,1637	142	TTP10	E7,1670	150	EDURPERM	E7,1715	148	P21ALT	E7,1752	146	TANGNB	4350	1286	-MAXADRS
E7,1640	152	1/DV3	E7,1670	150	LRLCTR	E7,1715	151	DT	E7,1754	146	MKTIME	4355	218	OCT30000
E7,1641	142	RTIG	E7,1671	150	LRRCTR	E7,1716	143	MUASTEER	E7,1756	146	RM	4355	1099	RIT13-14
E7,1642	149	TTF/8	E7,1672	142	END-IN/M	E7,1716	151	DALTRATE	E7,1756	151	RDDSCALI	4355	1099	PRID30
E7,1642	152	XRANGE	E7,1672	143	UT	E7,1717	144	UXVECT	E7,1757	151	LASTTPIP	4356	461	B12-1
E7,1644	148	NEWVEL	E7,1672	144	ERADM	E7,1717	151	QAXIS	E7,1760	146	PANGRODT	4357	1286	S8BITS
E7,1644	149	ELIDUMMY	E7,1672	150	LRMCTR	E7,1717	151	UHYP	E7,1761	151	THISTPIP	4360	1099	OCT23
E7,1644	150	VDSVERT	E7,1673	150	LRSCTR	E7,1720	143	MU/A	E7,1762	143	TIGSAVE	4361	381	DEC17
E7,1644	152	ENGOFOT	E7,1674	144	INCHPEX	E7,1720	145	SCALSHFT	E7,1762	146	P21TINE	4361	892	17OMS
E7,1645	149	AZIDUMMY	E7,1674	150	STILBADH	E7,1721	145	FXZ	E7,1763	151	OLDPIPAZ	4362	789	ASTINDEX
E7,1645	152	VGVECT	E7,1675	144	RLMSRCH	E7,1722	143	RTMAG	E7,1764	143	TIGSAVEP	4362	1099	OCT25
E7,1646	149	ZERDUMMY	E7,1675	145	IGRET	E7,1723	145	ULC	E7,1764	146	SCAXIS	4362	1391	UP21
E7,1646	150	NIGNLOOP	E7,1675	145	LGRET	E7,1724	143	RIC	E7,1764	151	OLDPIPAY	4363	1099	TEN
E7,1647	142	VTIG	E7,1675	145	RDRCT	E7,1725	120	ZAXIS1	E7,1765	151	OLDPIPAZ	4512	465	ENDPIMBF
E7,1647	149	ELVDUMMY	E7,1675	148	P21BASER	E7,1725	144	UYVECT	E7,1766	143	MUSCALE	4616	525	ENDRMDF
E7,1647	150	NGUIDSUB	E7,1675	150	STILBADV	E7,1725	151	UHYP	E7,1766	151	DELVPD	4733	1506	1/.03
E7,1647	150	WCHVERT	E7,1676	145	EC	E7,1731	145	SINMETHA	E7,1772	146	PRINTVSH	4734	1095	LIMITS
E7,1650	149	LRADRET	E7,1676	145	MX	E7,1732	143	SS	E7,1774	151	HCALC1	4735	67	NJETSBIT
E7,1651	149	VSELECT	E7,1676	150	LATVMETR	E7,1733	144	DATAGND	E7,1777	152	END-E7	4735	68	DRFTBIT
E7,1652	148	NEWPOS	E7,1677	150	FORVMETR	E7,1733	146	PSTRJN	E7,1777	152	END-E7.4	4735	72	MRKIDBIT
E7,1652	149	VMEAS	E7,1700	143	VGPREV	E7,1733	151	DELVS	4000	28	FFTAG1	4735	73	DSKYFBIT
E7,1653	152	TXD	E7,1700	143	VSTIG	E7,1734	143	F	4000	28	FFTAG10	4735	75	S32BIT1
E7,1654	149	HMEAS	E7,1700	145	E1	E7,1734	144	OMEGAD	4000	28	FFTAG11	4735	77	ITSWBIT
E7,1655	142	DELVSIN	E7,1700	150	LATVEL	E7,1734	144	OMEGDISP	4000	28	FFTAG12	4735	78	KPQFLBIT
E7,1655	143	IC	E7,1701	150	FORVEL	E7,1735	146	RRSHAFT	4000	28	FFTAG13	4735	83	LRBYBIT
E7,1655	152	END-E7.5	E7,1702	145	E2	E7,1736	143	MDOT	4000	28	FFTAG2	4735	85	CDESBIT
E7,1656	149	VH2	E7,1702	150	TRAKLATV	E7,1736	144	NSRCHPNT	4000	28	FFTAG3	4735	87	PULSES
E7,1656	150	GNUP	E7,1703	144	VXRCM	E7,1737	144	SAVLEMV	4000	28	FFTAG4	4735	1099	NEGMAX
E7,1656	150	GNUV	E7,1703	148	P21BASEV	E7,1737	146	LR22.IX	4000	28	FFTAG7	4735	1099	VLOADCOD
E7,1656	150	LRADRET1	E7,1703	150	TRAKFWDV	E7,1740	143	TDECAY	4000	28	FFTAG8	4735	1285	SBIT15
E7,1660	148	LNCHTM	E7,1704	145	E3	E7,1740	146	RRBORSIT	4000	28	FFTAG9	4736	65	JSWCHBIT
E7,1662	148	TRANSTM	E7,1704	145	MY	E7,1741	151	ALTBITS	4000	28	RADARFF	4736	67	DIDFLBIT
E7,1663	142	DELVSAB	E7,1704	150	VHY	E7,1742	143	VEX	4000	152	END-E7.2	4736	68	SRCHOBIT
E7,1663	142	VGDISP	E7,1705	151	VH2	E7,1742	772	ZVEXHUST	4060	154	UPRPTBB	4736	70	GLOKFBIT
E7,1664	148	NCSMVFL	E7,1706	143	VG	E7,1743	151	RUMIT	4101	1099	OCT60000	4736	72	PFIDBIT
E7,1664	150	DELTAH	E7,1706	151	VVECT	E7,1744	143	IRETURN1	4144	1372	VERBMASK	4736	75	S32BIT2

ASSEMBLE & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
4736	77	MANUEBIT	4741	69	STEERBIT	4744	67	VEHUPBIT	4747	68	TRACKBIT	4751	1285	S+4
4736	80	FLV3BIT	4741	70	NR29FBIT	4744	69	XDELVBIT	4747	69	AVFLBIT	4751	1285	SBIT3
4736	82	INTFLBIT	4741	72	NWAITBIT	4744	71	PRECIBIT	4747	71	STATEBIT	4752	37	DELAYNUM
4736	85	REMODBIT	4741	74	R77FLBIT	4744	72	NRMNVBIT	4747	73	MRUPTBIT	4752	66	R10FLBIT
4736	87	USEQRJTS	4741	77	SWANDBIT	4744	76	MUNFLBIT	4747	78	AVEGFBIT	4752	68	GUESSBIT
4736	1099	HALF	4741	79	LMOONBIT	4744	77	V67FLBIT	4747	79	APSESBIT	4752	70	CALC2BIT
4736	1099	PJS1/2	4741	80	FLPIBIT	4744	79	SURFFBIT	4747	81	QUITBIT	4752	71	D6OR9BIT
4736	1099	PRI020	4741	83	PSTHIBIT	4744	81	FLAPBIT	4747	84	READVBIT	4752	75	MGLVFBIT
4736	1285	SBIT14	4741	85	CCPOSBIT	4744	84	LRINHBIT	4747	86	LRALTBIT	4752	76	AUXFLBIT
4737	40	HIRTHROT	4741	87	ACC4OR2X	4744	86	LRVELBIT	4747	88	AORBSYST	4752	78	V82EMBIT
4737	65	MIDFLBIT	4741	131	QRBIT	4744	87	DRIFTBIT	4747	613	HLITE	4752	80	INITABIT
4737	67	ERADFBIT	4741	1099	EBANK4	4744	1285	SBIT8	4747	749	OCT20	4752	81	MIDAVBIT
4737	68	ACMODBIT	4741	1099	PRI02	4744	1331	IMUSEFLG	4747	751	LSTLIM	4752	84	VFLSHBIT
4737	70	REFSMBIT	4741	1099	2K	4744	1506	.0125RS	4747	821	+AZBIT	4752	86	AUTOMBIT
4737	72	NR4IDBIT	4741	1285	SBIT11	4745	66	RNDVZBIT	4747	1285	SBIT5	4752	88	AUTRATE2
4737	74	SNUFFBIT	4742	65	FSPASBIT	4745	67	UPDATBIT	4747	1412	CALLGMBL	4752	746	BLANKDEX
4737	75	S32BIT3A	4742	67	R61FLBIT	4745	69	ETPIBIT	4750	66	NEEDLBIT	4752	821	+ELBIT
4737	77	IGNFLBIT	4742	70	VFLAGBIT	4745	69	OPTNBIT	4750	69	PFRATBIT	4752	1099	TWO
4737	79	NEWIBIT	4742	72	NWAITBIT	4745	71	CULTBIT	4750	71	INTYPBIT	4752	1285	S+2
4737	82	APSFEBIT	4742	74	RNGSCBIT	4745	73	PRONVBIT	4750	73	NRUPTBIT	4752	1285	SBIT2
4737	85	RCDUOBIT	4742	76	GM3DRBIT	4745	74	ENGONBIT	4750	75	NORRMBIT	4752	1389	UP72
4737	87	CSMDOCKD	4742	77	NORMSBIT	4745	78	IDLEFBIT	4750	78	UPLOCBIT	4753	66	OLDESBIT
4737	218	OCT10000	4742	79	FLUNDRIT	4745	79	INFINBIT	4750	80	COGAFBIT	4753	70	NOOUBIT
4737	797	FEXTRA	4742	80	FLRCSBIT	4745	82	REINTBIT	4750	84	RNGEDBIT	4753	71	DIMOBIT
4737	1099	PRI010	4742	84	NOLRRBIT	4745	84	VELDABIT	4750	86	RRDATABT	4753	73	XDSPBIT
4737	1099	QUARTER	4742	85	DESIGBIT	4745	86	FCDUFBIT	4750	88	DRSELECT	4753	75	RENOWNBIT
4737	1285	SBIT13	4742	87	AORBTRAN	4745	87	RHCSCALE	4750	232	OCT00010	4753	77	ATTFLBIT
4740	65	MOONBIT	4742	131	PBIT	4745	1096	SUPER100	4750	827	TSCALINV	4753	78	TFFSWBIT
4740	67	ROJFLBIT	4742	1099	PRI01	4745	1285	SBIT7	4750	1099	EIGHT	4753	80	360SWBIT
4740	68	LOSCMBIT	4742	1285	SBIT10	4746	66	RRNBBIT	4750	1285	SBIT4	4753	81	AVEMDBIT
4740	70	LUNABIT	4743	66	P25FLBIT	4746	67	NOUPFBIT	4750	1419	DSPLYALT	4753	85	HFLSHBIT
4740	72	PDSPFBIT	4743	69	IMPULBIT	4746	69	FINALBIT	4751	66	FREFFBIT	4753	86	TURNONBIT
4740	74	NOTHRBIT	4743	71	READRBIT	4746	71	ORBWFBIT	4751	68	SLOPEBIT	4753	88	AUTRATE1
4740	75	S32BIT3B	4743	71	RO4FLBIT	4746	73	PINBRBIT	4751	70	CALC3BIT	4753	209	LAGSLIST
4740	77	ASTNBIT	4743	72	MRKNVBIT	4746	74	3AXISBIT	4751	71	VINTFBIT	4753	821	-ELBIT
4740	79	CMJONBIT	4743	74	DMENFBIT	4746	76	REDFLBIT	4751	73	MKOVBIT	4753	1099	ONE
4740	80	FLPCBIT	4743	77	RVSXBIT	4746	78	V37FLBIT	4751	75	SOLNSBIT	4753	1285	S+1
4740	83	VXINHBIT	4743	79	P29SWBIT	4746	79	ORDERBIT	4751	76	NTARGBIT	4753	1285	SBIT1
4740	85	ANTENBIT	4743	81	LETABBIT	4746	81	ROTFLBIT	4751	78	VERIFBIT	4753	1389	UP71
4740	87	OURRCBIT	4743	84	XORFLBIT	4746	84	READLBIT	4751	81	MID1FBIT	4754	1286	S-ZERO
4740	827	TTFSCALE	4743	85	ALTSCBIT	4746	86	LRPOSBIT	4751	84	SCABBIT	4755	235	DNLADPOO
4740	1099	PRI04	4743	87	XOVINHIB	4746	88	ULLAGER	4751	86	RRRSBIT	4755	1285	S+ZERO
4740	1285	SBIT12	4743	1285	SBIT9	4746	821	-AZBIT	4751	88	ACCSOKAY	4755	1389	UP70
4741	43	MINCSM	4743	1309	SPSCODE	4746	1285	SBIT6	4751	613	VLITE	4756	223	NUMGRPS
4741	65	P21FLBIT	4744	66	IMUSEBIT	4747	66	LOKONBIT	4751	1099	FOUR	4756	1285	S+5

SYMBOL & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
4756	1391	UPOTPHAS	5472	263	TERNEXTV	01,2000	28	RESTART	05,2154	199	LMREND04	10,2000	29	RTBCODES
4757	444	DSPMSK	5472	264	ENDEXTV3	01,2000	239	PRDTTAB	05,2154	200	LMDSAS04	10,2000	29	SLCTMU
4757	1099	LON3	5472	1372	ENDEXT	01,2001	239	CADRTAB	05,2154	202	LMLSAL04	10,2330	1372	GOXDSP
4757	1286	S+7	5644	1384	ABORT	01,2016	239	2.2SPOT	05,2154	204	LMAGSI04	10,2334	1372	GOXDSPF
4757	1374	OCT7	5660	137	NEG7	01,2016	240	3.2SPOT	05,2157	196	LMCSTA05	10,2350	1372	GOXDSPR
4760	745	VB990EX	5660	1286	S-7	01,2016	243	6.2SPOT	05,2157	199	LMREND05	10,2353	1372	GOXDSPFR
4760	1099	NDUTCON	5751	181	120MS	01,2516	1094	SW/	05,2157	200	LMDSAS05	10,3050	1372	GOASIN
4761	1073	THIRTEEN	5751	1331	BITSET4	04,2000	28	ACTMARK2	05,2157	202	LMLSAL05	10,3070	1372	GOPLAY
4762	745	CNTINDEX	5751	1484	TWELVE	04,2000	28	CONICS1	05,2157	204	LMAGSI05	11,2000	29	F2DPS*11
4764	1096	DEC27	6000	28	FFTAG5	04,2000	28	E/PRUG	05,2170	203	LMDSAS06	11,2000	29	INTVEL
4765	745	VB97DEX	6000	28	FFTAG6	04,2000	28	KEYRUPT	05,2170	202	LMLSAL06	11,2000	29	ORBITAL
4765	1096	DEC29	6001	749	?	04,2000	28	PINBALL4	05,2172	193	NMDNLST	12,2000	29	CONICS
4766	279	250MS+1	6010	209	VOON25	04,2000	18	FO2	05,2172	196	LMCSTADL	12,2000	29	ORBITAL1
4766	1510	RATELIM1	6074	1308	OCT177	04,2000	28	P36LM	05,2224	199	LMREND06	12,2000	30	INTPRET2
4767	1510	RATEDR1	6107	1099	VLOAD*	04,2000	28	UPDATE2	05,2224	201	LMDSAS09	12,2000	37	LOUNITZ
4771	304	MIXCON	6112	1286	S-4	04,2000	28	VERB37	05,2224	202	LMLSAL08	12,2002	37	LOUNITY
4771	1286	CNTRCON	6242	1099	SIX	04,2040	447	MODROUTB	05,2226	202	LMLSAL09	12,2004	37	LOPHALF
4771	1331	BIT5486	6242	1285	S+6	04,3036	37	LODPI1/4	05,2232	198	LMREND0L	12,2004	37	LOUNITX
4774	1335	OCT62	6245	563	BIN3	04,3041	1185	BEE19	05,2276	202	LMLSAL07	12,2004	1101	HALFDP
4775	1099	OCT120	6245	1099	LOH2	04,3045	1185	BEE22	05,2303	200	LMDSAS0L	12,2004	1136	DP1/2
4776	1099	OCT140	6245	1099	THREE	04,3041	1389	UPPART2	05,2357	202	LMLSALDL	12,2004	1148	181
4777	381	1SECX	6245	1285	S+3	04,3520	1391	UPSTORE	05,2407	193	AGSLIST	12,2006	37	LO6ZEROS
4777	763	SEC01	6245	1389	UP73	04,3562	1392	UPPART3	05,2407	193	UPONLIST	12,2006	1101	ZERODP
5006	930	VBO3409	6471	1099	OCT30002	04,3711	1394	UPOUT	05,2407	204	LMAGSIDL	12,2006	1137	20ZERO
5007	223	STARTED	6741	1025	0+2	04,3712	1391	UPOUT4	06,2000	29	EARTHLOC	12,2006	1185	KEPZERO
5007	1099	EBANK3	6742	1294	TCR	05,2000	29	ABORTS1	06,2000	29	IMUCOMP	12,2006	1246	DPZERO
5007	1286	ERASCON6	7663	1099	OCT10003	05,2000	29	ASENT3	06,2000	29	NIODGIM	12,2017	37	RMM
5007	1429	RGIMBITS	7712	552	BIT12.14	05,2000	29	DOWNTLM	06,2000	29	RCSMONT	12,2017	1202	LOPDSMAX
5011	37	ERASID	7716	1441	25/32	05,2000	29	EPHEM1	06,2000	29	T4RUP	12,2021	37	RME
5012	1286	S10BITS	7722	1099	BIT14	05,2000	29	FRANDRES	06,2703	180	ICDUFAL	12,3755	1246	DQUARTER
5014	595	NR29&R02	7727	155	100MRUPT	05,2066	194	LMORSMOL	06,2703	180	IMUFAL	12,3755	1246	PUS1/4
5014	1433	BIT59.11	7727	1413	MS100	05,2127	196	LMCSTA01	06,3132	188	DAPT4S	12,3773	1246	2/3
5015	1099	EBANK6	7731	159	20MRUPT	05,2127	198	LMREND01	06,3132	189	NURRGMON	13,2000	30	ABTFLGS
5020	907	BITSET	7740	532	-45003SR	05,2127	202	LMLSAL01	06,3156	191	RCSMONIT	13,2000	30	INTINIT
5020	1286	SRN403	7740	1372	PINMASK	05,2136	196	LMCSTA02	06,3242	192	5FAILTAB	13,2000	30	LATLONG
5020	1429	RGIMBITS	7741	528	-BIT12	05,2136	198	LMREND02	06,3252	192	6FAILTAB	13,2000	30	LEMGEUM
5024	1300	OCT14000	7741	994	MIM812	05,2136	200	LMDSAS02	07,2000	29	ADTMARK1	13,2000	30	ORBITAL2
5025	181	OCT15000	7745	1286	S-3	05,2136	202	LMLSAL02	07,2000	29	ASENT2	13,2000	30	P76LJC
5026	181	ERRDMSK	7746	1286	S-2	05,2136	204	LMAGSI02	07,2000	29	MODESW	13,2661	37	ATOPOTH
5026	223	IM33INIT	7746	1308	MINUS2	05,2145	196	LMCSTA03	07,2667	851	SETXFLAG	13,2734	37	ATOPTHIS
5055	1384	DRALARM	7747	1099	MINUS1	05,2145	198	LMREND03	07,3210	1331	IMUFINZO	13,2747	37	MOVATHIS
5070	181	GLOCKOK	7747	1099	NEG1	05,2145	200	LMDSAS03	07,3712	1330	OPTSTALL	13,3043	37	OTHPREC
5270	189	ENDDAPT4	7747	1286	S-1	05,2145	202	LMLSAL03	10,2000	29	DISPLAYS	13,3057	37	THISPREC
5070	190	RCSMONEX	00,2000	28	DLAYJ03	05,2145	204	LMAGSI03	10,2000	29	FLESHLOC	14,2000	31	ASENT4
5464	1373	LINUS	01,2000	28	LOADDAP1	05,2154	196	LMCSTA04	10,2000	29	PHASETAB	14,2000	31	P50S1

ERASABLE & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
14,2000	31	STARTAB	23,2000	32	APOPERI	24,2000	492	PROG22	31,2000	34	F2DPS#31	36,2777	745	V99PECYC
14,2556	935	S50	23,2000	32	ASENT7	25,2000	32	PLANTIN3	31,2000	34	V867	37,2000	36	IMUSUPER
14,2611	937	R56	23,2000	32	EXTVRI	25,2000	32	P20S1	32,2000	34	ABORTS	37,2000	36	IMU2
14,3256	945	R54	23,2000	32	INFLIGHT	25,2000	32	P20S2	32,2000	34	F2DPS#32	37,2000	36	IMU4
15,2000	31	EPHEM	23,2000	32	INTPRET1	25,2000	32	RADARUPT	32,2000	34	LRS22	37,2000	36	P05P06
15,2000	31	P50S	23,2000	32	MEASINC	25,2000	32	RRLEADIN	32,2000	34	P20S4	37,2000	36	R31
15,2465	251	DP1712	23,2000	32	MEASINC1	25,2000	32	R29S1	32,2000	34	P66LUC	37,2000	36	SERV1
15,3664	985	LUNPOS	23,2000	32	NORMLTZ	26,2000	33	SAWLANGS	32,2000	34	R47	37,3544	962	PIPSRINE
16,2000	31	DAPS1	23,2000	32	P3WFLITE	26,2000	33	MANUVER	32,2000	34	SERV	40,2000	36	PINBALL1
16,3572	1440	INDXYZ	23,2000	32	P3WFLIT1	26,2000	33	MANUVER1	33,2000	34	ASENT6	40,2000	36	PINSUPER
17,2000	31	DAPS2	23,2000	32	P12A	26,2000	33	PLANTIN1	33,2000	34	R29/SERV	40,2000	36	R31LOC
17,2000	31	P40S3	23,2000	32	R61	26,2000	33	PLANTIN2	33,2000	34	SERVICES	40,2000	36	SELSUPR
17,2022	742	ZOOM	23,2000	32	R62	26,2000	33	P20S3	33,2677	878	ALTCRIT	40,3322	443	ENDECVN
17,2561	1452	ATTSTEER	23,2103	485	R52DISP	27,2000	33	ASENT1	33,3146	855	100CS	40,3505	450	ENDRELOS
17,3107	1446	14MS	23,2314	1283	RPAD1	27,2000	33	P40S1	33,3514	889	ENDVDAT	40,3534	457	ENDSUB1
20,2000	31	DAPS3	23,2511	37	HIDP1/4	27,2000	33	SERV3	34,2000	34	ASCFILT	40,3534	1294	DSPMMJUB
20,2000	31	LOADDAP	23,2511	1283	TFE1/4	27,2000	33	TOF-FF	34,2000	34	CSI/CDH1	40,3674	471	ENDPINS1
20,2000	31	RJOTRAP	23,2513	37	HIUNITZ	27,2000	33	TOF-FF1	34,2000	34	P30S1	41,2000	36	PINBALL2
21,2000	31	DAPS4	23,2513	37	NBINB2	27,2000	33	VECPT	34,2000	34	R12STUFF	41,2615	417	ENDRTOUT
21,2000	31	R10	23,2513	37	THISAXIS	27,3753	1282	TCDANZIG	34,2000	34	SERV4	41,3230	431	ENDROUTIN
21,2000	31	R11	23,2515	37	HIUNITY	30,2000	34	ASENT	34,2000	34	STBLEORB	41,3731	469	ENDPINS2
21,2000	32	KALCMON1	23,2517	37	HIDPHALF	30,2000	34	ASENT5	35,2000	35	CSI/CDH	42,2000	36	PINBALL3
22,2000	32	KALCMON2	23,2517	37	HIUNITX	30,2000	34	FCDUW	35,2000	35	GLM	42,2000	36	SBAND
22,2000	32	LANDCNST	23,2517	593	COS60DEG	30,2000	34	FLOGSUB	35,2000	35	P30S	42,3606	436	ENDHMSS
22,2000	32	RENDEZ	23,2517	1100	OPHALF	30,2000	34	LOWSUPER	35,2000	35	P40S2	43,2000	36	EXTVERBS
22,2000	32	F30LOC	23,2521	37	HIGZEROS	30,2000	34	P12	36,2000	36	P40S	43,2000	36	SELFCHEC
22,2000	32	SERV2	23,2521	593	ZERO/SP	30,2000	34	V867A	36,2055	763	ACADN95	43,2002	466	PINTEST
22,2744	364	LOC SKIRT	23,2521	1157	ZERO	30,3022	855	T2A	36,2105	749	SERVCAOR	43,2226	269	OPTCDARV
22,2541	37	DELR SPL	23,2521	1283	TFEZEROS	30,3767	925	DAZMAX	36,2146	733	P12SPOT	43,3045	288	V74
22,2541	718	SPLRET	24,2000	32	PLANTIN	30,3771	925	DELERLIM	36,2146	733	P42SPOT	43,3100	290	GUSHOSUM
22,2707	864	OUTGDAVE	24,2000	32	P20S	31,2000	34	FTHRJT	36,2151	733	P63SPOT	43,3740	1388	CKMDMORE

SUMMARY OF SYMBOL TABLE LISTINGS

4927 DEFINED NORMALLY

2178 DEFINED BY EQUALS

TOTAL: 7105

MEMORY TYPE & AVAILABILITY DISPLAY

0000 TO	0057	SPECIAL OR NONEXISTENT MEMORY	23,2000 TO 23,3771	RESERVED SWITCHABLE FIXED MEMORY
	0060	AVAILABLE ERASABLE MEMORY	23,3772 TO 23,3777	AVAILABLE SWITCHABLE FIXED MEMORY
0061 TO	1377	RESERVED ERASABLE MEMORY	24,2000 TO 25,3772	RESERVED SWITCHABLE FIXED MEMORY
E3,1400 TO E4,1756		RESERVED SWITCHABLE ERASABLE MEMORY	25,3773 TO 25,3777	AVAILABLE SWITCHABLE FIXED MEMORY
E4,1757 TO E4,1777		AVAILABLE SWITCHABLE ERASABLE MEMORY	26,2000 TO 27,3774	RESERVED SWITCHABLE FIXED MEMORY
E5,1400 TO E5,1641		RESERVED SWITCHABLE ERASABLE MEMORY	27,3775 TO 27,3777	AVAILABLE SWITCHABLE FIXED MEMORY
E5,1642 TO E5,1777		AVAILABLE SWITCHABLE ERASABLE MEMORY	30,2000 TO 31,3763	RESERVED SWITCHABLE FIXED MEMORY
E6,1400 TO E6,1771		RESERVED SWITCHABLE ERASABLE MEMORY	31,3764 TO 31,3777	AVAILABLE SWITCHABLE FIXED MEMORY
E6,1772 TO E6,1777		AVAILABLE SWITCHABLE ERASABLE MEMORY	32,2000 TO 32,3775	RESERVED SWITCHABLE FIXED MEMORY
E7,1400 TO E7,1744		RESERVED SWITCHABLE ERASABLE MEMORY	32,3776 TO 32,3777	AVAILABLE SWITCHABLE FIXED MEMORY
E7,1745 TO E7,1777		AVAILABLE SWITCHABLE ERASABLE MEMORY	33,2000 TO 36,3767	RESERVED SWITCHABLE FIXED MEMORY
			36,3770 TO 36,3777	AVAILABLE SWITCHABLE FIXED MEMORY
			37,2000 TO 37,3776	RESERVED SWITCHABLE FIXED MEMORY
			37,3777	AVAILABLE SWITCHABLE FIXED MEMORY
4000 TO	7760	RESERVED FIXED MEMORY	40,2000 TO 40,3715	RESERVED SWITCHABLE FIXED MEMORY
7761 TO	7777	AVAILABLE FIXED MEMORY	40,3716 TO 40,3777	AVAILABLE SWITCHABLE FIXED MEMORY
00,2000 TO 00,3776		RESERVED SWITCHABLE FIXED MEMORY	41,2000 TO 41,3733	RESERVED SWITCHABLE FIXED MEMORY
	00,3777	AVAILABLE SWITCHABLE FIXED MEMORY	41,3734 TO 41,3777	AVAILABLE SWITCHABLE FIXED MEMORY
01,2000 TO 01,3777		RESERVED SWITCHABLE FIXED MEMORY	42,2000 TO 42,3774	RESERVED SWITCHABLE FIXED MEMORY
			42,3775 TO 42,3777	AVAILABLE SWITCHABLE FIXED MEMORY
02,2000 TO 03,3777		SPECIAL OR NONEXISTENT MEMORY	43,2000 TO 43,3754	RESERVED SWITCHABLE FIXED MEMORY
			43,3755 TO 43,3777	AVAILABLE SWITCHABLE FIXED MEMORY
04,2000 TO 04,3773		RESERVED SWITCHABLE FIXED MEMORY	44,2000 TO 57,3777	SPECIAL OR NONEXISTENT MEMORY
04,3774 TO 04,3777		AVAILABLE SWITCHABLE FIXED MEMORY	60,2000 TO 67,3777	AVAILABLE SWITCHABLE FIXED MEMORY
05,2000 TO 05,3774		RESERVED SWITCHABLE FIXED MEMORY	70,2000 TO 75,3777	SPECIAL OR NONEXISTENT MEMORY
05,3775 TO 05,3777		AVAILABLE SWITCHABLE FIXED MEMORY		
06,2000 TO 06,3766		RESERVED SWITCHABLE FIXED MEMORY		
06,3767 TO 06,3777		AVAILABLE SWITCHABLE FIXED MEMORY		
07,2000 TO 07,3775		RESERVED SWITCHABLE FIXED MEMORY		
07,3776 TO 07,3777		AVAILABLE SWITCHABLE FIXED MEMORY		
10,2000 TO 13,3771		RESERVED SWITCHABLE FIXED MEMORY		
13,3772 TO 13,3777		AVAILABLE SWITCHABLE FIXED MEMORY		
14,2000 TO 14,3776		RESERVED SWITCHABLE FIXED MEMORY		
	14,3777	AVAILABLE SWITCHABLE FIXED MEMORY		
15,2000 TO 16,3774		RESERVED SWITCHABLE FIXED MEMORY		
16,3775 TO 16,3777		AVAILABLE SWITCHABLE FIXED MEMORY		
17,2000 TO 17,3743		RESERVED SWITCHABLE FIXED MEMORY		
17,3747 TO 17,3777		AVAILABLE SWITCHABLE FIXED MEMORY		
20,2000 TO 20,3774		RESERVED SWITCHABLE FIXED MEMORY		
20,3775 TO 20,3777		AVAILABLE SWITCHABLE FIXED MEMORY		
21,2000 TO 21,3772		RESERVED SWITCHABLE FIXED MEMORY		
21,3773 TO 21,3777		AVAILABLE SWITCHABLE FIXED MEMORY		
22,2000 TO 22,3775		RESERVED SWITCHABLE FIXED MEMORY		
22,3776 TO 22,3777		AVAILABLE SWITCHABLE FIXED MEMORY		

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

	REF	0	LAST	TO	28:	0	0	0
BANKSUM	REF	1	LAST	28	TO 38:	65	65	65
00/DELAY	REF	1	LAST	1377	TO 1379:	31	31	96
00/INTER	REF	1	LAST	1047	TO 1087:	974	974	1070

01/EXEC	REF	1	LAST	1106	TO 1116:	280	280	1350
01/INTER	REF	1	LAST	1087	TO 1095:	157	157	1507
01/RSRDU	REF	3	LAST	1307	TO 1309:	55	168	1675
01/STAB	REF	1	LAST	239	TO 244:	132	132	1807

01/TO3	REF	2	LAST	293	TO 297:	94	96	1903
01/WAIT	REF	2	LAST	1131	TO 1133:	44	189	2092
02/ALARM	REF	2	LAST	1382	TO 1385:	79	116	2208
02/BANK	REF	1	LAST	998	TO 1002:	76	76	2284

02/DAPTS	REF	1	LAST	1404	TO 1405:	13	13	2302
02/DSPLA	REF	1	LAST	1354	TO 1354:	16	16	2318
02/EXEC	REF	2	LAST	1116	TO 1119:	6	65	2383
02/EXTVB	REF	1	LAST	1380	TO 1381:	4	4	2387

02/FCONS	REF	1	LAST	1095	TO 1097:	64	64	2451
02/FLAG	REF	1	LAST	1375	TO 1377:	32	32	2483
02/INODE	REF	1	LAST	1309	TO 1310:	5	5	2488
02/INTER	REF	1	LAST	1102	TO 1103:	32	32	2520

02/PHASE	REF	1	LAST	1298	TO 1300:	71	71	2591
02/PIN	REF	6	LAST	464	TO 467:	37	246	2837
02/P07	REF	1	LAST	381	TO 383:	18	18	2855
02/RSUB	REF	1	LAST	520	TO 526:	63	68	2923

02/RSRDU	REF	2	LAST	1306	TO 1307:	10	17	2940
02/RSPTS	REF	1	LAST	153	TO 155:	54	54	2994
02/TRAN	REF	1	LAST	1379	TO 1380:	15	15	3009
02/T4EPT	REF	1	LAST	155	TO 156:	12	12	3021

02/WAIT	REF	2	LAST	1129	TO 1131:	24	78	3099
03/DAP	REF	1	LAST	1459	TO 1461:	2	2	3101
03/FCONS	REF	1	LAST	1097	TO 1100:	32	32	3133
03/INTER	REF	3	LAST	1014	TO 1047:	732	952	4085

03/KILL	REF	1	LAST	750	TO 750:	8	8	4093
03/PHASE	REF	1	LAST	1302	TO 1303:	4	4	4097
03/P00	REF	1	LAST	224	TO 224:	8	8	4105
03/P20	REF	1	LAST	593	TO 595:	5	5	4110

03/P40	REF	1	LAST	40	TO 40:	1	1	4111
03/R24	REF	1	LAST	516	TO 516:	9	9	4120
04/CONIC	REF	3	LAST	1186	TO 1189:	65	110	4230
04/INTIN	REF	1	LAST	1225	TO 1227:	54	54	4284

04/KEYUP	REF	1	LAST	1338	TO 1354:	69	69	4353
04/LT-LG	REF	1	LAST	45	TO 45:	4	4	4357
04/MARK	REF	1	LAST	249	TO 250:	32	32	4389
04/PIN	REF	2	LAST	464	TO 464:	7	16	4405

04/P00	REF	1	LAST	224	TO 236:	330	330	4735
04/P07	REF	2	LAST	372	TO 373:	5	32	4767
04/P27	REF	1	LAST	1389	TO 1397:	248	248	5015
04/P57	REF	1	LAST	985	TO 985:	12	12	5027

04/R02	REF	1	LAST	1332	TO 1335:	17	17	5044
04/R36	REF	1	LAST	701	TO 703:	93	93	5137
05/ASENT	REF	1	LAST	852	TO 852:	4	4	5141
05/DLIST	REF	1	LAST	193	TO 206:	242	242	5383

05/DPROG	REF	1	LAST	991	TO 998:	180	180	5563
05/EPHEM	REF	2	LAST	987	TO 991:	0	52	5615
05/P70	REF	1	LAST	830	TO 832:	64	64	5679
05/START	REF	2	LAST	211	TO 224:	475	476	6155

06/ICOMP	REF	1	LAST	326	TO 339:	282	282	6437
06/EUR0T	REF	1	LAST	1147	TO 1149:	9	9	6446
06/MIDG	REF	1	LAST	692	TO 693:	30	30	6476
06/T4RCS	REF	1	LAST	191	TO 193:	69	69	6545

06/T4RPT	REF	2	LAST	156	TO 191:	612	622	7167
07/ASENT	REF	1	LAST	851	TO 852:	21	21	7188
07/INODE	REF	1	LAST	1310	TO 1332:	559	559	7747
07/MARK	REF	2	LAST	251	TO 261:	286	407	8154

07/R59	REF	1	LAST	261	TO 262:	32	32	8186
10/DSPLA	REF	3	LAST	1382	TO 1382:	9	677	8863
10/MIDG	REF	1	LAST	693	TO 695:	24	24	8887
10/PHASE	REF	2	LAST	1300	TO 1302:	66	75	8962

10/PSWFL	REF	1	LAST	1265	TO 1271:	115	115	9077
10/RTB	REF	1	LAST	1397	TO 1404:	130	130	9207
11/P20PS	REF	1	LAST	820	TO 822:	65	65	9272
11/INITV	REF	1	LAST	686	TO 692:	189	189	9461

11/ORBITE	REF	1	LAST	1227	TO 1249:	841	841	10302
12/CONIC	REF	3	LAST	1189	TO 1209:	494	978	11280
12/ICONS	REF	1	LAST	1101	TO 1102:	19	19	11299
13/ALARM	REF	1	LAST	1385	TO 1388:	10	10	11309

13/GEOM	REF	1	LAST	320	TO 324:	79	79	11388
13/INTIN	REF	4	LAST	1221	TO 1225:	134	605	11993
13/LT-LG	REF	1	LAST	1133	TO 1140:	155	155	12148
13/ORBITE	REF	1	LAST	46	TO 46:	20	20	12168

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

13/P76	REF	1	LAST	709 TO 713:	98	98	12266
14/ASENT	REF	1	LAST	852 TO 854:	63	63	12329
14/INFLT	REF	1	LAST	948 TO 949:	0	0	12329
14/LOSSAM	REF	2	LAST	935 TO 937:	67	75	12404

14/P51	REF	1	LAST	949 TO 953:	120	120	12524
14/R50	REF	1	LAST	947 TO 948:	64	64	12588
14/R51	REF	1	LAST	941 TO 945:	135	135	12723
14/R52	REF	1	LAST	955 TO 957:	68	68	12791

14/R54	REF	1	LAST	946 TO 947:	41	41	12832
14/R55	REF	1	LAST	945 TO 946:	26	26	12858
14/R56	REF	1	LAST	937 TO 941:	132	132	12990
14/STARS	REF	1	LAST	47 TO 51:	223	223	13213

14/S52.1	REF	1	LAST	953 TO 954:	25	25	13238
14/S52.3	REF	1	LAST	954 TO 955:	16	16	13254
15/EPHEM	REF	1	LAST	985 TO 987:	74	74	13328
15/P51	REF	1	LAST	961 TO 964:	67	67	13395

15/P52	REF	1	LAST	927 TO 935:	157	157	13552
15/P57	REF	2	LAST	966 TO 983:	440	567	14119
15/P59	REF	2	LAST	957 TO 961:	149	189	14308
16/DAP	REF	1	LAST	1470 TO 1472:	60	60	14368

16/DAPID	REF	1	LAST	1410 TO 1414:	139	139	14507
16/DAPP	REF	1	LAST	1421 TO 1442:	790	790	15297
17/DAPOR	REF	1	LAST	1442 TO 1459:	624	624	15921
17/DAPRJ	REF	1	LAST	1461 TO 1470:	314	314	16235

17/DAPTS	REF	2	LAST	1405 TO 1406:	5	35	16270
17/P40	REF	1	LAST	741 TO 742:	23	23	16293
20/DAPAD	REF	4	LAST	1497 TO 1508:	354	727	17020
20/DAPIF	REF	1	LAST	1436 TO 1410:	67	67	17087

20/F2DPS	REF	1	LAST	822 TO 822:	6	6	17093
20/NEEDL	REF	1	LAST	1414 TO 1421:	145	145	17238
20/P03	REF	1	LAST	292 TO 293:	73	73	17311
21/DAPBJ	REF	1	LAST	1508 TO 1508:	82	82	17293

21/DAPGT	REF	1	LAST	1472 TO 1486:	338	338	17781
21/P70	REF	2	LAST	835 TO 836:	16	30	17811
21/R10	REF	2	LAST	898 TO 910:	467	473	18284
21/R11	REF	1	LAST	829 TO 830:	52	52	18336

21/SERV	REF	1	LAST	872 TO 873:	20	20	18356
21/F2DPS	REF	1	LAST	827 TO 829:	10	10	18366
22/INCOR	REF	1	LAST	1157 TO 1174:	50	50	18416
22/KILL	REF	1	LAST	351 TO 370:	670	670	19086

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

22/P30	REF	2	LAST	713 TO 720:	199	203	19289
22/SERV	REF	1	LAST	862 TO 865:	24	24	19313
22/SR30S	REF	1	LAST	720 TO 724:	62	62	19375
23/EXTVB	REF	1	LAST	271 TO 271:	33	33	19408

23/SEDM	REF	1	LAST	324 TO 326:	34	34	19442
23/ICONS	REF	1	LAST	1100 TO 1101:	16	16	19458
23/INCOR	REF	2	LAST	1153 TO 1157:	196	334	19792
23/INFLT	REF	1	LAST	1249 TO 1259:	184	184	19976

23/PERAP	REF	1	LAST	695 TO 701:	76	76	20054
23/POWFL	REF	1	LAST	1259 TO 1265:	152	152	20206
23/P12	REF	1	LAST	841 TO 843:	23	23	20229
23/R61	REF	1	LAST	517 TO 520:	126	126	20355

23/R62	REF	1	LAST	485 TO 486:	11	11	20366
23/SERV	REF	1	LAST	866 TO 867:	24	24	20390
24/LPS20	REF	1	LAST	565 TO 566:	46	46	20436
24/LUPOT	REF	1	LAST	1141 TO 1144:	69	69	20505

24/P20	REF	2	LAST	495 TO 501:	230	260	20765
24/P21	REF	1	LAST	655 TO 661:	115	115	20880
24/P22	REF	2	LAST	507 TO 508:	5	5	20885
24/P25	REF	1	LAST	502 TO 504:	37	37	20922

24/R21	REF	1	LAST	508 TO 513:	161	161	21083
24/R22	REF	1	LAST	504 TO 507:	142	142	21225
24/R23	REF	1	LAST	513 TO 515:	41	41	21266
24/R24	REF	2	LAST	516 TO 517:	17	39	21305

24/R29	REF	2	LAST	605 TO 608:	69	87	21392
25/LPS20	REF	1	LAST	566 TO 569:	12	12	21404
25/LUPOT	REF	1	LAST	1144 TO 1146:	63	63	21467
25/LEAD	REF	1	LAST	490 TO 492:	47	47	21514

25/RRUPT	REF	3	LAST	612 TO 614:	50	262	21776
25/RSUB	REF	2	LAST	561 TO 565:	60	626	22402
26/BALL	REF	1	LAST	477 TO 481:	50	50	22452
26/LPS24	REF	1	LAST	588 TO 593:	172	172	22624

26/LSR22	REF	1	LAST	575 TO 588:	536	536	23160
26/LUPOT	REF	3	LAST	1146 TO 1147:	26	65	23225
26/R06	REF	1	LAST	473 TO 477:	99	99	23324
26/R63	REF	1	LAST	339 TO 351:	65	65	23389

27/ASENT	REF	2	LAST	854 TO 855:	21	36	23425
27/KILL	REF	1	LAST	750 TO 752:	38	38	23463
27/P12	REF	1	LAST	44 TO 44:	4	4	23467
27/P40	REF	2	LAST	753 TO 755:	83	93	23560

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

27/P70	REF	1	LAST	38	TO	39:	8	8	23568
27/SERV	REF	1	LAST	865	TO	866:	31	31	23599
27/S40.1	REF	1	LAST	765	TO	769:	101	101	23700
27/S40.2	REF	1	LAST	769	TO	770:	28	28	23728

27/S40.6	REF	1	LAST	781	TO	784:	40	40	23768
27/S40.8	REF	1	LAST	770	TO	773:	57	57	23825
27/S40.9	REF	2	LAST	776	TO	781:	200	202	24027
27/S41.1	REF	1	LAST	784	TO	785:	4	4	24031

27/TEF	REF	2	LAST	1271	TO	1285:	266	268	24299
27/VEOPT	REF	1	LAST	481	TO	485:	136	136	24435
27/40.13	REF	1	LAST	773	TO	776:	103	103	24538
40/ASENT	REF	3	LAST	854	TO	854:	17	321	24859

30/EXTVB	REF	1	LAST	610	TO	612:	47	47	24906
30/FCDUW	REF	1	LAST	910	TO	927:	441	441	25347
30/P12	REF	1	LAST	838	TO	841:	160	160	25507
31/EXTVB	REF	1	LAST	608	TO	610:	93	93	25600

31/FCDPS	REF	4	LAST	822	TO	827:	134	665	26265
31/P6567	REF	1	LAST	791	TO	793:	42	42	26307
31/13	REF	1	LAST	800	TO	801:	74	74	26381
31/THROT	REF	2	LAST	793	TO	798:	130	135	26516

32/FCDPS	REF	2	LAST	816	TO	820:	173	174	26690
32/LRS22	REF	2	LAST	569	TO	575:	132	136	26826
32/P20	REF	1	LAST	493	TO	495:	103	103	26929
32/P63	REF	1	LAST	785	TO	791:	181	181	27110

32/P70	REF	2	LAST	836	TO	838:	25	152	27262
32/P29	REF	1	LAST	600	TO	605:	151	151	27413
32/P47	REF	1	LAST	206	TO	211:	138	138	27551
32/SERV	REF	1	LAST	865	TO	866:	3	3	27554

33/ASENT	REF	1	LAST	855	TO	857:	44	44	27598
33/P29	REF	1	LAST	595	TO	599:	97	97	27695
33/SERV	REF	8	LAST	894	TO	893:	71	926	28621
34/ASENT	REF	1	LAST	843	TO	845:	44	44	28665

34/CSI	REF	1	LAST	632	TO	650:	650	650	29315
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ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

34/P3879	REF	1	LAST	724	TO	731:	233	233	29548
34/SERV	REF	2	LAST	894	TO	894:	14	47	29595
34/S20S	REF	1	LAST	616	TO	621:	47	47	29642
35/P30	REF	1	LAST	614	TO	616:	23	23	29665

35/P31	REF	1	LAST	652	TO	655:	61	61	29726
35/P3272	REF	1	LAST	621	TO	627:	119	119	29845
35/P3373	REF	1	LAST	627	TO	632:	140	140	29985
35/P3474	REF	1	LAST	661	TO	666:	112	112	30097

35/P3575	REF	2	LAST	666	TO	686:	530	544	30641
35/P40	REF	1	LAST	748	TO	749:	23	25	30664
36/P40	REF	6	LAST	759	TO	765:	163	778	31442
36/P41	REF	1	LAST	755	TO	757:	78	78	31520

36/P42	REF	1	LAST	757	TO	758:	22	22	31542
36/P47	REF	1	LAST	758	TO	759:	52	52	31594
37/P05	REF	1	LAST	1336	TO	1338:	32	32	31626
37/P06	REF	1	LAST	1335	TO	1336:	47	47	31673

37/P07	REF	3	LAST	383	TO	398:	267	587	32260
37/R31	REF	1	LAST	703	TO	709:	189	189	32449
37/SERV	REF	2	LAST	869	TO	872:	76	165	32614
40/EXTVB	REF	1	LAST	299	TO	304:	63	63	32677

40/PIN	REF	10	LAST	470	TO	473:	57	893	33570
40/R31	REF	1	LAST	703	TO	703:	15	15	33585
41/PIN	REF	8	LAST	467	TO	470:	78	935	34570
42/EXTVB	REF	2	LAST	287	TO	288:	23	38	34608

42/NOUNS	REF	1	LAST	304	TO	320:	597	597	35205
42/PIN	REF	2	LAST	434	TO	437:	92	238	35443
42/R05	REF	2	LAST	486	TO	490:	116	118	35561
42/R33	REF	1	LAST	275	TO	276:	27	27	35588

43/EXTVB	REF	6	LAST	297	TO	299:	56	478	36066
43/PHASE	REF	1	LAST	1294	TO	1294:	14	14	36080
43/P27	REF	1	LAST	1388	TO	1389:	22	22	36102
43/R0477	REF	1	LAST	276	TO	280:	188	188	36290

43/SELF	REF	1	LAST	1285	TO	1294:	314	314	36604
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PARAGRAPHS GENERATED FOR THIS ASSEMBLY; ADDRESS LIMITS AND THE MANUFACTURING LOCATION CODE ARE SHOWN FOR EACH

4000	TO	4377	PARAGRAPH # 010	ROPE MODULE 1, SIDE A, SENSE LINE SET 5 (WIRES 65- 80)
4400	TO	4777	PARAGRAPH # 011	ROPE MODULE 1, SIDE B, SENSE LINE SET 5 (WIRES 65- 80)
5000	TO	5377	PARAGRAPH # 012	ROPE MODULE 1, SIDE A, SENSE LINE SET 6 (WIRES 81- 96)
5400	TO	5777	PARAGRAPH # 013	ROPE MODULE 1, SIDE B, SENSE LINE SET 6 (WIRES 81- 96)
6000	TO	6377	PARAGRAPH # 014	ROPE MODULE 1, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
6400	TO	6777	PARAGRAPH # 015	ROPE MODULE 1, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
7000	TO	7377	PARAGRAPH # 016	ROPE MODULE 1, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
7400	TO	7777	PARAGRAPH # 017	ROPE MODULE 1, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
00,2000	TO	00,2377	PARAGRAPH # 020	ROPE MODULE 1, SIDE A, SENSE LINE SET 1 (WIRES 1- 16)
00,2400	TO	00,2777	PARAGRAPH # 021	ROPE MODULE 1, SIDE B, SENSE LINE SET 1 (WIRES 1- 16)
00,3000	TO	00,3377	PARAGRAPH # 022	ROPE MODULE 1, SIDE A, SENSE LINE SET 2 (WIRES 17- 32)
00,3400	TO	00,3777	PARAGRAPH # 023	ROPE MODULE 1, SIDE B, SENSE LINE SET 2 (WIRES 17- 32)
01,2000	TO	01,2377	PARAGRAPH # 024	ROPE MODULE 1, SIDE A, SENSE LINE SET 3 (WIRES 33- 48)
01,2400	TO	01,2777	PARAGRAPH # 025	ROPE MODULE 1, SIDE B, SENSE LINE SET 3 (WIRES 33- 48)
01,3000	TO	01,3377	PARAGRAPH # 026	ROPE MODULE 1, SIDE A, SENSE LINE SET 4 (WIRES 49- 64)
01,3400	TO	01,3777	PARAGRAPH # 027	ROPE MODULE 1, SIDE B, SENSE LINE SET 4 (WIRES 49- 64)
04,2000	TO	04,2377	PARAGRAPH # 040	ROPE MODULE 1, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
04,2400	TO	04,2777	PARAGRAPH # 041	ROPE MODULE 1, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
04,3000	TO	04,3377	PARAGRAPH # 042	ROPE MODULE 1, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
04,3400	TO	04,3777	PARAGRAPH # 043	ROPE MODULE 1, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
05,2000	TO	05,2377	PARAGRAPH # 044	ROPE MODULE 1, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
05,2400	TO	05,2777	PARAGRAPH # 045	ROPE MODULE 1, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
05,3000	TO	05,3377	PARAGRAPH # 046	ROPE MODULE 1, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
05,3400	TO	05,3777	PARAGRAPH # 047	ROPE MODULE 1, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
06,2000	TO	06,2377	PARAGRAPH # 050	ROPE MODULE 2, SIDE A, SENSE LINE SET 1 (WIRES 1- 16)
06,2400	TO	06,2777	PARAGRAPH # 051	ROPE MODULE 2, SIDE B, SENSE LINE SET 1 (WIRES 1- 16)
06,3000	TO	06,3377	PARAGRAPH # 052	ROPE MODULE 2, SIDE A, SENSE LINE SET 2 (WIRES 17- 32)
06,3400	TO	06,3777	PARAGRAPH # 053	ROPE MODULE 2, SIDE B, SENSE LINE SET 2 (WIRES 17- 32)
07,2000	TO	07,2377	PARAGRAPH # 054	ROPE MODULE 2, SIDE A, SENSE LINE SET 3 (WIRES 33- 48)
07,2400	TO	07,2777	PARAGRAPH # 055	ROPE MODULE 2, SIDE B, SENSE LINE SET 3 (WIRES 33- 48)
07,3000	TO	07,3377	PARAGRAPH # 056	ROPE MODULE 2, SIDE A, SENSE LINE SET 4 (WIRES 49- 64)
07,3400	TO	07,3777	PARAGRAPH # 057	ROPE MODULE 2, SIDE B, SENSE LINE SET 4 (WIRES 49- 64)
10,2000	TO	10,2377	PARAGRAPH # 060	ROPE MODULE 2, SIDE A, SENSE LINE SET 5 (WIRES 65- 80)
10,2400	TO	10,2777	PARAGRAPH # 061	ROPE MODULE 2, SIDE B, SENSE LINE SET 5 (WIRES 65- 80)
10,3000	TO	10,3377	PARAGRAPH # 062	ROPE MODULE 2, SIDE A, SENSE LINE SET 6 (WIRES 81- 96)
10,3400	TO	10,3777	PARAGRAPH # 063	ROPE MODULE 2, SIDE B, SENSE LINE SET 6 (WIRES 81- 96)
11,2000	TO	11,2377	PARAGRAPH # 064	ROPE MODULE 2, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
11,2400	TO	11,2777	PARAGRAPH # 065	ROPE MODULE 2, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
11,3000	TO	11,3377	PARAGRAPH # 066	ROPE MODULE 2, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
11,3400	TO	11,3777	PARAGRAPH # 067	ROPE MODULE 2, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
12,2000	TO	12,2377	PARAGRAPH # 070	ROPE MODULE 2, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
12,2400	TO	12,2777	PARAGRAPH # 071	ROPE MODULE 2, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
12,3000	TO	12,3377	PARAGRAPH # 072	ROPE MODULE 2, SIDE A, SENSE LINE SET 10 (WIRES 145-160)

PARAGRAPHS GENERATED FOR THIS ASSEMBLY; ADDRESS LIMITS AND THE MANUFACTURING LOCATION CODE ARE SHOWN FOR EACH

12,3400	TO 12,3777	PARAGRAPH # 073	ROPE MODULE 2, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
13,2000	TO 13,2377	PARAGRAPH # 074	ROPE MODULE 2, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
13,2400	TO 13,2777	PARAGRAPH # 075	ROPE MODULE 2, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
13,3000	TO 13,3377	PARAGRAPH # 076	ROPE MODULE 2, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
13,3400	TO 13,3777	PARAGRAPH # 077	ROPE MODULE 2, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
14,2000	TO 14,2377	PARAGRAPH # 100	ROPE MODULE 3, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
14,2400	TO 14,2777	PARAGRAPH # 101	ROPE MODULE 3, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
14,3000	TO 14,3377	PARAGRAPH # 102	ROPE MODULE 3, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
14,3400	TO 14,3777	PARAGRAPH # 103	ROPE MODULE 3, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
15,2000	TO 15,2377	PARAGRAPH # 104	ROPE MODULE 3, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
15,2400	TO 15,2777	PARAGRAPH # 105	ROPE MODULE 3, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
15,3000	TO 15,3377	PARAGRAPH # 106	ROPE MODULE 3, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
15,3400	TO 15,3777	PARAGRAPH # 107	ROPE MODULE 3, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
16,2000	TO 16,2377	PARAGRAPH # 110	ROPE MODULE 3, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
16,2400	TO 16,2777	PARAGRAPH # 111	ROPE MODULE 3, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
16,3000	TO 16,3377	PARAGRAPH # 112	ROPE MODULE 3, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
16,3400	TO 16,3777	PARAGRAPH # 113	ROPE MODULE 3, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
17,2000	TO 17,2377	PARAGRAPH # 114	ROPE MODULE 3, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
17,2400	TO 17,2777	PARAGRAPH # 115	ROPE MODULE 3, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
17,3000	TO 17,3377	PARAGRAPH # 116	ROPE MODULE 3, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
17,3400	TO 17,3777	PARAGRAPH # 117	ROPE MODULE 3, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
20,2000	TO 20,2377	PARAGRAPH # 120	ROPE MODULE 3, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
20,2400	TO 20,2777	PARAGRAPH # 121	ROPE MODULE 3, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
20,3000	TO 20,3377	PARAGRAPH # 122	ROPE MODULE 3, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
20,3400	TO 20,3777	PARAGRAPH # 123	ROPE MODULE 3, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
21,2000	TO 21,2377	PARAGRAPH # 124	ROPE MODULE 3, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
21,2400	TO 21,2777	PARAGRAPH # 125	ROPE MODULE 3, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
21,3000	TO 21,3377	PARAGRAPH # 126	ROPE MODULE 3, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
21,3400	TO 21,3777	PARAGRAPH # 127	ROPE MODULE 3, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
22,2000	TO 22,2377	PARAGRAPH # 130	ROPE MODULE 4, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
22,2400	TO 22,2777	PARAGRAPH # 131	ROPE MODULE 4, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
22,3000	TO 22,3377	PARAGRAPH # 132	ROPE MODULE 4, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
22,3400	TO 22,3777	PARAGRAPH # 133	ROPE MODULE 4, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
23,2000	TO 23,2377	PARAGRAPH # 134	ROPE MODULE 4, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
23,2400	TO 23,2777	PARAGRAPH # 135	ROPE MODULE 4, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
23,3000	TO 23,3377	PARAGRAPH # 136	ROPE MODULE 4, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
23,3400	TO 23,3777	PARAGRAPH # 137	ROPE MODULE 4, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
24,2000	TO 24,2377	PARAGRAPH # 140	ROPE MODULE 4, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
24,2400	TO 24,2777	PARAGRAPH # 141	ROPE MODULE 4, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
24,3000	TO 24,3377	PARAGRAPH # 142	ROPE MODULE 4, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
24,3400	TO 24,3777	PARAGRAPH # 143	ROPE MODULE 4, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
25,2000	TO 25,2377	PARAGRAPH # 144	ROPE MODULE 4, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
25,2400	TO 25,2777	PARAGRAPH # 145	ROPE MODULE 4, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
25,3000	TO 25,3377	PARAGRAPH # 146	ROPE MODULE 4, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
25,3400	TO 25,3777	PARAGRAPH # 147	ROPE MODULE 4, SIDE B, SENSE LINE SET 8 (WIRES 113-128)

PARAGRAPHS GENERATED FOR THIS ASSEMBLY: ADDRESS LIMITS AND THE MANUFACTURING LOCATION CODE ARE SHOWN FOR EACH

26,2000	TO 26,2377	PARAGRAPH # 150	ROPE MODULE 4, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
26,2400	TO 26,2777	PARAGRAPH # 151	ROPE MODULE 4, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
26,2800	TO 26,3377	PARAGRAPH # 152	ROPE MODULE 4, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
26,3400	TO 26,3777	PARAGRAPH # 153	ROPE MODULE 4, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
27,2000	TO 27,2377	PARAGRAPH # 154	ROPE MODULE 4, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
27,2400	TO 27,2777	PARAGRAPH # 155	ROPE MODULE 4, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
27,3000	TO 27,3377	PARAGRAPH # 156	ROPE MODULE 4, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
27,3400	TO 27,3777	PARAGRAPH # 157	ROPE MODULE 4, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
30,2000	TO 30,2377	PARAGRAPH # 160	ROPE MODULE 5, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
30,2400	TO 30,2777	PARAGRAPH # 161	ROPE MODULE 5, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
30,3000	TO 30,3377	PARAGRAPH # 162	ROPE MODULE 5, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
30,3400	TO 30,3777	PARAGRAPH # 163	ROPE MODULE 5, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
31,2000	TO 31,2377	PARAGRAPH # 164	ROPE MODULE 5, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
31,2400	TO 31,2777	PARAGRAPH # 165	ROPE MODULE 5, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
31,3000	TO 31,3377	PARAGRAPH # 166	ROPE MODULE 5, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
31,3400	TO 31,3777	PARAGRAPH # 167	ROPE MODULE 5, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
32,2000	TO 32,2377	PARAGRAPH # 170	ROPE MODULE 5, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
32,2400	TO 32,2777	PARAGRAPH # 171	ROPE MODULE 5, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
32,3000	TO 32,3377	PARAGRAPH # 172	ROPE MODULE 5, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
32,3400	TO 32,3777	PARAGRAPH # 173	ROPE MODULE 5, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
33,2000	TO 33,2377	PARAGRAPH # 174	ROPE MODULE 5, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
33,2400	TO 33,2777	PARAGRAPH # 175	ROPE MODULE 5, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
33,3000	TO 33,3377	PARAGRAPH # 176	ROPE MODULE 5, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
33,3400	TO 33,3777	PARAGRAPH # 177	ROPE MODULE 5, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
34,2000	TO 34,2377	PARAGRAPH # 200	ROPE MODULE 5, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
34,2400	TO 34,2777	PARAGRAPH # 201	ROPE MODULE 5, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
34,3000	TO 34,3377	PARAGRAPH # 202	ROPE MODULE 5, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
34,3400	TO 34,3777	PARAGRAPH # 203	ROPE MODULE 5, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
35,2000	TO 35,2377	PARAGRAPH # 204	ROPE MODULE 5, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
35,2400	TO 35,2777	PARAGRAPH # 205	ROPE MODULE 5, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
35,3000	TO 35,3377	PARAGRAPH # 206	ROPE MODULE 5, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
35,3400	TO 35,3777	PARAGRAPH # 207	ROPE MODULE 5, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
36,2000	TO 36,2377	PARAGRAPH # 210	ROPE MODULE 6, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
36,2400	TO 36,2777	PARAGRAPH # 211	ROPE MODULE 6, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
36,3000	TO 36,3377	PARAGRAPH # 212	ROPE MODULE 6, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
36,3400	TO 36,3777	PARAGRAPH # 213	ROPE MODULE 6, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
37,2000	TO 37,2377	PARAGRAPH # 214	ROPE MODULE 6, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
37,2400	TO 37,2777	PARAGRAPH # 215	ROPE MODULE 6, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
37,3000	TO 37,3377	PARAGRAPH # 216	ROPE MODULE 6, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
37,3400	TO 37,3777	PARAGRAPH # 217	ROPE MODULE 6, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
40,2000	TO 40,2377	PARAGRAPH # 220	ROPE MODULE 6, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
40,2400	TO 40,2777	PARAGRAPH # 221	ROPE MODULE 6, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
40,3000	TO 40,3377	PARAGRAPH # 222	ROPE MODULE 6, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
40,3400	TO 40,3777	PARAGRAPH # 223	ROPE MODULE 6, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
41,2000	TO 41,2377	PARAGRAPH # 224	ROPE MODULE 6, SIDE A, SENSE LINE SET 7 (WIRES 97-112)

PARAGRAPHS GENERATED FOR THIS ASSEMBLY; ADDRESS LIMITS AND THE MANUFACTURING LOCATION CODE ARE SHOWN FOR EACH

41,2400 TO 41,2777	PARAGRAPH # 225	ROPE MODULE 6, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
41,3000 TO 41,3377	PARAGRAPH # 226	ROPE MODULE 6, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
41,3400 TO 41,3777	PARAGRAPH # 227	ROPE MODULE 6, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
42,2000 TO 42,2377	PARAGRAPH # 230	ROPE MODULE 6, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
42,2400 TO 42,2777	PARAGRAPH # 231	ROPE MODULE 6, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
42,3000 TO 42,3377	PARAGRAPH # 232	ROPE MODULE 6, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
42,3400 TO 42,3777	PARAGRAPH # 233	ROPE MODULE 6, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
43,2000 TO 43,2377	PARAGRAPH # 234	ROPE MODULE 6, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
43,2400 TO 43,2777	PARAGRAPH # 235	ROPE MODULE 6, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
43,3000 TO 43,3377	PARAGRAPH # 236	ROPE MODULE 6, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
43,3400 TO 43,3777	PARAGRAPH # 237	ROPE MODULE 6, SIDE B, SENSE LINE SET 12 (WIRES 177-192)

OCTAL LISTING FOR PARAGRAPH # 010, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

4000	00004 0	34054 1	56006 1	12667 0	52011 0	00006 1	34056 0	52006 0
4010	52011 0	00006 1	31275 0	52006 0	52011 0	34057 1	56006 1	13407 0
4020	52011 0	34064 1	56006 1	12000 1	52011 0	34060 0	56006 1	13274 1
4030	52011 0	34061 1	56006 1	12332 0	52011 0	34060 0	56006 1	13317 0
4040	52011 0	34062 1	56006 1	13506 0	52011 0	34063 0	56006 1	13150 1
4050	52011 0	34065 0	56006 1	12275 1	C: 12103 0	C: 02065 0	C: 36106 0	C: 02103 1
4060	C: 10100 1	C: 16107 0	C: 12100 0	C: 52100 1	C: 14106 0	C: 22102 1	C: 04025 1	C: 10003 0
4070	C: 14031 0	C: 20033 0	C: 24017 1	C: 30036 1	C: 34034 1	C: 40023 1	C: 44035 1	C: 50037 0
4100	C: 54000 0	C: 60000 1	00004 0	00006 1	00004 0	54001 1	00006 1	06004 0
4110	00006 1	14115 1	00006 1	00004 0	54001 1	44733 0	60001 0	00006 1
4120	14103 0	00006 1	00003 1	00002 0	34144 1	71022 1	00006 1	14131 1
4130	04130 0	31020 1	54023 1	30023 0	04616 1	C: 62337 1	34755 1	55013 0
4140	31022 0	04255 1	04143 0	05155 0	C: 37600 0	04364 1	41041 1	55013 0
4150	04616 1	C: 62337 1	04635 0	C: 62002 1	22007 0	54123 0	34736 1	71021 1
4160	61012 0	10000 0	00002 0	34753 1	60002 0	55037 0	23022 0	04204 0
4170	34201 0	56006 1	00006 1	04007 1	55040 0	34201 0	00006 1	01007 1
4200	02000 0	C: 62101 0	53040 0	05165 0	34735 1	55021 1	00002 0	22002 0
4210	04220 0	04224 1	30001 0	75012 0	60004 0	55042 1	05133 0	05155 0
4220	11042 1	04227 1	00002 0	04227 1	11043 0	04227 1	00002 0	05652 0
4230	C: 01206 1	34201 0	00006 1	01007 1	34242 1	55013 0	44360 1	54777 1
4240	04635 0	C: 61450 1	C: 00042 1	34201 0	00006 1	01007 1	34254 0	55013 0
4250	44360 1	54777 1	04635 0	C: 61442 1	C: 00041 1	74757 1	54123 0	34736 1
4260	71021 1	61012 0	10000 0	00002 0	24002 0	10123 0	14270 1	00002 0
4270	22002 0	34302 1	56006 1	00006 1	04007 1	52131 0	34201 0	00006 1
4300	01007 1	03505 1	C: 60101 1	55017 1	54003 0	74357 0	65007 0	54145 0
4310	00002 0	31017 0	14304 0	54003 0	74357 0	65007 0	00002 0	C: 00016 0
4320	C: 00011 1	C: 00004 0	54020 1	40020 1	40020 1	40020 1	40020 1	56020 0
4330	00002 0	54022 0	40022 0	40027 0	40022 0	40022 0	55022 1	00002 0
4340	60000 1	60000 1	60000 1	60000 1	60000 1	00002 0	C: 00037 0	C: 01740 0
4350	C: 76000 0	05072 1	05203 0	05261 1	05105 0	C: 30000 1	C: 03777 0	C: 00377 1
4360	C: 00023 0	C: 05001 1	C: 00025 0	C: 00012 1	34745 0	00006 1	05011 1	00002 0
4370	44745 1	00006 1	03011 1	00002 0	34747 1	00006 1	05011 1	00002 0

DATA LISTING FOR PARAGRAPH # 011, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

4400	00006 1	30025 0	52014 0	00002 0	00006 1	30156 0	20156 1	60154 1
4410	26154 0	54007 1	00002 0	54162 0	00002 0	54125 1	10000 0	30135 0
4420	17310 0	14417 0	44755 0	54154 0	54155 1	54156 1	00002 0	34746 0
4430	00006 1	05011 1	00002 0	44746 1	00006 1	03011 1	00002 0	44444 0
4440	60002 0	60004 0	04635 0	C: 10647 0	C: 02003 0	22007 0	54123 0	34736 1
4450	71021 1	61012 0	10000 0	14455 0	14164 1	24002 0	14437 1	56002 0
4460	54144 1	44736 0	00004 0	71021 1	55021 1	11043 0	04470 0	04473 0
4470	34755 1	57043 1	05137 1	00003 1	44747 0	00006 1	03011 1	34755 1
4500	55012 1	00144 0	56002 0	54144 1	11043 0	04507 1	04473 0	34755 1
4510	55012 1	00144 0	00006 1	64515 1	14516 0	40000 0	50002 0	60000 1
4520	00006 1	66741 0	16737 0	00006 1	50002 0	50000 1	30001 0	24002 0
4530	52062 1	22002 0	34740 0	70110 0	10000 0	14550 1	30061 0	04512 0
4540	C: 66161 1	00001 0	34562 1	60062 0	04512 0	C: 64420 0	00001 0	04560 0
4550	34563 0	60062 0	04512 0	C: 65673 0	00001 0	30061 0	04512 0	C: 51615 1
4560	50001 0	00001 0	C: 00765 0	C: 16450 1	34753 1	71303 1	10000 0	00002 0
4570	34744 1	54001 1	34615 1	70110 0	00006 1	14601 0	34750 1	70110 0
4600	10000 0	30001 0	61036 0	70001 1	00006 1	16742 1	31036 0	00006 1
4610	06001 0	74733 0	64735 1	55036 1	00002 0	C: 10102 0	52134 0	50002 0
4620	30000 1	24002 0	54001 1	22004 0	75012 0	56002 0	52134 0	50002 0
4630	02000 0	56134 1	56004 0	56134 1	60133 0	56002 0	50000 1	30000 1
4640	54004 1	75012 0	56002 0	56002 0	12000 1	55012 1	70133 1	60134 1
4650	00002 0	54125 1	56004 0	00006 1	04007 1	56135 0	75012 0	56001 0
4660	00004 0	00006 1	01007 1	50001 0	32000 0	56135 0	00006 1	01007 1
4670	00003 1	54004 1	30135 0	00002 0	52073 1	50002 0	30000 1	24002 0
4700	54001 1	22004 0	75012 0	56002 0	52073 1	50002 0	02000 0	56073 0
4710	56004 0	56073 0	00072 1	54164 0	34744 1	54023 1	30006 1	54165 1
4720	50002 0	30009 1	54004 1	75012 0	56002 0	56164 1	14643 0	00006 1
4730	01007 1	00002 0	C: 37777 1	C: 37777 1	C: 57777 1	C: 40000 0	C: 20000 0	C: 10000 0
4740	C: 04000 0	C: 02000 0	C: 01000 0	C: 00400 0	C: 00200 0	C: 00100 0	C: 00040 0	C: 00020 0
4750	C: 00010 0	C: 00004 0	C: 00002 0	C: 00001 0	C: 77777 0	C: 00000 1	C: 00005 1	C: 00007 0
4760	C: 00013 0	C: 00015 0	C: 00017 1	C: 00030 1	C: 00033 1	C: 00035 1	C: 00032 0	C: 00045 0
4770	C: 00046 0	C: 00050 1	C: 00055 1	C: 00060 1	C: 00062 0	C: 00120 1	C: 00140 1	C: 00144 0

OBJECT LISTING FOR PARAGRAPH # 012, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

5000	C: 00310 0	C: 00401 1	C: 00454 1	C: 00620 0	C: 00777 0	C: 01124 1	C: 01211 1	C: 01400 1
5010	C: 01426 0	C: 01776 0	C: 01777 1	C: 02177 1	C: 02400 1	C: 03000 1	C: 03400 0	C: 05000 1
5020	C: 06000 1	C: 07000 0	C: 11000 1	C: 13000 0	C: 14000 1	C: 15000 0	C: 16000 0	C: 17000 1
5030	C: 17770 1	C: 21000 1	64736 1	55076 0	15036 0	41076 0	60000 1	55076 0
5040	15051 1	57076 1	51076 1	64734 0	40000 0	61076 1	55076 0	15051 1
5050	15067 1	00006 1	71076 0	55077 1	00006 1	75005 0	67737 0	00006 1
5060	71077 1	67717 1	00006 1	71076 0	20001 1	55076 0	00002 0	50000 1
5070	44734 1	00002 0	00004 0	65164 1	54063 0	00006 1	50002 0	30001 0
5100	52066 0	35163 0	56004 0	54061 1	12625 0	00004 0	54063 0	00006 1
5110	50002 0	30001 0	52066 0	35163 0	56004 0	12601 0	56002 0	67746 0
5120	56002 0	15112 1	22002 0	35163 0	56006 1	12706 0	40164 0	54001 1
5130	35163 0	54006 0	17705 0	54164 0	35163 0	54004 1	12776 1	00004 0
5140	54065 0	44752 1	26002 1	35163 0	56004 0	13023 1	00004 0	54063 0
5150	35163 0	56006 1	54165 1	30002 0	13072 0	35163 0	54004 1	13103 1
5160	30061 0	54004 1	16741 1	C: 02601 1	C: 00110 1	56001 0	00006 1	01007 1
5170	54006 0	00001 0	C: 77577 1	00004 0	54001 1	34733 1	26002 1	30006 1
5200	00006 1	04007 1	56001 0	00004 0	56002 0	54061 1	00006 1	50061 0
5210	30001 0	54063 0	35220 1	56006 1	13231 0	52062 1	64752 0	52006 0
5220	C: 02063 0	50002 0	30000 1	24002 0	56002 0	54063 0	30006 1	00006 1
5230	04007 1	54001 1	35235 0	54061 1	15212 1	15257 0	C: 72557 0	C: 73714 1
5240	10076 1	15261 0	15261 0	15244 1	11304 0	15256 1	15251 0	15256 1
5250	15256 1	37723 0	05072 1	C: 03555 1	C: 14063 1	15261 0	05221 0	C: 00764 1
5260	05240 1	10734 0	35220 1	54006 0	13414 1	30016 0	00006 1	01007 1
5270	00006 1	22012 1	30016 0	56006 1	52011 0	00003 1	50017 1	53154 1
5300	00006 1	50002 0	30001 0	53150 0	00006 1	35310 0	52006 0	C: 03452 1
5310	C: 02063 0	50002 0	30000 1	24002 0	55011 1	35320 0	22006 1	14640 0
5320	C: 20213 0	50002 0	40000 0	61011 0	00006 1	16741 1	16737 0	00004 0
5330	50002 0	30000 1	24002 0	54072 0	74757 1	60000 1	54071 0	00072 1
5340	75030 0	00006 1	74740 1	56072 1	74735 0	54066 0	50002 0	30000 1
5350	24002 0	54065 0	15363 0	00004 0	50002 0	30000 1	24002 0	00004 0
5360	54065 0	24753 1	54066 0	00006 1	55367 0	52006 0	C: 02224 1	C: 20103 1
5370	22073 0	22006 1	22073 0	75024 0	10000 0	17750 0	30062 0	74745 1

DATA LISTING FOR PARAGRAPH # 013, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

5400	10000 0	15423 0	50061 0	31052 1	54070 1	30062 0	74744 0	10000 0
5410	15427 1	30002 0	54063 0	30006 1	00006 1	04007 1	54064 1	35422 0
5420	22073 0	52006 0	C: 02312 0	50002 0	30000 1	24002 0	15404 0	00006 1
5430	50002 0	30001 0	52064 1	34752 0	26002 1	15417 1	22706 0	22006 1
5440	50000 1	30001 0	22006 1	22706 0	13601 1	22706 0	22006 1	22706 0
5450	00006 1	50000 1	30001 0	22706 0	22006 1	22706 0	13707 0	34755 1
5460	54032 1	54033 0	54034 1	00002 0	54162 0	40160 1	70162 0	50161 1
5470	26160 1	00001 0	04635 0	C: 20326 1	34755 1	55044 1	00004 0	44753 0
5500	70100 1	54100 1	00003 1	00002 0	30002 0	05522 1	40000 0	00006 1
5510	04001 1	50061 0	54074 0	22063 1	00003 1	00001 0	30002 0	05522 1
5520	70001 1	15511 0	64753 1	00004 0	54063 0	34762 0	54061 1	50063 1
5530	27777 0	54001 1	34755 1	00006 1	10061 1	52062 1	50061 0	30074 1
5540	54001 1	50062 0	44735 0	00002 0	00004 0	54061 1	50002 0	60000 1
5550	50000 1	30000 1	54001 1	30061 0	50002 0	60001 0	50000 1	22000 1
5560	10061 1	15545 1	16741 1	44747 0	71044 1	55044 1	05155 0	00004 0
5570	30002 0	55363 1	50002 0	30000 1	54001 1	30006 1	00006 1	04007 1
5600	55364 0	30002 0	54061 1	10375 1	15607 1	22375 0	15621 0	10376 1
5610	15613 1	22376 0	15624 0	30377 1	74733 0	10000 0	15630 0	22377 1
5620	15624 0	41036 1	75642 0	27036 1	56061 0	00003 1	50000 1	00001 0
5630	30001 0	64735 1	54377 0	15624 0	00004 0	30002 0	55363 1	50002 0
5640	30000 1	05574 1	C: 40400 1	00004 0	34752 0	60005 1	54017 0	50017 1
5650	04635 0	C: 12765 0	00004 0	30002 0	55363 1	50002 0	30000 1	05574 1
5660	C: 77770 1	34765 1	54001 1	40000 0	52761 0	00004 0	04616 1	C: 27755 0
5670	30103 0	74746 1	10000 0	15701 0	04616 1	C: 12652 0	04616 1	C: 12643 0
5700	15644 0	35743 1	04727 1	04616 1	C: 57321 0	00004 0	30002 0	05654 0
5710	C: 01103 1	00004 0	30002 0	05571 1	C: 50217 0	01363 0	00004 0	53364 0
5720	35742 0	54061 1	50002 0	30000 1	54001 1	15603 0	00004 0	53364 0
5730	35741 0	15721 1	00004 0	53364 0	00004 0	50002 0	30000 1	54001 1
5740	15601 1	15660 0	15642 0	C: 56067 0	00004 0	54001 1	30002 0	55363 1
5750	05575 0	C: 00014 1	01363 0	31472 1	00006 1	01006 0	00002 0	31473 0
5760	54001 1	45774 1	00006 1	02005 0	60001 0	00006 1	01005 0	00002 0
5770	31474 1	54001 1	35774 0	15762 0	C: 00314 1	C: 05775 1	C: 05776 1	CKS4 67044 0

OBJECT LISTING FOR PARAGRAPH # 014, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

6000	C: 00464 1	34764 0	54001 1	40000 0	52761 0	04635 0	C: 10024 0	C: 00024 1
6010	C: 00031 0	46021 0	00004 0	70110 0	54110 0	44752 1	00006 1	03012 1
6020	00002 0	C: 41000 1	00006 1	36026 0	15165 1	C: 03024 1	C: 66107 1	36036 1
6030	00004 0	22000 1	50002 0	30000 1	22006 1	12200 0	C: 56063 1	00003 1
6040	00006 1	22164 1	30006 1	54165 1	74735 0	54115 0	54023 1	16070 1
6050	22006 1	16042 0	00006 1	50116 1	30001 0	52155 1	34755 1	54156 1
6060	54163 1	30165 0	54006 0	10023 1	16077 0	10067 1	15126 0	24164 1
6070	50164 1	30000 1	10000 0	16362 1	C: 00177 0	54023 1	76074 0	54020 1
6100	10020 1	16247 1	16743 0	74753 0	10000 0	16146 0	50164 1	40001 1
6110	10000 0	16215 0	C: 77773 1	24164 1	54116 0	66251 1	10000 0	67743 0
6120	16125 0	30120 1	26116 0	50020 0	76273 0	00006 1	66136 0	75012 0
6130	65012 1	56116 1	60115 1	54004 1	50020 0	76273 0	74357 0	65007 0
6140	56116 1	54003 0	50020 0	76273 0	37733 1	54020 1	30120 1	54130 1
6150	24164 1	50164 1	40000 0	10000 0	24130 0	16156 1	54116 0	77742 0
6160	00006 1	16164 0	30115 1	26116 0	50130 0	40046 1	26116 0	77744 0
6170	00006 1	16204 0	77742 0	00006 1	16206 1	30116 1	54004 1	75012 0
6200	64741 1	54116 0	50020 0	36273 1	30120 1	16212 1	35007 0	56116 1
6210	54003 0	74357 0	26116 0	50020 0	36273 1	34360 0	70020 1	66222 0
6220	10000 0	16233 1	C: 77767 1	66112 0	10000 0	50000 1	46244 1	16235 1
6230	50163 0	46242 1	16235 1	50163 0	46244 1	26166 1	54116 0	50020 0
6240	76273 0	C: 00502 0	C: 00506 1	C: 00006 1	C: 00002 0	C: 00003 1	C: 00006 1	10020 1
6250	16263 1	C: 77722 0	24164 1	50164 1	30000 1	54117 1	35013 0	54004 1
6260	70020 1	50000 1	16334 1	54004 1	10020 1	50000 1	12000 1	10163 1
6270	12017 1	12017 1	12121 0	C: 00122 0	16505 0	17071 1	17655 1	17401 1
6300	16703 1	16470 0	16052 1	17624 1	16501 1	16620 1	16523 1	17334 0
6310	16557 1	16526 1	17337 0	17616 0	17574 1	17577 1	17603 1	17621 1
6320	16751 0	16747 1	17036 1	17331 0	17460 0	17425 1	17005 1	17062 0
6330	16775 0	16331 1	17572 1	17613 0	12344 1	12351 0	12354 0	12360 1
6340	12364 0	12372 1	12406 0	12415 1	12400 0	12411 0	12467 1	12474 0
6350	12447 0	12507 0	12516 0	12457 1	30165 0	54004 1	24164 1	50164 1
6360	40000 0	67747 1	54116 0	74356 1	56116 1	77722 0	00006 1	74747 0
6370	50000 1	16372 0	06422 0	16061 1	06414 0	16061 1	06417 0	16061 1

DETAIL LISTING FOR PARAGRAPH # 015. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

6400	06422 0	16460 1	06422 0	16144 1	06422 0	16463 1	06422 0	16466 1
6410	06422 0	34766 1	54020 1	16252 0	50120 1	40046 1	16421 1	50120 1
6420	40047 0	26116 0	40116 0	64772 1	10000 0	30120 1	16433 1	35007 0
6430	56116 1	54003 0	74357 0	26116 0	00006 1	30155 0	50116 1	52001 1
6440	10163 1	16454 0	00002 0	00006 1	30160 0	50116 1	52003 0	00006 1
6450	30162 1	50116 1	52005 0	00002 0	30156 0	50116 1	54002 1	00002 0
6460	37732 0	54020 1	16106 1	34735 1	54020 1	16106 1	36107 1	16145 0
6470	50116 1	30002 0	54156 1	00006 1	50116 1	50001 0	52155 1	34753 1
6500	16060 0	22007 0	50116 1	30000 1	16055 0	00006 1	50116 1	30001 0
6510	52155 1	00006 1	50116 1	30003 1	52160 1	00006 1	50116 1	30005 1
6520	52162 0	44755 0	16060 0	00006 1	50116 1	30001 0	52155 1	50166 0
6530	52001 1	50163 0	36244 0	26166 1	10163 1	16552 1	16550 0	54163 1
6540	54156 1	52160 1	50166 0	51775 0	52162 0	50166 0	51777 1	16061 1
6550	54156 1	16061 1	54163 1	56156 0	50166 0	53777 0	16061 1	00006 1
6560	50116 1	30001 0	52155 1	50166 0	52001 1	50163 0	36244 0	26166 1
6570	10163 1	16610 1	16511 0	00006 1	50116 1	30003 1	52160 1	50166 0
6600	51775 0	00006 1	50116 1	30005 1	52162 0	50166 0	51777 1	16061 1
6610	00006 1	50116 1	30003 1	52160 1	30156 0	50166 0	53777 0	16515 1
6620	24164 1	50164 1	30000 1	50116 1	54000 0	16061 1	24164 1	50164 1
6630	30000 1	50116 1	30000 1	54004 1	75012 0	50000 1	32000 0	54117 1
6640	30165 0	74350 1	64350 0	60164 1	50120 1	54052 1	30117 0	77742 0
6650	00006 1	16662 1	50165 0	54006 0	30117 0	54004 1	75012 0	64741 1
6660	54164 0	16042 0	30117 0	66251 1	10000 0	30117 0	16675 1	30120 1
6670	60117 0	50000 1	30000 1	54117 1	16647 0	54003 0	74357 0	50000 1
6700	31400 1	54117 1	16647 0	50164 1	30001 0	50116 1	60000 1	54004 1
6710	75012 0	50000 1	32000 0	54117 1	16647 0	30165 0	54004 1	50164 1
6720	30001 0	54117 1	16647 0	10154 0	00002 0	16727 1	16741 1	10155 1
6730	00002 0	16733 1	16741 1	10156 1	00002 0	16737 0	16741 1	50002 0
6740	00001 0	50002 0	00002 0	30165 0	54006 0	50164 1	00001 0	34735 1
6750	16752 0	34355 0	26116 0	00006 1	50116 1	00003 1	20160 1	00006 1
6760	16762 0	07014 0	00006 1	50116 1	00005 1	20162 0	00006 1	16771 1
6770	07011 0	00006 1	50116 1	00001 0	17000 1	00006 1	50116 1	30001 0

DATA LISTING FOR PARAGRAPH # 016. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

7000	20155 1	00006 1	16061 1	07017 0	16061 1	00006 1	50116 1	40001 1
7010	17000 1	54001 1	34756 1	17016 0	54001 1	36245 1	56001 0	50000 1
7020	44734 1	54130 1	00006 1	24000 1	50001 0	26155 1	54007 1	34755 1
7030	60130 0	50001 0	26154 0	54007 1	00002 0	17152 1	00006 1	50116 1
7040	30003 1	52160 1	00006 1	40001 1	20160 1	00006 1	17050 1	07014 0
7050	00006 1	50116 1	30005 1	52162 0	00006 1	40001 1	20162 0	00006 1
7060	17062 0	07011 0	00006 1	50116 1	30001 0	52155 1	00006 1	40001 1
7070	17000 1	00005 1	50116 1	30002 0	20156 1	50116 1	60000 1	60154 1
7100	54154 0	16061 1	17003 1	50002 0	30000 1	24002 0	54116 0	50116 1
7110	30001 0	54156 1	34755 1	56155 0	54135 1	00006 1	70156 1	56156 0
7120	00006 1	70154 0	20156 1	50116 1	30000 1	56135 0	00006 1	70135 1
7130	20156 1	56154 1	00006 1	70135 1	20155 1	00002 0	34755 1	54163 1
7140	56156 0	60000 1	54001 1	00002 0	60155 0	54155 1	00002 0	60154 1
7150	54154 0	00002 0	54121 1	00002 0	34752 0	54136 1	00006 1	22137 1
7160	07107 0	52160 1	52155 1	52131 0	30156 0	54132 0	30136 0	26116 0
7170	07107 0	52156 1	20132 0	60154 1	60130 0	54130 1	17200 0	54121 1
7200	52162 0	52155 1	30136 0	26116 0	07107 0	52132 0	20156 1	60154 1
7210	60130 0	54154 0	00137 1	07017 0	00137 1	00006 1	22141 0	54117 1
7220	22140 1	17232 1	50002 0	30000 1	54140 0	60000 1	60002 0	54117 1
7230	64756 1	54141 1	36273 1	54116 0	00006 1	50117 0	30004 0	52155 1
7240	52123 0	17245 1	54140 0	44752 1	26117 1	07107 0	00006 1	50117 0
7250	30002 0	20155 1	10140 0	17242 0	00141 0	34755 1	54156 1	22002 0
7260	06723 1	17265 0	17305 1	44733 0	17266 0	34733 1	54002 1	00006 1
7270	24000 1	60156 0	54156 1	34755 1	60002 0	60155 0	54155 1	34755 1
7300	60002 0	60154 1	54154 0	54155 1	00001 0	54156 1	17302 0	54135 1
7310	00006 1	70156 1	54156 1	34755 1	56155 0	17126 1	54135 1	00006 1
7320	70155 1	52155 1	00006 1	70135 1	30001 0	26154 0	00006 1	30155 0
7330	00002 0	07154 0	34755 1	16060 0	34752 0	54140 0	17342 1	44363 1
7340	54140 0	36242 0	54136 1	07532 1	07156 1	00006 1	30123 1	52155 1
7350	52134 0	00006 1	30125 1	52160 1	00006 1	30127 0	52162 0	30140 1
7360	26116 0	07156 1	52123 0	52155 1	52125 0	52160 1	52127 1	52162 0
7370	30140 1	26116 0	07156 1	52134 0	52155 1	52162 0	52125 0	52160 1

DATA LISTING FOR PARAGRAPH # 017. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

7400	15061 1	10163 1	17430 0	17430 0	07107 0	07140 0	52160 1	52155 1
7410	52160 1	07107 0	07140 0	52162 0	52155 1	52162 0	07107 0	07140 0
7420	52155 1	52162 0	52160 1	52155 1	16061 1	07154 0	44751 1	26116 0
7430	00006 1	30155 0	52160 1	07107 0	07140 0	34752 0	26116 0	00006 1
7440	30160 0	52155 1	52162 0	07107 0	07140 0	34752 0	26116 0	52160 1
7450	52155 1	52160 1	07107 0	07140 0	52155 1	52162 0	52155 1	16521 0
7460	00006 1	30162 1	52155 1	52123 0	07107 0	00006 1	40160 1	52155 1
7470	52125 0	07107 0	34752 0	26116 0	00006 1	40162 0	52155 1	52162 0
7500	07107 0	00006 1	30123 1	52155 1	52127 1	07107 0	34752 0	26116 0
7510	00006 1	40123 0	52155 1	20162 0	00006 1	17517 1	07011 0	07107 0
7520	52125 0	52160 1	52155 1	20160 1	00006 1	17527 1	07014 0	07107 0
7530	52127 1	17000 1	00006 1	30155 0	52123 0	00006 1	30160 0	52125 0
7540	00006 1	30162 1	52127 1	00002 0	10000 0	17551 0	00002 0	17561 0
7550	00002 0	56001 0	64736 1	64736 1	54000 0	17557 0	24001 0	56001 0
7560	00002 0	56001 0	64735 1	67747 1	54000 0	17567 0	24001 0	56001 0
7570	40000 0	00002 0	07107 0	16061 1	07107 0	07137 0	16061 1	00006 1
7600	50116 1	30001 0	17607 0	00006 1	50116 1	30001 0	52155 1	52131 0
7610	34755 1	54004 1	12353 1	30116 1	54166 1	16063 0	34755 1	54004 1
7620	12172 0	36074 1	54004 1	12214 0	10163 1	17636 1	17636 1	00006 1
7630	50116 1	30001 0	52131 0	34755 1	54004 1	12654 0	00006 1	50116 1
7640	30003 1	52160 1	00006 1	50116 1	30005 1	52162 0	44753 0	54163 1
7650	00006 1	50116 1	30001 0	52155 1	17632 0	50116 1	10000 0	16061 1
7660	17662 0	17670 0	50116 1	10001 1	16061 1	16061 1	17670 0	16061 1
7670	00006 1	40155 1	52155 1	10163 1	17705 0	17705 0	00006 1	40160 1
7700	52160 1	00006 1	40162 0	52162 0	16061 1	40156 1	54156 1	16061 1
7710	C: 22000 1	C: 23000 0	C: 24000 1	C: 25000 0	C: 26000 0	C: 27000 1	C: 31000 0	C: 31103 1
7720	C: 32000 0	C: 33000 1	C: 34000 0	C: 35000 1	C: 36000 1	C: 37000 0	C: 37401 0	C: 37766 1
7730	C: 37774 1	C: 37776 0	C: 40014 0	C: 40015 1	C: 40040 1	C: 40200 1	C: 57777 1	C: 65552 0
7740	C: 70000 0	C: 73777 1	C: 74000 1	C: 74056 1	C: 77700 0	C: 77774 0	C: 77775 1	C: 77776 1
7750	74740 1	10000 0	15423 0	15402 0	00006 1	07754 0	C: 07756 1	C: 07757 0
7760	CKSM 61751 0	@	@	@	@	@	@	@
7770	@	@	@	@	@	@	@	@

OCTAL LISTING FOR PARAGRAPH # 020. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

00,2000	13207 0	13530 0	13517 0	13610 1	13612 0	13174 1	12116 1	17670 0
00,2010	13232 0	13023 1	13176 0	13245 0	16354 1	13274 1	13247 1	36242 0
00,2020	70020 1	54021 0	10020 1	12101 1	C: 00024 1	50021 1	34736 1	54135 1
00,2030	10020 1	02050 0	16060 0	30135 0	00006 1	70156 1	54156 1	30135 0
00,2040	00006 1	70154 0	52155 1	30135 0	00006 1	70001 1	20156 1	16061 1
00,2050	30156 0	00006 1	70135 1	56155 0	00006 1	70135 1	56155 0	60001 0
00,2060	60000 1	54156 1	12064 0	26155 1	34755 1	54156 1	56154 1	00006 1
00,2070	70135 1	20155 1	00002 0	30135 0	00006 1	70155 1	54155 1	56001 0
00,2100	12060 1	30021 1	54135 1	00006 1	30156 0	20156 1	60154 1	60154 1
00,2110	54154 0	12113 1	54121 1	10135 1	12102 1	10020 1	07136 1	16061 1
00,2120	16061 1	34757 0	70020 1	54135 1	10020 1	12145 1	C: 00176 1	50135 0
00,2130	34736 1	54135 1	02073 1	52155 1	52160 1	52155 1	02073 1	52155 1
00,2140	52162 0	52155 1	02073 1	17420 1	54135 1	00006 1	30155 0	20155 1
00,2150	00006 1	12153 0	07017 0	00006 1	30160 0	20160 1	00006 1	12161 1
00,2160	07014 0	00006 1	30162 1	20162 0	00006 1	12167 1	07011 0	10135 1
00,2170	12144 0	16061 1	54135 1	06723 1	12176 1	12212 0	07257 0	30154 1
00,2200	12207 1	24135 0	00006 1	30156 0	20156 1	60154 1	26154 0	60000 1
00,2210	54000 0	12201 1	40135 1	16623 1	70116 0	10000 0	12224 0	34742 1
00,2220	70116 0	10000 0	07136 1	16061 1	54135 1	34744 1	00006 1	70116 0
00,2230	76245 0	50000 1	12233 0	12332 0	12342 1	12336 1	10163 1	12277 0
00,2240	12277 0	30135 0	63733 0	00006 1	62127 1	67747 1	54135 1	34755 1
00,2250	54001 1	56154 1	56155 0	02272 1	20155 1	56157 1	56160 0	02272 1
00,2260	20160 1	56161 1	56162 1	02272 1	20162 0	10135 1	54135 1	12242 0
00,2270	C: 04604 1	16061 1	60000 1	54156 1	34755 1	56001 0	00002 0	30135 0
00,2300	63733 0	00006 1	62322 0	67747 1	54135 1	34755 1	56154 1	56155 0
00,2310	54156 1	10135 1	54135 1	02300 0	C: 22650 1	34742 1	70116 0	10000 0
00,2320	07136 1	16061 1	50135 0	34736 1	54135 1	34742 1	70116 0	10000 0
00,2330	12031 0	12033 1	40135 1	62126 0	54135 1	12236 0	42126 1	60135 0
00,2340	40000 0	54135 1	10163 1	12346 0	12346 0	12145 1	40116 0	00006 1
00,2350	74746 1	54020 1	12103 0	44753 0	54136 1	54137 0	54140 0	10130 1
00,2360	12516 0	12363 1	12531 0	54156 1	07257 0	10154 0	12414 0	12371 1
00,2370	12413 1	56131 1	56130 0	56155 0	56154 1	10130 1	12422 0	12401 1

ACTAL LISTING FOR PARAGRAPH # 021. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

00,2400	12416 1	40154 0	00006 1	62405 1	24136 0	34733 1	54154 0	02630 0
00,2410	34753 1	54121 1	06061 0	24136 0	40131 0	12402 1	00006 1	40131 0
00,2420	52131 0	24136 0	10154 0	12437 1	12426 1	12433 0	10155 1	12437 1
00,2430	15061 1	12433 0	16061 1	00006 1	40155 1	52155 1	24136 0	40154 0
00,2440	67747 1	60130 0	10000 0	12505 1	C: 60001 0	12446 1	34736 1	60000 1
00,2450	60155 0	54155 1	34755 1	64733 1	26154 0	34736 1	60000 1	60131 1
00,2460	54131 0	34755 1	64733 1	26130 1	40154 0	60130 0	10000 0	12505 1
00,2470	C: 00133 0	12405 0	54140 0	40155 1	60131 1	00006 1	62405 1	12505 1
00,2500	00006 1	24137 1	00006 1	30131 1	20131 0	30130 0	60000 1	54000 0
00,2510	12500 1	52155 1	50137 1	02565 0	54156 1	16061 1	10000 0	12422 0
00,2520	40131 0	00006 1	62422 1	34736 1	60000 1	26131 0	34755 1	54130 1
00,2530	12363 1	10000 0	12416 1	30131 1	00006 1	62416 0	44736 0	12524 1
00,2540	22021 1	00006 1	74736 0	56001 0	60021 1	56001 0	12571 1	20001 1
00,2550	20001 1	20001 1	20001 1	20001 1	20001 1	20001 1	20001 1	20001 1
00,2560	20001 1	20001 1	20001 1	20001 1	52155 1	10140 0	C: 06552 0	12642 1
00,2570	52155 1	00006 1	10130 1	52155 1	40154 0	00006 1	70131 0	60155 0
00,2600	54000 0	12606 1	00006 1	60130 0	24154 1	12610 0	00006 1	62620 1
00,2610	00006 1	60130 0	00006 1	12616 0	00006 1	62624 0	24154 1	12625 0
00,2620	00006 1	12630 1	00006 1	26154 0	60130 0	22007 0	00006 1	10130 1
00,2630	54155 1	10136 1	00002 0	00002 0	00002 0	00006 1	40155 1	52155 1
00,2640	34755 1	00002 0	40154 0	60130 0	00006 1	12647 1	12570 0	34733 1
00,2650	54154 0	40131 0	60155 0	12624 1	44753 0	54137 0	54127 1	03010 0
00,2660	52131 0	07544 0	52131 0	10130 1	12721 0	12667 0	12715 1	56131 1
00,2670	56130 0	56155 0	56154 1	00006 1	12676 0	12405 0	56160 0	56157 1
00,2700	00006 1	12703 0	12405 0	56162 1	56161 1	00006 1	12710 1	12405 0
00,2710	10130 1	12721 0	12405 0	12715 1	12405 0	00006 1	40131 0	52131 0
00,2720	24127 0	00006 1	30131 1	52134 0	12732 1	00006 1	24137 1	00006 1
00,2730	30131 1	20131 0	30130 0	60000 1	54000 0	12725 1	02750 1	52160 1
00,2740	52155 1	52160 1	02750 1	52162 0	52155 1	52162 0	02750 1	17420 1
00,2750	30127 0	54136 1	10154 0	12767 1	12756 0	12763 0	10155 1	12767 1
00,2760	00002 0	12763 0	00002 0	00006 1	40155 1	52155 1	24136 0	44753 0
00,2770	54140 0	40154 0	60133 0	10000 0	13004 1	12777 0	12405 0	54140 0

ACTUAL LISTING FOR PARAGRAPH # 022. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

00,3000	40155 1	60134 1	00006 1	62405 1	52155 1	50137 1	12565 1	C: 32506 0
00,3010	56002 0	52155 1	07544 0	52155 1	52160 1	07544 0	52160 1	52162 0
00,3020	07544 0	52162 0	00000 1	03010 0	07532 1	34755 1	56121 0	54141 1
00,3030	03317 1	30141 0	56121 0	00006 1	13036 0	12405 0	00006 1	30155 0
00,3040	50120 1	52043 1	03343 0	10154 0	13051 1	54001 1	50120 1	52045 1
00,3050	12405 0	44317 1	60135 0	10000 0	40000 0	13133 1	13065 0	44761 1
00,3060	54135 1	30154 1	54001 1	34755 1	13112 1	10135 1	13074 0	42024 1
00,3070	54135 1	00006 1	30155 0	13112 1	40000 0	54135 1	40000 0	50000 1
00,3100	34736 1	54130 1	00006 1	70155 1	56130 0	00006 1	70154 0	56001 0
00,3110	60130 0	56001 0	50120 1	52045 1	44753 0	54140 0	52123 0	52155 1
00,3120	52131 0	03151 1	52125 0	52155 1	52160 1	03151 1	52127 1	52155 1
00,3130	52162 0	03151 1	17420 1	54135 1	34755 1	56123 1	56122 0	56125 1
00,3140	56124 0	56127 0	56126 1	40135 1	50000 1	34736 1	00006 1	70154 0
00,3150	13062 1	10154 0	13170 0	13155 1	13162 0	10155 1	13170 0	00002 0
00,3160	13162 0	00002 0	44755 0	54136 1	00006 1	40155 1	50135 0	12564 0
00,3170	54136 1	52155 1	50135 0	12564 0	03300 1	16061 1	10163 1	13226 0
00,3200	13226 0	03317 1	22163 0	00006 1	30155 0	50120 1	52043 1	03343 0
00,3210	10135 1	13213 0	16061 1	63733 0	00006 1	63221 0	22007 0	22116 1
00,3220	12303 1	50135 0	34735 1	54135 1	34755 1	12036 1	06723 1	16061 1
00,3230	16061 1	17670 0	44751 1	26166 1	00006 1	50000 1	30003 1	52160 1
00,3240	00006 1	50166 0	30001 0	52162 0	16521 0	03317 1	17332 0	00006 1
00,3250	30155 0	50166 0	52001 1	50163 0	36244 0	26166 1	10163 1	13272 1
00,3260	16061 1	00006 1	30160 0	50166 0	51775 0	00006 1	30162 1	50166 0
00,3270	51777 1	16061 1	30156 0	16554 1	50120 1	30052 0	54117 1	16652 1
00,3300	30155 0	00006 1	70000 0	54156 1	34755 1	56155 0	00006 1	70154 0
00,3310	20001 1	20156 1	55154 1	00006 1	70000 0	20155 1	00002 0	00006 1
00,3320	22137 1	03300 1	52160 1	52155 1	52131 0	30156 0	54132 0	03300 1
00,3330	52156 1	20132 0	60154 1	60130 0	54130 1	13337 1	54121 1	52162 0
00,3340	52155 1	03300 1	17205 0	34755 1	54135 1	10154 0	13405 1	13351 1
00,3350	13373 1	56156 0	56155 0	54154 0	34757 0	54135 1	10154 0	13405 1
00,3360	13362 1	13376 1	56155 0	54154 0	34757 0	26135 1	10154 0	13405 1
00,3370	00002 0	13376 1	13453 1	10000 0	13402 0	10155 1	34755 1	13453 1

JCTAL LISTING FOR PARAGRAPH # 022. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

00,3400	13402 0	13453 1	52165 1	05726 1	C: 01302 1	62444 1	00006 1	63456 0
00,3410	52155 1	22021 1	00006 1	74736 0	52155 1	56021 1	26155 1	32314 0
00,3420	00006 1	70154 0	62566 0	54130 1	30154 1	22007 0	00006 1	10130 1
00,3430	00006 1	74736 0	26130 1	00006 1	74736 0	52155 1	00006 1	10130 1
00,3440	54131 0	34755 1	56001 0	00006 1	10130 1	54001 1	30131 1	20155 1
00,3450	00006 1	13455 1	34733 1	54154 0	54155 1	00002 0	64737 0	00006 1
00,3460	63502 0	52155 1	22021 1	00006 1	74736 0	52155 1	56021 1	26155 1
00,3470	33007 0	00006 1	70154 0	62270 0	13423 0	00006 1	30156 0	20156 1
00,3500	60154 1	26154 0	24135 0	00006 1	30156 0	20156 1	60154 1	26154 0
00,3510	60000 1	54022 0	10022 0	10022 0	13475 0	13417 1	13470 0	06723 1
00,3520	13523 1	13526 1	13526 1	00006 1	40155 1	52155 1	34737 0	26154 0
00,3530	52155 1	20001 1	54000 0	13536 0	00006 1	40001 1	52155 1	30154 1
00,3540	60000 1	54001 1	13553 0	50000 1	34735 1	60000 1	00006 1	60154 1
00,3550	54154 0	40155 1	54155 1	00006 1	30155 0	52134 0	03300 1	07222 1
00,3560	C: 00003 1	C: 14441 0	C: 37325 1	C: 53250 0	C: 60764 1	C: 12146 1	C: 21276 1	C: 75466 1
00,3570	C: 71471 0	C: 00236 0	C: 32757 0	32470 0	07106 1	00006 1	30156 0	20156 1
00,3600	60154 1	26154 0	00006 1	30156 0	20156 1	60154 1	26154 0	16061 1
00,3610	33631 0	13613 1	33713 1	54136 1	06723 1	13625 1	13731 0	00006 1
00,3620	40155 1	52155 1	33734 1	56136 0	54137 0	44736 0	60154 1	10000 0
00,3630	13721 1	13707 0	13642 0	10155 1	34755 1	13637 1	13642 0	54155 1
00,3640	54154 0	00136 0	00006 1	40155 1	64736 1	52155 1	52134 0	03343 0
00,3650	10135 1	13714 1	52155 1	52134 0	52155 1	07222 1	C: 00006 1	C: 13240 0
00,3660	C: 23630 0	C: 74721 0	C: 47775 1	C: 02440 0	C: 20237 0	C: 75067 1	C: 70742 1	C: 03436 0
00,3670	C: 25756 1	C: 74037 0	C: 57640 1	C: 03046 0	C: 07143 0	C: 76654 1	C: 42244 0	32470 0
00,3700	07106 1	00136 0	00006 1	40155 1	64736 1	52155 1	00137 1	00006 1
00,3710	40155 1	64737 0	52155 1	16061 1	50000 1	34736 1	54135 1	02073 1
00,3720	13652 1	00006 1	13637 1	00006 1	30165 0	05732 1	C: 01301 1	34755 1
00,3730	13637 1	34737 0	13640 1	C: 77763 0	13702 0	00004 0	54002 1	34752 0
00,3740	54070 1	50000 1	31326 1	00006 1	13752 0	10070 1	13740 0	52134 0
00,3750	05716 1	C: 01104 0	33772 0	54061 1	30004 0	60070 0	54001 1	33773 1
00,3760	15211 1	04645 1	50070 0	55326 0	05133 0	34755 1	50006 1	57326 1
00,3770	05137 1	05261 1	C: 03757 1	C: 03765 0	C: 03774 0	C: 03775 1	CKSM 77716 1	

ACTUAL LISTING FOR PARAGRAPH # 024. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

01,2000	C: 76466 1	C: 76731 0	00010 0	00020 0	00010 0	00023 0	00010 0	00053 1
01,2010	00057 0	00067 0	00142 0	00160 0	00010 0	00171 0	C: 21000 1	C: 05155 0
01,2020	C: 04050 0	C: 00144 0	C: 05261 1	C: 04060 0	C: 76300 0	C: 75431 0	C: 03710 1	C: 02630 0
01,2030	C: 75173 0	C: 26063 0	C: 05000 1	C: 02613 1	C: 26063 0	C: 02734 0	C: 75533 0	C: 27710 1
01,2040	C: 14000 1	C: 02416 0	C: 50067 0	C: 10000 0	C: 02217 1	C: 54067 1	C: 26000 0	C: 02653 0
01,2050	C: 50067 0	C: 77777 0	C: 75440 0	C: 03710 1	C: 00031 0	C: 75771 1	C: 35710 1	C: 76355 0
01,2060	C: 75755 1	C: 41710 1	C: 20000 0	C: 02540 1	C: 56067 0	C: 04704 0	C: 75425 0	C: 03710 1
01,2070	C: 77777 0	C: 75425 1	C: 03710 1	C: 25000 0	C: 03540 0	C: 64067 1	C: 00062 0	C: 75215 0
01,2100	C: 03710 1	C: 00764 1	C: 75374 0	C: 03710 1	C: 76260 1	C: 74235 0	C: 03710 1	C: 12000 1
01,2110	C: 03223 1	C: 74067 0	C: 00764 1	C: 75501 1	C: 03710 1	C: 77777 0	C: 75425 0	C: 03710 1
01,2120	C: 13000 0	C: 03020 0	C: 30065 1	C: 77777 0	C: 75351 1	C: 03710 1	C: 01477 1	C: 75537 1
01,2130	C: 74067 0	C: 52777 1	C: 02073 1	C: 42067 0	C: 52777 1	C: 02076 1	C: 42067 0	C: 46777 1
01,2140	C: 02024 0	C: 10067 1	C: 46777 1	C: 05665 1	C: 04067 1	C: 52777 1	C: 02571 0	C: 74067 0
01,2150	C: 22000 1	C: 02461 0	C: 46067 1	C: 00310 0	C: 74163 0	C: 01710 0	C: 00310 0	C: 74163 0
01,2160	C: 01710 0	C: 20000 0	C: 02206 1	C: 66067 0	C: 00310 0	C: 74163 0	C: 01710 0	C: 77777 0
01,2170	C: 74324 1	C: 01710 0	C: 77777 0	C: 74361 0	C: 01710 0	C: 00144 0	C: 75060 0	C: 03710 1
01,2200	C: 30000 1	C: 03601 0	C: 10063 0	C: 17000 1	C: 03350 1	C: 74067 0	35015 0	54003 0
01,2210	34745 0	70111 1	10000 0	32337 1	62340 1	55444 0	32342 0	55476 1
01,2220	34737 0	70111 1	00006 1	12232 1	31444 1	00006 1	72341 1	55444 0
01,2230	32343 1	55476 1	00003 1	32334 1	04615 1	C: 20353 0	12244 0	12250 0
01,2240	12233 0	34751 0	05464 1	15155 1	00004 0	04674 0	C: 40123 0	15472 1
01,2250	40106 1	74737 1	10000 0	32000 0	62001 1	61331 1	00006 1	62233 1
01,2260	30111 0	74737 1	00006 1	12271 0	44741 0	61332 1	00006 1	62233 1
01,2270	31332 1	61331 1	22007 0	53245 1	00004 0	04674 0	C: 40123 0	00003 1
01,2300	40106 1	74737 1	00006 1	15472 1	32335 0	04616 1	C: 20353 0	05472 0
01,2310	12315 0	12304 0	34751 0	05464 1	15155 1	34753 1	00004 0	05203 0
01,2320	C: 03217 0	C: 56065 1	15155 1	32336 0	04616 1	C: 20361 1	05472 0	05472 0
01,2330	05472 0	36007 0	05464 1	15155 1	C: 01457 0	C: 01460 1	C: 14460 0	C: 25101 0
01,2340	C: 05220 1	C: 03146 1	C: 77445 1	C: 77622 1	02441 1	30117 0	50130 0	54046 1
01,2350	15061 1	02441 1	40117 1	02346 1	02427 1	50117 0	30000 1	12346 0
01,2360	02427 1	50117 0	40000 0	12346 0	02427 1	50130 0	30046 0	50117 0
01,2370	54000 0	16061 1	02427 1	50117 0	30000 1	50130 0	56046 0	12367 0

ACTUAL LISTING FOR PARAGRAPH # 025. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

01,2400	02427 1	50117 0	30000 1	50130 0	26046 1	16061 1	02441 1	30117 0
01,2410	12403 0	02427 1	50117 0	40006 0	12403 0	02441 1	50130 0	40050 0
01,2420	50130 0	60046 0	00006 1	56061 0	50130 0	56046 0	16646 1	40117 1
01,2430	64772 1	10000 0	30120 1	12440 1	35007 0	56117 0	54003 0	74357 0
01,2440	26117 1	30120 1	54130 1	10020 1	24130 0	00002 0	00002 0	10020 1
01,2450	30117 0	04621 0	10154 0	16061 1	16646 1	16061 1	16646 1	10121 1
01,2460	12462 1	16061 1	54121 1	10020 1	12450 0	C: 00360 1	16646 1	10020 1
01,2470	06723 1	16061 1	16646 1	16061 1	10020 1	12503 1	C: 12000 1	06723 1
01,2500	16061 1	16061 1	16646 1	06723 1	16646 1	16646 1	16061 1	10020 1
01,2510	16640 1	05705 0	02427 1	50120 1	30052 0	12367 0	34762 0	70117 1
01,2520	50000 1	34735 1	54131 0	34745 0	00006 1	70117 1	54130 1	00004 0
01,2530	50000 1	30074 1	54002 1	34741 1	00006 1	70117 1	72576 0	50000 1
01,2540	12541 1	30131 1	00006 1	04002 1	12553 1	30131 1	00006 1	06002 0
01,2550	12553 1	40131 0	70002 1	50130 0	54074 0	00003 1	34737 0	00006 1
01,2560	70117 1	72576 0	50000 1	12564 0	40002 1	70131 0	10000 0	12577 1
01,2570	16715 0	12577 1	05705 0	05705 0	30002 0	12565 1	C: 00014 1	24164 1
01,2600	16061 1	54061 1	10400 1	12620 0	10454 0	12620 0	10530 0	12620 0
01,2610	10604 1	12620 0	10660 0	12620 0	22061 0	30002 0	05716 1	C: 01201 0
01,2620	64752 0	22067 0	50000 1	21777 0	26063 0	34755 1	54064 1	32634 1
01,2630	54062 1	52064 0	10167 0	12674 1	C: 00007 0	12674 1	30063 1	50064 0
01,2640	54167 0	75064 1	50064 0	54166 1	10064 1	12661 0	54121 1	30166 0
01,2650	54120 0	10067 1	12661 0	05705 0	05705 0	54067 1	52066 0	52165 1
01,2660	15160 1	52066 0	50064 0	52165 1	50067 0	40167 0	60063 1	00006 1
01,2670	65160 0	30064 0	54067 1	15160 1	33033 1	26064 1	10062 1	12630 1
01,2700	22061 0	30002 0	05716 1	C: 01202 0	22164 1	30165 0	00004 0	00006 1
01,2710	04077 1	55001 0	50067 0	52165 1	52165 1	30165 0	00006 1	01007 1
01,2720	52155 1	50067 0	52155 1	52155 1	52157 0	50067 0	52157 0	52157 0
01,2730	52161 0	50067 0	52161 0	52161 0	52163 1	50067 0	52163 1	52163 1
01,2740	34755 1	55121 0	00006 1	12746 1	40166 1	54166 1	52167 0	50067 0
01,2750	52167 0	52167 0	35004 0	70167 0	54120 0	10166 1	34755 1	12764 1
01,2760	40166 1	54166 1	34753 1	55121 0	54067 1	00003 1	52165 1	00006 1
01,2770	62772 1	52006 0	40000 0	64753 1	54164 0	16050 0	00004 0	40167 0

OCTAL LISTING FOR PARAGRAPH # 025. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

01,3000	54167 0	36074 1	70006 0	00006 1	04007 1	54165 1	44755 0	54131 0
01,3010	13120 0	00004 0	10067 1	13016 1	00003 1	13216 0	34752 0	00006 1
01,3020	05011 1	52165 1	12712 0	54061 1	34755 1	54064 1	32634 1	54062 1
01,3030	50064 0	10167 0	13035 0	C: 00014 1	13044 0	33033 1	26064 1	10062 1
01,3040	13027 0	44752 0	54064 1	15160 1	40065 0	50064 0	60164 1	00006 1
01,3050	13052 1	13035 0	50064 0	40167 0	54063 0	50064 0	54167 0	44350 1
01,3060	70065 0	64741 1	56065 1	74350 1	50064 0	60165 0	54066 0	10064 1
01,3070	12661 0	12651 0	54164 0	34755 1	54130 1	35004 0	70167 0	60063 1
01,3100	54167 0	40000 0	13007 1	00004 0	44755 0	54131 0	56167 1	75004 1
01,3110	54001 1	45164 0	60001 0	00005 1	63120 1	10001 1	50000 1	54000 0
01,3120	10203 1	03171 0	05705 0	13124 1	10217 1	03171 0	05705 0	13130 1
01,3130	10233 1	03171 0	C: 67510 1	13134 0	10247 1	03171 0	05705 0	13140 0
01,3140	10263 1	03171 0	05705 0	13144 1	10277 1	03171 0	05705 0	13150 1
01,3150	10313 1	03171 0	05705 0	13154 0	10131 0	05705 0	05705 0	13161 0
01,3160	13206 1	10130 1	13164 0	12764 1	50000 1	27777 0	63132 1	54067 1
01,3170	12704 1	54132 0	60131 1	10000 0	40132 0	13201 0	13177 1	50002 0
01, 3200	00002 0	54131 0	00005 1	22130 0	50130 0	00002 0	44755 0	54067 1
01,3210	00003 1	44752 1	00006 1	03011 1	10067 1	13011 0	34752 0	13225 0
01, 3220	31361 1	54001 1	33224 0	15166 1	C: 66102 1	00006 1	05011 1	52165 1
01,3230	15165 1	54062 1	30002 0	00006 1	63523 0	40026 1	64744 1	10000 0
01,3240	66107 1	40000 0	65370 0	60002 0	10000 0	61400 1	13310 1	13250 1
01,3250	40002 1	64736 1	64736 1	56026 0	64735 1	60002 0	00006 1	22007 0
01,3260	57400 1	57401 0	57402 0	57403 1	57404 0	57405 1	57406 1	57407 0
01,3270	30063 1	50062 0	13273 0	53411 0	53413 1	53415 1	53417 0	53421 0
01,3300	53423 1	53425 1	53427 0	53431 1	65236 0	00006 1	15215 0	13363 0
01,3310	10000 0	61401 0	13316 1	64753 1	03374 1	C: 00001 0	10000 0	61402 0
01,3320	13324 0	64753 1	03374 1	C: 00002 0	10000 0	61403 1	13332 1	64753 1
01,3330	03374 1	C: 00003 1	10000 0	61404 0	13340 1	64753 1	03374 1	C: 00004 0
01,3340	10000 0	61405 1	13346 1	64753 1	03374 1	C: 00005 1	10000 0	61406 1
01,3350	13354 1	64753 1	03374 1	C: 00006 1	10000 0	61407 0	13362 1	64753 1
01,3360	03374 1	C: 05007 0	10000 0	03371 1	13365 0	64753 1	03374 1	C: 00010 0
01,3370	C: 40201 0	52062 1	05716 1	C: 01203 1	54064 1	50002 0	30000 1	54002 1

OCTAL LISTING FOR PARAGRAPH # 027, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

01,3400	34753 1	60064 0	50002 0	27377 1	40064 1	50002 0	13260 1	00006 1
01,3410	04007 1	54016 1	00006 1	22012 1	34734 0	57407 0	57406 1	57405 1
01,3420	57404 0	57403 1	57402 0	57401 0	57400 1	64733 1	26026 1	54734 0
01,3430	44755 0	54734 0	00006 1	45237 0	53431 1	53427 0	53425 1	53423 1
01,3440	53421 0	53417 0	53415 1	53413 1	53411 0	56001 0	00006 1	01007 1
01,3450	56001 0	52006 0	23435 1	34752 0	26002 1	55434 1	31153 1	10000 0
01,3460	13466 1	13463 1	13521 0	31154 0	00006 1	63521 1	00006 1	43500 0
01,3470	21154 1	11154 1	13511 0	13474 1	13475 0	11153 0	13511 0	C: 00000 1
01,3500	C: 20000 0	34736 1	27154 1	05203 0	C: 03516 0	C: 02063 0	33520 0	53435 0
01,3510	52006 0	34736 1	05203 0	C: 03466 0	C: 02063 0	13506 0	53150 0	52006 0
01,3520	C: 05261 1	53435 0	13524 0	52062 1	05726 1	C: 01204 0	30161 1	60000 1
01,3530	54155 1	33770 1	54157 0	33565 1	54707 0	30154 1	75007 1	10000 0
01,3540	13551 1	10154 0	10000 0	13651 1	35024 1	05105 0	C: 03037 0	C: 20103 1
01,3550	03565 1	75007 1	10000 0	13622 0	00006 1	50155 0	31437 0	52706 1
01,3560	30154 1	74757 1	67746 0	10000 0	13734 0	04631 1	13570 1	13635 0
01,3570	33774 0	54704 0	50155 0	31054 1	10000 0	24000 1	13601 1	15436 1
01,3600	13620 1	40000 0	54001 1	50155 0	41053 1	00006 1	60025 0	10000 0
01,3610	40000 0	67701 0	64753 1	60001 0	10000 0	34755 1	13620 1	13620 1
01,3620	64753 1	00704 1	33565 1	54157 0	33771 0	54707 0	30154 1	76074 0
01,3630	54154 0	00006 1	50155 0	31437 0	52706 1	50155 0	31054 1	54704 0
01,3640	00006 1	63645 0	33773 1	56704 1	00704 1	33775 1	56704 1	40000 0
01,3650	00704 1	54020 1	10020 1	13654 1	13752 0	33565 1	54707 0	30154 1
01,3660	54021 0	60021 1	50155 0	62003 0	54156 1	00006 1	50156 0	32002 1
01,3670	22706 0	10000 0	24000 1	13746 0	24000 1	54705 1	33774 0	54704 0
01,3700	30706 0	74742 0	10000 0	13741 1	50156 0	22000 0	15445 0	53154 1
01,3710	00006 1	40025 1	21154 1	00006 1	31152 0	21154 1	11153 0	13727 1
01,3720	13722 1	13615 1	11154 1	13727 1	13725 0	13615 1	13620 1	33772 0
01,3730	54704 0	00006 1	31154 0	00704 1	33774 0	54704 0	50155 0	41054 0
01,3740	15445 0	40706 1	54706 1	50156 0	32000 0	13574 0	56705 0	50156 0
01,3750	32000 0	13637 1	30157 1	54707 0	50155 0	32002 1	60154 1	60154 1
01,3760	60154 1	54156 1	13665 0	36245 1	26156 1	33565 1	54707 0	13665 0
01,3770	C: 03763 0	C: 03541 1	C: 05277 0	C: 05105 0	C: 05203 0	C: 05072 1	C: 03776 1	CKSM 55151 1

TOTAL LISTING FOR PARAGRAPH # 040, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

04,2000	C: 00302 0	C: 17755 0	C: 00055 1	C: 01265 1	C: 22437 1	C: 16067 1	C: 15625 1	C: 21042 1
04,2010	C: 30276 1	C: 04773 0	C: 25004 1	C: 06702 1	C: 16471 1	C: 01352 1	C: 21412 0	C: 20500 0
04,2020	C: 25477 1	C: 03567 0	C: 27533 1	C: 07571 0	05516 0	C: 00311 1	05516 0	C: 00314 1
04,2030	05476 1	32037 1	04616 1	C: 20476 0	12031 0	12031 0	12031 0	C: 11343 0
04,2040	54775 0	34355 0	54366 0	31202 1	74746 1	10000 0	12065 1	40775 0
04,2050	62400 1	00003 1	12373 0	64753 1	00006 1	12372 1	30775 1	00006 1
04,2060	12107 1	40076 1	74753 0	10000 0	12072 1	05567 0	C: 01520 1	04457 0
04,2070	04635 0	C: 21050 1	32477 1	54155 1	50155 0	32441 1	76074 0	40000 0
04,2100	60775 1	10000 0	10155 1	12073 0	12322 1	30155 0	54774 1	40103 1
04,2110	74746 1	10000 0	12134 1	05516 0	C: 00163 0	32366 0	55260 0	15155 1
04,2120	40074 0	74745 1	10000 0	12125 1	12132 1	40074 0	74743 1	10000 0
04,2130	32367 1	64747 1	62370 1	05357 0	34755 1	00006 1	01007 1	32365 0
04,2140	54374 0	05353 1	C: 00014 1	06037 0	I: 77624 1	C: 27414 0	I: 77776 1	05516 0
04,2150	C: 00124 0	34735 1	54107 0	05516 0	C: 00063 1	05516 0	C: 00141 0	05516 0
04,2160	C: 00311 1	10775 0	12310 0	04457 0	35017 1	55056 1	06011 1	44753 0
04,2170	70076 1	54076 1	34756 1	54001 1	40000 0	52755 1	42371 1	70074 0
04,2200	54074 0	34755 1	54332 1	55324 1	04674 0	C: 75555 0	04674 0	C: 40204 0
04,2210	44775 1	55072 1	70075 1	54075 1	04674 0	C: 12652 0	10775 0	12226 1
04,2220	04674 0	C: 12647 1	00775 1	55011 1	04635 0	C: 12770 1	41011 1	62326 1
04,2230	00006 1	12250 0	40775 0	62326 1	00006 1	12250 0	67746 0	00006 1
04,2240	12262 1	64756 1	00006 1	12262 1	32324 0	70074 0	10000 0	12257 1
04,2250	42371 1	70074 0	54074 0	06011 1	00006 1	34755 1	52755 1	32364 1
04,2260	54374 0	12224 0	41011 1	66007 0	00006 1	12254 1	64756 1	00006 1
04,2270	12254 1	32324 0	70074 0	60775 1	40000 0	62327 0	00006 1	12304 0
04,2300	62325 1	00006 1	12304 0	12254 1	40075 1	74775 1	26075 1	12220 1
04,2310	32324 0	70074 0	10000 0	12316 0	05516 0	C: 00007 0	50774 0	32500 0
04,2320	00004 0	12202 1	04364 1	12067 0	C: 00500 1	C: 00305 1	C: 00026 0	C: 00124 0
04,2330	00004 0	50774 0	32441 1	55060 1	54020 1	30020 0	77725 1	55062 0
04,2340	54063 0	31060 0	00006 1	74744 0	74757 1	54001 1	50774 0	32403 1
04,2350	55061 0	74350 1	26001 1	31061 1	75012 0	64741 1	05116 1	31060 0
04,2360	76074 0	05314 1	04457 0	05155 0	C: 10333 0	C: 10146 0	C: 10120 0	C: 37667 1
04,2370	C: 40072 0	C: 00700 0	36245 1	54002 1	00006 1	32402 0	60002 0	52006 0

DETAILED LISTING FOR PARAGRAPH # 041, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

04,2400	C: 00106 0	C: 02072 0	C: 42067 0	C: 71526 0	C: 71274 0	C: 26207 0	C: 72731 1	C: 72547 1
04,2410	C: 72220 1	C: 72031 0	C: 62144 1	C: 64776 0	C: 33314 1	C: 32050 0	C: 31427 1	C: 75436 1
04,2420	C: 75410 0	C: 75272 1	C: 75147 1	C: 71521 1	C: 71271 0	C: 72725 1	C: 72545 0	C: 72216 1
04,2430	C: 72027 1	C: 72450 0	C: 72000 1	C: 50404 1	C: 50000 1	C: 51505 0	C: 50000 1	C: 60061 0
04,2440	C: 77655 1	C: 27717 0	C: 27716 1	C: 27714 0	C: 27713 1	C: 27712 0	C: 27711 0	C: 27710 1
04,2450	C: 27704 1	C: 27677 1	C: 27271 0	C: 27264 1	C: 27263 0	C: 27657 0	C: 27652 0	C: 27651 0
04,2460	C: 27650 1	C: 27647 1	C: 27646 0	C: 27645 0	C: 27642 1	C: 27641 1	C: 27640 0	C: 27637 0
04,2470	C: 27636 1	C: 27631 0	C: 27526 0	C: 27625 0	C: 27624 1	C: 27614 1	C: 27006 1	C: 00035 1
04,2500	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00004 0
04,2510	C: 00004 0	C: 00005 1	C: 00000 1	C: 00000 1	C: 00003 1	C: 00003 1	C: 00003 1	C: 00003 1
04,2520	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0
04,2530	C: 00002 0	C: 00005 1	C: 00002 0	C: 00002 0	C: 00004 0	C: 00000 1	I: 44001 0	C: 00001 0
04,2540	C: 02736 1	I: 47135 0	C: 00012 1	C: 21576 0	I: 71406 0	I: 73525 1	I: 77626 0	C: 60012 1
04,2550	C: 00011 1	I: 77634 0	C: 21576 0	I: 71406 0	C: 00025 0	I: 73525 1	I: 57406 1	C: 14027 1
04,2560	C: 24007 0	C: 14005 0	I: 72405 0	C: 00001 0	C: 17767 1	I: 72405 0	I: 77626 0	C: 50006 1
04,2570	C: 00023 0	I: 53435 0	C: 03765 0	C: 00031 0	I: 77650 1	C: 02736 1	52134 0	53170 1
04,2600	25167 0	30006 1	75012 0	27170 1	51167 0	27777 0	04622 0	02613 1
04,2610	02612 0	25167 0	25167 0	53170 1	52006 0	22164 1	50001 0	30001 0
04,2620	24001 0	24001 0	53170 1	06037 0	I: 77624 1	C: 01167 0	I: 77776 1	23170 0
04,2630	16041 0	05137 1	44741 0	50064 0	26164 0	00072 1	56002 0	54154 0
04,2640	00004 0	34355 0	05072 1	C: 03534 0	C: 60101 1	00003 1	00154 1	54001 1
04,2650	04220 0	04224 1	04374 0	30001 0	55043 0	05133 0	22007 0	34755 1
04,2660	53052 0	33011 1	04616 1	C: 20334 1	15472 1	12667 0	12661 0	53052 0
04,2670	00006 1	13000 0	52155 1	06037 0	I: 77634 0	C: 21716 1	C: 34041 0	C: 27043 0
04,2700	I: 63375 0	C: 00007 0	C: 00001 0	C: 02207 0	I: 63256 0	I: 53435 0	I: 77626 0	C: 61562 1
04,2710	C: 00015 0	C: 34041 0	C: 27057 0	I: 63375 0	C: 00007 0	C: 00001 0	I: 77725 1	C: 00015 0
04,2720	C: 24037 0	I: 41406 0	I: 63245 1	C: 02207 0	I: 72441 0	C: 02215 0	C: 26201 0	C: 00001 0
04,2730	I: 72441 0	C: 02215 0	C: 26203 1	C: 00007 0	I: 41456 0	I: 47235 0	C: 00001 0	C: 00023 0
04,2740	I: 53552 0	I: 77656 1	C: 24001 0	C: 00023 0	I: 74241 0	C: 00015 0	I: 77752 1	I: 53445 1
04,2750	I: 77656 1	I: 50206 0	C: 00001 0	I: 65552 0	C: 26205 1	I: 50235 0	C: 00001 0	I: 71244 0
04,2760	C: 10765 1	C: 24000 0	I: 77625 0	C: 02205 1	C: 02205 1	I: 47145 1	C: 00037 0	C: 21612 1
04,2770	C: 01052 1	I: 77775 1	32012 1	04616 1	C: 20334 1	15472 1	15472 1	12661 0

DCTAL LISTING FOR PARAGRAPH # 042, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

04,3000	55001 0	00006 1	13005 0	56001 0	12672 1	06037 0	I: 52034 1	C: 21573 0
04,3010	C: 10676 1	C: 01420 0	C: 01532 1	I: 77220 1	C: 02746 0	C: 01555 0	I: 47235 0	C: 01563 0
04,3020	C: 03607 0	I: 77656 1	C: 03623 0	I: 53435 0	C: 03607 0	C: 37615 1	C: 02746 0	C: 00000 1
04,3030	C: 04000 0	C: 00000 1	C: 00200 0	C: 00000 1	C: 00400 0	C: 00000 1	C: 10000 0	C: 00000 1
04,3040	C: 02000 0	C: 00000 1	C: 01000 0	C: 00000 1	C: 00020 0	C: 00000 1	C: 00100 0	C: 00000 1
04,3050	C: 34631 1	C: 23146 0	C: 77467 1	C: 77777 0	C: 03110 1	C: 17665 1	C: 00000 1	C: 00001 0
04,3060	C: 37767 0	C: 37737 0	C: 40010 1	C: 40040 1	I: 43020 1	C: 02753 1	C: 03665 1	I: 77614 1
04,3070	C: 04273 0	I: 45131 0	C: 02673 1	C: 27777 0	C: 11130 0	C: 14045 0	I: 56261 1	C: 20606 0
04,3100	C: 00045 0	C: 32766 1	C: 10005 0	C: 14017 1	C: 02720 0	I: 60316 0	C: 00047 1	I: 41275 1
04,3110	C: 00017 1	C: 00041 1	I: 77657 0	C: 21576 0	I: 44206 0	C: 11043 0	C: 16742 1	I: 60205 0
04,3120	C: 00045 0	C: 00047 1	I: 53605 1	C: 00045 0	C: 20575 1	C: 02740 0	I: 77650 1	C: 02753 1
04,3130	I: 77656 1	C: 16712 1	C: 00045 0	C: 26720 0	I: 77656 1	C: 02722 1	I: 72441 0	C: 02712 1
04,3140	I: 77725 1	C: 00045 0	C: 24041 1	C: 02722 1	I: 76435 1	C: 02712 1	I: 75214 1	C: 03705 0
04,3150	C: 11162 1	C: 02673 1	I: 40056 0	C: 11160 0	C: 16674 0	C: 00045 0	I: 43565 0	C: 02673 1
04,3160	I: 52162 0	C: 11154 1	I: 75246 0	C: 02673 1	I: 77616 0	00003 1	00006 1	23167 0
04,3170	05037 0	I: 53135 0	C: 01502 1	C: 11232 1	I: 77775 1	C: 01503 0	C: 25535 0	C: 01511 0
04,3200	I: 77624 1	C: 23456 1	I: 51535 0	C: 01502 1	I: 53025 0	C: 11243 1	C: 11213 1	I: 43174 1
04,3210	C: 00000 1	C: 00223 1	C: 11216 1	I: 43174 1	C: 00002 0	C: 00063 1	I: 50135 0	C: 01502 1
04,3220	C: 11226 1	I: 77624 1	C: 26661 1	I: 52014 0	C: 01671 0	C: 11230 0	I: 77624 1	C: 26734 0
04,3230	I: 77614 1	C: 02676 1	I: 45131 0	C: 01502 1	C: 00000 1	C: 27423 1	I: 77776 1	05353 1
04,3240	C: 04026 1	C: 01167 0	C: 00002 0	C: 00000 1	I: 77420 1	C: 02711 1	05352 1	C: 04022 0
04,3250	06037 0	I: 77650 1	C: 02711 1	C: 00063 1	34737 0	70077 0	10000 0	03270 1
04,3260	31302 1	74743 1	00006 1	13265 1	44750 0	63273 1	05744 0	06001 0
04,3270	05504 0	C: 00007 0	14631 0	C: 00220 1	54016 1	56002 0	54012 0	04400 1
04,3300	34346 1	00006 1	02015 1	54073 1	40101 0	74735 0	26101 0	34355 0
04,3310	05072 1	C: 02077 0	C: 60101 1	30073 0	50064 0	54154 0	05270 1	54016 1
04,3320	56002 0	54012 0	04400 1	34755 1	56045 0	54073 1	34751 0	00006 1
04,3330	05011 1	34346 1	70073 1	56073 0	00006 1	74742 0	54734 0	74346 0
04,3340	63374 1	03371 1	34742 1	00006 1	70734 0	74346 0	40000 0	03371 1
04,3350	43377 0	60073 0	00006 1	13361 1	34750 1	70103 1	10000 0	05270 1
04,3360	03307 0	44750 0	70103 1	54103 1	03307 0	40103 1	74750 0	26103 1
04,3370	05270 1	60073 0	10000 0	03365 1	C: 77740 1	03365 1	00002 0	C: 00022 1

DCTAL LISTING FOR PARAGRAPH # 041, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "Q" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

04,3400	44753 0	05353 1	C: 07026 1	C: 30000 1	C: 03712 0	C: 10102 0	34753 1	54332 1
04,3410	05311 1	C: 00053 1	51172 1	13414 1	13417 1	13422 1	13422 1	34752 0
04,3420	55170 1	13445 0	33515 0	54156 1	33516 0	04616 1	C: 20334 1	13712 1
04,3430	13424 1	03506 1	44752 1	61174 1	00006 1	63424 0	41174 0	64362 1
04,3440	00006 1	63424 0	31174 1	55170 1	25173 0	33662 0	61173 0	54156 1
04,3450	33516 0	04616 1	C: 20334 1	13712 1	13450 1	03506 1	41173 1	61170 0
04,3460	00006 1	63463 0	13444 1	33514 1	54156 1	33517 1	04616 1	C: 20334 1
04,3470	13712 1	13550 1	03506 1	31167 0	00006 1	63463 0	41167 1	61170 0
04,3500	64753 1	00006 1	63463 0	33662 0	61167 0	13447 1	40154 0	74746 1
04,3510	10000 0	00052 0	50002 0	77771 0	C: 01167 0	C: 01174 1	C: 05201 1	C: 05202 1
04,3520	00004 0	30103 0	56001 0	34751 0	00006 1	06001 0	54103 1	05353 1
04,3530	C: 04026 1	00004 0	44752 1	61172 1	00006 1	63544 1	00006 1	31175 0
04,3540	53205 0	03567 0	04364 1	03712 0	34355 0	05105 0	C: 03551 0	C: 10103 1
04,3550	05155 0	06037 0	I: 77524 1	C: 27414 0	I: 77776 1	05353 1	C: 04026 1	05504 0
04,3560	C: 00236 0	00004 0	51172 1	13564 1	13723 0	13632 1	13664 1	00006 1
04,3570	23167 0	34755 1	22007 0	52025 1	53217 0	34756 1	54001 1	40000 0
04,3600	52765 1	00004 0	34755 1	22007 0	54156 1	53205 0	52155 1	00006 1
04,3610	31217 1	20155 1	00006 1	13622 0	34755 1	53217 0	20025 1	05353 1
04,3620	C: 04026 1	01167 0	07257 0	52155 1	20025 1	05353 1	C: 04026 1	00004 0
04,3630	51167 0	00001 0	31175 0	54003 0	74357 0	55167 1	67745 0	61170 0
04,3640	00006 1	13647 0	74743 1	10000 0	13760 1	37745 0	61170 0	54154 0
04,3650	50000 1	31176 0	54001 1	30154 1	61167 0	50000 1	23400 1	10154 0
04,3660	13647 0	13711 1	C: 01172 0	13711 1	34753 1	71170 1	10000 0	13671 0
04,3670	13760 1	44752 1	61170 0	54154 0	50000 1	31175 0	22000 1	10154 0
04,3700	54154 0	50000 1	31175 0	54003 0	74357 0	50000 1	23400 1	10154 0
04,3710	13673 1	03165 0	31171 1	05314 1	34755 1	54332 1	03765 0	00006 1
04,3720	34755 1	52765 1	05472 0	00006 1	41175 1	53205 0	03567 0	03760 0
04,3730	00006 1	41175 1	53207 1	00006 1	41175 1	53211 0	05353 1	C: 04026 1
04,3740	34755 1	22007 0	53207 1	21571 1	34755 1	22007 0	53211 0	21643 0
04,3750	34755 1	22007 0	53175 1	21710 1	27706 0	05353 1	C: 04026 1	03711 0
04,3760	04364 1	13711 1	04364 1	03765 0	05472 0	44751 1	00006 1	03011 1
04,3770	00002 0	C: 03771 0	C: 03772 0	CKSM 12532 0	Q	Q	Q	Q

OCTAL LISTING FOR PARAGRAPH # 044, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

05,2000	C: 02357 1	C: 20000 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1
05,2010	C: 00000 1	C: 16533 0	C: 30007 0	C: 77333 1	C: 56654 0	C: 00000 1	C: 00000 1	C: 06273 1
05,2020	C: 03275 1	C: 01242 1	C: 24467 1	C: 00020 0	C: 17260 0	C: 00002 0	C: 00000 1	C: 22572 1
05,2030	C: 27214 0	C: 01315 1	C: 26177 1	C: 77731 1	C: 55217 0	C: 32055 0	C: 22576 0	C: 10624 0
05,2040	C: 10605 0	C: 37436 1	C: 01635 0	C: 01065 0	C: 31323 1	C: 20770 0	C: 13725 0	C: 02245 0
05,2050	C: 06475 1	C: 00162 1	C: 33431 1	C: 22566 1	C: 24130 0	C: 02000 0	C: 00000 1	C: 00256 0
05,2060	C: 17752 1	C: 77512 1	C: 67453 1	C: 00131 1	C: 26730 1	C: 77340 0	C: 32127 1	C: 24340 0
05,2070	C: 03451 1	C: 13443 0	C: 02256 1	C: 01344 0	C: 25733 1	C: 03633 1	C: 12266 0	C: 13700 1
05,2100	C: 01340 1	C: 03630 1	C: 32136 1	C: 00024 1	C: 32145 0	C: 24340 0	C: 32154 0	C: 07115 0
05,2110	C: 00007 0	C: 01776 0	C: 12274 0	C: 03635 1	C: 12365 1	C: 01333 0	C: 05336 1	C: 03577 1
05,2120	C: 01331 1	C: 01302 1	C: 03441 0	C: 32157 0	C: 32170 0	C: 00007 0	C: 74261 1	C: 76056 0
05,2130	C: 01723 0	C: 01725 0	C: 01727 1	C: 01731 0	C: 01570 1	C: 76060 0	C: 04320 1	C: 01432 0
05,2140	C: 07021 0	C: 07235 1	C: 04032 1	C: 24074 1	C: 52754 0	C: 76555 0	C: 01224 1	C: 01226 0
05,2150	C: 01230 1	C: 01232 0	C: 01234 0	C: 76557 1	C: 07243 0	C: 10372 0	C: 77667 0	C: 07021 0
05,2160	C: 07235 1	C: 04032 1	C: 03024 1	C: 03113 1	C: 34011 0	C: 34013 1	C: 34030 0	C: 43745 0
05,2170	C: 03560 1	C: 67453 1	C: 32127 1	C: 24340 0	C: 02020 1	C: 02774 1	C: 07115 0	C: 01333 0
05,2200	C: 01344 0	C: 25733 1	C: 00735 0	C: 12022 1	C: 05336 1	C: 32224 1	C: 32136 1	C: 00024 1
05,2210	C: 32145 0	C: 24340 0	C: 32154 0	C: 32226 0	C: 05336 1	C: 04036 0	C: 00112 0	C: 01331 1
05,2220	C: 01302 1	C: 03441 0	C: 32157 0	C: 52754 0	C: 05700 0	C: 77665 1	C: 12737 1	C: 02755 1
05,2230	C: 12760 0	C: 65011 1	C: 32127 1	C: 24340 0	C: 32276 0	C: 14340 0	C: 03451 1	C: 13443 0
05,2240	C: 13433 1	C: 03633 1	C: 12266 0	C: 00007 0	C: 03630 1	C: 32224 1	C: 32136 1	C: 00024 1
05,2250	C: 32145 0	C: 24340 0	C: 32154 0	C: 07115 0	C: 00007 0	C: 01776 0	C: 12274 0	C: 03635 1
05,2260	C: 12365 1	C: 02756 1	C: 04036 0	C: 00112 0	C: 01331 1	C: 01302 1	C: 03441 0	C: 32157 0
05,2270	C: 02302 1	C: 03620 0	C: 03466 0	C: 03577 1	C: 02347 0	C: 77770 1	C: 74320 0	C: 03461 1
05,2300	C: 03752 1	C: 03754 1	C: 74017 1	C: 32341 0	C: 32355 0	C: 01344 0	C: 13253 1	C: 13645 1
05,2310	C: 03642 1	C: 03664 0	C: 12022 1	C: 00007 0	C: 32224 1	C: 32136 1	C: 00024 1	C: 32145 0
05,2320	C: 24340 0	C: 32154 0	C: 07115 0	C: 12636 1	C: 13626 1	C: 13634 1	C: 02262 0	C: 02400 1
05,2330	C: 03615 0	C: 00112 0	C: 01331 1	C: 01302 1	C: 03441 0	C: 32157 0	C: 32170 0	C: 03614 1
05,2340	C: 74324 1	C: 75441 1	C: 03651 0	C: 02337 1	C: 03652 0	C: 03754 1	C: 03654 0	C: 03756 0
05,2350	C: 03457 1	C: 03461 1	C: 03752 1	C: 03754 1	C: 75443 0	C: 24340 0	C: 57423 0	C: 32127 1
05,2360	C: 24340 0	C: 32276 0	C: 14340 0	C: 02774 1	C: 25733 1	C: 26236 1	C: 32224 1	C: 32136 1
05,2370	C: 00024 1	C: 32145 0	C: 24340 0	C: 32154 0	C: 32226 0	C: 12230 0	C: 02020 1	C: 00112 0

OGTAL LISTING FOR PARAGRAPH # 045, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

05,2400	C: 01331 1	C: 01302 1	C: 03441 0	C: 32157 0	C: 32170 0	C: 00007 0	C: 77770 1	C: 12200 0
05,2410	C: 02214 1	C: 12201 1	C: 02215 0	C: 12206 0	C: 02214 1	C: 12207 1	C: 02215 0	C: 25170 0
05,2420	C: 25204 0	C: 32136 1	C: 00024 1	C: 32145 0	C: 24340 0	C: 32154 0	C: 07115 0	C: 00007 0
05,2430	C: 00007 0	C: 02020 1	C: 25174 1	C: 15210 0	C: 01331 1	C: 01302 1	C: 00007 0	C: 32157 0
05,2440	C: 52754 0	C: 02172 1	C: 02407 0	C: 02232 0	C: 02066 0	C: 02303 0	C: 02357 1	00004 0
05,2450	03107 1	12456 0	34736 1	05105 0	C: 77777 0	C: 77777 0	31036 0	74771 0
05,2460	64735 1	55036 1	24740 0	54332 0	34755 1	55365 1	54375 1	54376 1
05,2470	54377 0	54320 1	44644 1	55313 0	34736 1	00006 1	01011 0	44755 0
05,2500	54055 0	34751 0	55273 1	34355 0	54366 0	34755 1	55246 1	54371 0
05,2510	55072 1	55262 1	55263 0	55276 1	55360 1	55362 0	54332 1	55324 1
05,2520	55501 0	00006 1	01005 0	00006 1	01006 0	00006 1	01012 0	00006 1
05,2530	01013 1	00006 1	01014 0	41036 1	74771 0	10000 0	02542 0	34771 1
05,2540	00006 1	05012 1	02643 1	44755 0	55011 1	33362 0	55302 0	33067 0
05,2550	55346 0	34751 0	55325 0	33063 1	54111 1	35015 0	54003 0	33060 1
05,2560	55444 0	33061 0	55476 1	32000 0	55400 0	33064 0	55403 0	55406 0
05,2570	33065 1	55405 0	55410 1	34755 1	55407 1	34363 0	55404 1	34744 1
05,2600	55411 0	35026 0	64746 0	55303 1	00006 1	33367 0	52075 1	33370 0
05,2610	54076 1	34737 0	70077 0	63371 1	54077 0	00006 1	33373 0	52101 0
05,2620	00006 1	33375 0	52103 1	34744 1	64740 0	64741 1	70104 0	63376 0
05,2630	54104 0	33377 1	54105 1	34737 0	70106 1	62400 0	54106 1	33401 1
05,2640	54107 0	04635 0	C: 03210 1	00004 0	00006 1	34755 1	52755 1	00006 1
05,2650	34755 1	52761 0	00006 1	34755 1	52753 1	00006 1	34755 1	52757 0
05,2660	00006 1	34755 1	52763 1	00006 1	34755 1	52765 1	00002 0	24320 0
05,2670	22002 0	00006 1	04007 1	53433 0	31036 0	74750 0	00006 1	12703 0
05,2700	64746 0	00006 1	05012 1	03070 0	34350 0	71360 1	00006 1	12711 0
05,2710	13105 1	41560 1	00006 1	12730 0	61377 0	00006 1	12720 1	13105 1
05,2720	31374 0	54003 0	00006 1	31376 1	51377 0	52001 1	34755 1	55360 1
05,2730	03107 1	44736 0	70106 1	54106 1	33364 0	71036 1	64735 1	57036 0
05,2740	32350 1	71302 0	63363 1	55302 0	31324 0	54332 1	34750 1	00006 1
05,2750	05014 1	40101 0	74745 1	10000 0	12761 1	34737 0	00006 1	05011 1
05,2760	12775 1	34736 1	00006 1	05011 1	12775 1	00004 0	03116 1	12771 0
05,2770	03146 1	03070 0	43066 0	70106 1	54106 1	34756 1	54161 0	60000 1

TOTAL LISTING FOR PARAGRAPH # 046. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

05,3000	00006 1	50000 1	30753 0	00006 1	06001 0	10000 0	13054 1	13054 1
05,3010	13054 1	10161 0	12776 1	54162 0	05315 0	00004 0	44736 0	70075 1
05,3020	54075 1	44740 1	70075 1	54075 1	44741 0	70074 0	54074 0	34756 1
05,3030	54161 0	50000 1	50000 1	10753 1	13036 0	13043 1	54154 0	24154 1
05,3040	24162 1	33062 0	04622 0	10161 0	13030 0	10162 0	12641 1	34735 1
05,3050	71011 1	00006 1	16001 1	12641 1	05567 0	C: 01107 0	12501 0	C: 07777 1
05,3060	C: 32321 0	C: 77445 1	C: 03526 0	C: 21312 1	C: 77001 0	C: 00074 1	C: 20100 1	C: 03434 1
05,3070	34747 1	00006 1	02016 1	00006 1	13102 0	00006 1	00015 0	63361 0
05,3100	00006 1	13103 1	00002 0	03107 1	12474 0	03107 1	12501 0	33351 0
05,3110	54335 0	34746 0	00006 1	02033 0	63365 1	54110 0	34733 1	54026 1
05,3120	67746 0	54027 0	67747 1	54030 0	35015 0	54003 0	44737 1	71273 1
05,3130	55273 1	34733 1	55466 0	00006 1	03013 0	34755 1	55465 0	55472 0
05,3140	44751 1	70111 1	54111 1	00006 1	33347 1	53275 1	33360 1	00006 1
05,3150	03011 1	44743 1	70077 0	54077 0	40077 0	74741 0	00006 1	13161 0
05,3160	34742 1	53354 0	40000 0	70110 0	54110 0	33356 1	00006 1	03012 1
05,3170	44750 0	70101 0	54101 0	44741 0	70101 0	54101 0	33357 0	00006 1
05,3200	03013 0	34740 0	00006 1	05013 0	34746 0	00006 1	03014 1	35007 0
05,3210	54003 0	34734 0	55407 1	55406 0	55405 0	55404 1	55403 0	55402 1
05,3220	55401 1	55400 0	45236 1	55410 1	55412 0	55414 0	55416 1	55420 1
05,3230	55422 0	55424 0	55426 1	55430 0	45237 0	55411 0	55413 1	55415 1
05,3240	55417 0	55421 0	55423 1	55425 1	55427 0	55431 1	44755 0	54167 0
05,3250	54203 1	54217 1	54233 1	54247 1	54263 1	54277 1	54313 1	55313 0
05,3260	54057 1	33353 1	54400 1	63355 1	54454 0	63355 1	54530 0	63355 1
05,3270	54604 1	63355 1	54660 0	34363 0	54154 0	44740 1	50154 1	55023 0
05,3300	10154 0	13274 1	55326 0	55327 1	55330 1	55074 1	54045 1	54776 0
05,3310	55042 1	55013 0	55015 0	55012 1	55020 0	55021 1	55001 0	55002 0
05,3320	55043 0	55312 1	55044 1	55304 0	55305 1	55306 1	55307 0	55314 1
05,3330	54100 1	34760 1	55016 0	44753 0	55100 0	34746 0	71303 1	65026 0
05,3340	55303 1	33352 0	55361 0	44360 1	54777 1	00002 0	C: 02024 0	C: 34066 0
05,3350	C: 00435 0	C: 03515 0	C: 03336 1	C: 00400 0	C: 32001 1	C: 00054 0	C: 27470 1	C: 74160 0
05,3360	C: 30001 0	C: 77755 0	C: 37411 1	C: 37000 0	C: 00450 0	C: 00102 1	C: 00000 1	C: 00000 1
05,3370	C: 00000 1	C: 02000 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00100 0	C: 00000 1	C: 00000 1

DATA LISTING FOR PARAGRAPH # 047. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

05,3400	C: 00000 1	C: 40000 0	33405 0	54017 0	50017 1	13406 1	33477 0	60002 0
05,3410	54001 1	40000 0	52761 0	50002 0	33476 1	55011 1	55163 0	10002 1
05,3420	40106 1	74737 1	26106 1	43501 1	70111 1	54111 1	40101 0	74745 1
05,3430	26101 0	44355 1	00006 1	02011 0	64737 0	00006 1	01011 0	64735 1
05,3440	54107 0	40074 0	74752 1	26074 0	06011 1	00006 1	30025 0	53345 0
05,3450	00006 1	33475 1	53253 0	00006 1	34755 1	52753 1	00006 1	34755 1
05,3460	52757 0	00006 1	34755 1	52765 1	36245 1	54001 1	40000 0	52761 0
05,3470	37730 1	54030 0	04635 0	C: 12765 0	C: 03770 1	C: 64067 1	C: 00106 0	C: 00027 1
05,3500	C: 00107 1	C: 00640 0	C: 00545 0	C: 00171 0	C: 00017 1	C: 23305 0	54016 1	00006 1
05,3510	22012 1	13763 1	00006 1	05013 0	00335 1	37747 1	54337 1	54336 0
05,3520	33640 0	54335 0	13536 0	10336 0	03653 1	C: 77753 0	13527 0	10337 1
05,3530	13666 0	C: 74001 0	30334 0	00006 1	63536 1	13543 1	50332 0	32441 1
05,3540	54334 1	40332 1	13756 1	50334 0	30000 1	10000 0	24334 0	13553 0
05,3550	55334 0	40000 0	56334 0	24000 1	54336 0	63525 0	10000 0	13563 0
05,3560	C: 47777 0	13563 0	03605 1	30336 1	63560 1	00006 1	63653 1	67741 1
05,3570	00005 1	63611 1	00006 1	50336 1	44000 1	54001 1	00006 1	50336 1
05,3600	43777 1	54336 0	37747 1	56336 1	13701 0	44745 1	00006 1	03013 0
05,3610	00002 0	50336 1	00000 1	10000 0	30336 1	13665 0	56336 1	54337 1
05,3620	34755 1	56336 1	54003 0	74357 0	00006 1	50000 1	31402 0	50336 1
05,3630	52341 0	24336 1	24336 1	24337 0	50337 0	00000 1	10000 0	13622 0
05,3640	C: 03523 0	54337 1	37747 1	54336 0	56337 0	54003 0	74357 0	00006 1
05,3650	50000 1	31402 0	13701 0	30336 1	54003 0	74357 0	54001 1	33531 0
05,3660	26336 0	00006 1	50001 0	31401 0	13701 0	54337 1	50337 0	00000 1
05,3670	10000 0	24337 0	13676 1	54337 1	37747 1	56337 0	24000 1	54336 0
05,3700	13564 1	00006 1	01034 1	30001 0	00006 1	01035 0	15270 0	34755 1
05,3710	54336 0	03753 0	33721 0	54335 0	30025 0	56301 0	30336 1	13701 0
05,3720	C: 03722 0	C: 03715 0	34752 0	26336 0	74357 0	10000 0	13737 0	30336 1
05,3730	70333 0	77722 0	10000 0	13515 1	13711 1	33720 1	54335 0	30336 1
05,3740	54003 0	74357 0	54002 1	34754 0	54001 1	50002 0	71401 1	56001 0
05,3750	50002 0	71400 0	13701 0	00006 1	22335 1	35011 1	54001 1	03605 1
05,3760	32065 0	56301 0	13701 0	34745 0	00006 1	02013 1	10000 0	00355 1
05,3770	34745 0	13512 0	C: 03772 0	C: 03773 1	CKSM 44531 0	0	0	0

ACTUAL LISTING FOR PARAGRAPH # 050. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

06,2000	54016 1	00006 1	22012 1	11313 0	12010 0	12007 0	12134 1	34757 0
06,2010	54070 1	55313 0	11036 1	02063 0	02063 0	57036 0	74356 1	55036 1
06,2020	64101 0	00006 1	01010 1	02071 0	55016 0	44755 0	54072 1	56776 1
06,2030	64754 0	54776 0	50776 1	11023 0	10776 0	12030 1	12047 1	C: 00012 1
06,2040	10073 1	C: 37764 0	55016 0	00002 0	54073 1	32037 1	12031 0	64753 1
06,2050	50776 1	55023 0	74356 1	54073 1	34350 0	50776 1	74066 1	60073 0
06,2060	00006 1	01010 1	16737 0	10101 0	34755 1	12130 0	11016 0	02024 0
06,2070	12130 0	42171 0	27313 0	37731 0	54027 0	31303 0	00006 1	06032 0
06,2100	74736 0	00006 1	12116 1	23303 0	00006 1	06001 0	55303 1	74736 0
06,2110	10000 0	12116 1	34355 0	05072 1	C: 03452 1	C: 60101 1	50070 0	12120 1
06,2120	03156 0	13006 0	12172 0	13132 0	03156 0	13006 0	12172 0	13132 0
06,2130	00006 1	01010 1	32041 0	12074 1	34736 1	71313 0	00006 1	12165 0
06,2140	11016 0	02024 0	12152 1	44736 0	27313 0	37731 0	54027 0	34743 0
06,2150	27313 0	05270 1	00006 1	01010 1	37731 0	26027 0	34743 0	27313 0
06,2160	11313 0	05270 1	C: 37737 0	02154 0	05270 1	00006 1	01010 1	34736 1
06,2170	12144 0	C: 22400 0	31302 1	00006 1	06030 1	72761 1	00006 1	12227 0
06,2200	54070 1	23302 1	00006 1	06001 0	55302 0	44753 0	56070 0	00006 1
06,2210	62514 0	12213 1	64753 1	24070 0	60000 1	54000 0	12213 1	56071 1
06,2220	50070 0	34736 1	71302 0	50070 0	02755 1	10071 0	12212 0	41302 0
06,2230	74745 1	10000 0	12374 1	34744 1	71302 0	10000 0	12242 0	34744 1
06,2240	27302 0	12374 1	42777 0	71302 0	55302 0	74736 0	10000 0	12347 1
06,2250	41302 0	74743 1	10000 0	12256 0	05567 0	C: 00213 1	02735 1	33005 1
06,2260	05203 0	C: 02266 1	C: 14106 0	12374 1	33005 1	05224 0	44752 1	71302 0
06,2270	57302 1	74752 1	00006 1	12306 1	34736 1	71302 0	00006 1	12264 1
06,2300	40074 0	74744 0	10000 0	15261 0	04635 0	C: 17637 0	34735 1	00006 1
06,2310	05012 1	04674 0	C: 17266 0	05457 1	44763 0	00006 1	03012 1	34741 1
06,2320	05224 0	42774 0	71302 0	55302 0	44746 1	71303 1	55303 1	40076 1
06,2330	74735 0	00006 1	12336 1	26076 1	30025 0	57075 1	02703 1	44735 0
06,2340	00006 1	03012 1	35003 1	05203 0	C: 03254 1	C: 16103 1	15261 0	34750 1
06,2350	00006 1	02012 0	10000 0	12374 1	34744 1	70074 0	10000 0	12374 1
06,2360	02746 0	04674 0	C: 17266 0	34747 1	00006 1	05012 1	05457 1	34746 0
06,2370	05203 0	C: 02313 1	C: 14106 0	12374 1	31303 0	75026 1	54001 1	35026 0

OBJECT LISTING FOR PARAGRAPH # 051. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "d" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

06,2400	00006 1	03033 1	00006 1	06001 0	00006 1	12434 1	54070 1	23303 0
06,2410	00006 1	06001 0	55303 1	34755 1	56070 0	60000 1	12421 0	64753 1
06,2420	24070 0	60000 1	54000 0	12420 1	56071 1	50070 0	34737 0	71303 1
06,2430	50070 0	02763 1	10071 0	12417 0	10034 1	12441 0	12465 0	12441 0
06,2440	12465 0	62512 0	00006 1	62464 0	62513 1	00006 1	62462 0	34750 1
06,2450	00006 1	02012 0	10000 0	12462 1	04674 0	C: 17144 0	36242 0	05203 0
06,2460	C: 03140 1	C: 16103 1	34746 0	12465 0	34755 1	61036 0	74746 1	00006 1
06,2470	15270 0	71036 1	10000 0	12507 0	34746 0	71302 0	10000 0	15270 0
06,2500	41036 1	74746 1	64735 1	57036 0	72162 1	27036 1	15270 0	02766 1
06,2510	15270 0	12500 1	C: 63434 1	C: 75252 0	74733 0	54071 0	11302 0	12525 0
06,2520	12525 0	34750 1	00006 1	05011 1	12225 1	02766 1	12225 1	44750 0
06,2530	00006 1	03011 1	12225 1	34752 0	71302 0	10000 0	12225 1	34736 1
06,2540	71302 0	00006 1	12556 1	34735 1	00006 1	02012 0	00006 1	12551 0
06,2550	12225 1	34752 0	27302 0	05567 0	C: 00207 1	12225 1	41302 0	74745 1
06,2560	27302 0	32564 1	54110 0	12225 1	C: 00102 1	10000 0	12361 0	43002 1
06,2570	00006 1	03014 1	42776 1	00006 1	03012 1	44745 1	70101 0	54101 0
06,2600	44355 1	00006 1	02011 0	64736 1	00006 1	01011 0	02743 0	04674 0
06,2610	C: 17175 1	44755 0	54050 0	54051 1	54052 1	54047 0	43001 1	00006 1
06,2620	03014 1	12225 1	00006 1	12643 0	41303 1	74746 1	27303 1	04674 0
06,2630	C: 17175 1	42777 0	70074 0	56074 1	40000 0	74744 0	10000 0	12225 1
06,2640	05567 0	C: 00214 0	12225 1	34752 0	71302 0	10000 0	12225 1	12556 1
06,2650	10000 0	34742 1	57302 1	73004 1	27302 0	02703 1	41302 0	74753 0
06,2660	10000 0	12432 1	31302 1	73000 0	10000 0	12432 1	05567 0	C: 00212 0
06,2670	12432 1	10000 0	12432 1	05567 0	C: 01105 1	12432 1	10000 0	12432 1
06,2700	05567 0	C: 01106 1	12432 1	34761 0	71302 0	00006 1	74742 0	31302 1
06,2710	00006 1	04001 1	40000 0	75025 1	10000 0	12726 1	34753 1	71303 1
06,2720	10000 0	00002 0	44753 0	00006 1	03011 1	00002 0	00006 1	22066 1
06,2730	05744 0	34753 1	00006 1	05011 1	00066 1	43003 0	00006 1	03012 1
06,2740	34763 1	00006 1	05012 1	41036 1	72773 1	27036 1	41302 0	72775 1
06,2750	27302 0	41303 1	74746 1	27303 1	00002 0	12533 1	12703 0	12703 0
06,2760	12565 1	C: 76400 1	12522 1	12650 1	12671 1	12676 0	41303 1	74753 0
06,2770	10000 0	24002 0	00002 0	C: 40010 1	C: 00054 0	C: 00075 0	C: 00272 0	C: 00300 1

OCTAL LISTING FOR PARAGRAPH # 052, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

06,3000	C: 01720 0	C: 00740 1	C: 77000 1	C: 40040 1	C: 76777 1	C: 21450 0	30110 1	00006 1
06,3010	05033 1	74752 1	00006 1	13037 1	22110 1	00006 1	06001 0	73033 0
06,3020	54110 0	74752 1	10000 0	13034 1	37663 0	26110 0	34753 1	05203 0
06,3030	C: 02062 1	C: 52107 0	13132 0	C: 05776 1	44752 1	00006 1	03012 1	30110 1
06,3040	00006 1	06030 1	74745 1	00006 1	13071 0	34752 0	70110 0	10000 0
06,3050	13132 0	34745 0	22110 1	00006 1	05001 0	54110 0	30110 1	74745 1
06,3060	13000 0	13070 1	40074 0	74745 1	10000 0	13070 1	05567 0	C: 00515 0
06,3070	04564 1	30101 1	74750 0	10000 0	13132 0	40103 1	74747 0	10000 0
06,3100	13105 1	30102 1	74744 0	10000 0	13132 0	33127 0	70110 0	10000 0
06,3110	13132 0	04523 1	C: 00035 1	13115 0	13132 0	34741 1	26110 0	43130 1
06,3120	00006 1	03012 1	34752 0	05203 0	C: 02127 1	C: 52107 0	13132 0	C: 32002 1
06,3130	C: 20002 1	C: 02100 1	30034 0	05033 1	55414 0	30034 0	05032 0	54061 1
06,3140	30032 0	05033 1	55417 0	41417 0	00006 1	70061 1	55416 1	30032 0
06,3150	05032 0	55420 1	00006 1	70061 1	55415 1	05270 1	44755 0	00006 1
06,3160	05032 0	74357 0	54002 1	41276 1	70002 1	54001 1	40002 1	71276 1
06,3170	26001 1	00006 1	15270 0	00006 1	74745 1	56001 0	24001 0	60000 1
06,3200	54000 0	13176 0	50001 0	34743 0	54002 1	71276 1	10000 0	13223 0
06,3210	41262 1	50001 0	73242 1	27262 1	41263 0	50001 0	73252 0	27263 0
06,3220	30002 0	27276 1	13236 1	50001 0	43242 1	71262 1	55262 1	50001 0
06,3230	43252 0	71263 0	55263 0	40002 1	71276 1	55276 1	37715 0	05072 1
06,3240	C: 02454 0	C: 40106 1	15270 0	C: 00040 0	C: 00020 0	C: 00100 0	C: 00200 0	C: 00010 0
06,3250	C: 00001 0	C: 00004 0	C: 00002 0	C: 00010 0	C: 00020 0	C: 00004 0	C: 00200 0	C: 00001 0
06,3260	C: 00002 0	C: 00040 0	C: 00100 0	33531 0	56003 1	54163 1	11477 0	13272 1
06,3270	13272 1	13353 0	34751 0	54132 0	50132 1	31453 1	00006 1	50132 1
06,3300	70324 0	54002 1	30001 0	00006 1	74746 1	50132 1	54325 1	30002 0
06,3310	00006 1	74746 1	50132 1	20325 1	50132 1	41452 1	00006 1	71075 0
06,3320	00006 1	74750 0	50132 1	20325 1	10132 0	67747 1	13273 0	13330 0
06,3330	55477 0	54130 1	03356 1	41460 0	03454 1	03373 0	41461 1	03454 1
06,3340	03410 1	31462 0	03454 1	11477 0	13346 1	13353 0	35031 0	05072 1
06,3350	C: 03507 0	C: 14063 1	00003 1	30163 0	54003 0	14631 0	00006 1	22156 0
06,3360	00006 1	40325 1	52155 1	31463 1	03425 1	00006 1	40327 0	52155 1
06,3370	41466 0	03425 1	00156 0	00006 1	22156 0	00006 1	40327 0	52155 1

JOIAL LISTING FOR PARAGRAPH # 054, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

07.2000	00004 0	11312 1	02004 1	02006 0	05652 0	C: 00105 0	36242 0	71044 1
07.2010	10000 0	12044 1	34752 0	27044 1	10400 1	12031 0	10454 0	12031 0
07.2020	10530 0	12031 0	10604 1	12031 0	10660 0	12031 0	52134 0	05716 1
07.2030	C: 01207 0	64752 0	55312 1	34755 1	51312 0	53777 0	35025 0	05105 0
07.2040	C: 02063 0	C: 16067 1	00303 1	14631 0	52134 0	05716 1	C: 01211 1	34755 1
07.2050	57312 0	75004 1	10000 0	50000 1	54000 0	34753 1	04674 0	C: 17665 1
07.2060	34755 1	55044 1	06001 0	41312 1	74740 1	27312 1	32330 0	04616 1
07.2070	C: 20334 1	12060 1	12074 1	12063 1	37744 1	70735 1	00006 1	74743 1
07.2100	55551 0	00006 1	62063 0	65660 1	00006 1	12107 1	12123 1	32331 1
07.2110	04616 1	C: 20334 1	12060 1	12115 1	12107 1	00006 1	31350 0	50120 1
07.2120	52011 0	34755 1	12137 1	51551 1	31411 1	50120 1	54011 0	51551 1
07.2130	31403 1	50120 1	54010 1	31405 1	00006 1	50120 1	20010 1	50120 1
07.2140	54012 0	06037 0	I: 77624 1	C: 10536 0	I: 70535 0	C: 00013 0	I: 73406 1	I: 71525 0
07.2150	I: 74206 0	C: 00023 0	I: 74325 0	C: 00001 0	C: 00031 0	I: 45445 0	C: 63762 1	I: 65361 0
07.2160	C: 00031 0	I: 53361 0	C: 00023 0	I: 77626 0	C: 53754 1	C: 24007 0	C: 02715 0	I: 77776 1
07.2170	12202 1	I: 53133 0	C: 00004 0	C: 16177 1	I: 52145 0	C: 00031 0	C: 32011 0	I: 52175 0
07.2200	C: 03765 0	C: 32042 0	34755 1	55551 0	55550 1	35004 0	71312 1	55312 1
07.2210	32621 0	04616 1	C: 20345 1	12060 1	12216 1	12063 1	41312 1	74740 1
07.2220	27312 1	75004 1	55551 0	34755 1	55552 0	31312 0	75015 1	54001 1
07.2230	35015 0	00006 1	06001 0	00006 1	12241 0	11550 1	12240 1	12325 0
07.2240	55550 1	34740 0	27552 0	41550 1	00006 1	76242 1	41551 0	60001 0
07.2250	50120 1	54046 1	30120 1	54166 1	06037 0	I: 76614 0	C: 04307 1	C: 32000 0
07.2260	C: 00002 0	C: 24767 1	C: 00015 0	I: 77624 1	C: 47664 0	I: 76606 0	C: 00001 0	C: 24767 1
07.2270	C: 00023 0	I: 77624 1	C: 47664 0	I: 53435 0	I: 77626 0	C: 77746 1	I: 63335 1	C: 03553 1
07.2300	C: 00031 0	I: 70322 0	C: 00001 0	C: 14031 0	C: 00001 0	I: 56225 1	C: 16623 1	I: 53361 0
07.2310	C: 02715 0	C: 00031 0	C: 02715 0	C: 02767 0	I: 77776 1	11550 1	12240 1	34756 1
07.2320	00004 0	05203 0	C: 02047 0	C: 16067 1	05472 0	05567 0	C: 00111 0	12202 1
07.2330	C: 00307 0	C: 01527 0	54016 1	30033 1	54063 0	30034 0	54064 1	20032 0
07.2340	54065 0	00006 1	30025 0	52062 1	56002 0	54012 0	32624 0	00006 1
07.2350	02016 1	10000 0	12354 0	12404 1	34740 0	71312 1	10000 0	05270 1
07.2360	11312 1	12365 1	05567 0	C: 00112 0	05270 1	34747 1	00006 1	02016 1
07.2370	10000 0	12461 1	34750 1	00006 1	02016 1	10000 0	12422 0	34751 0

OCTAL LISTING FOR PARAGRAPH # 055, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

07,2400	00006 1	02016 1	10000 0	12416 1	34776 0	00006 1	02016 1	00006 1
07,2410	12413 1	04635 0	C: 40115 0	05567 0	C: 00113 1	05270 1	34755 1	54070 1
07,2420	34742 1	12425 1	34753 1	54070 1	34741 1	55551 0	02514 0	12521 1
07,2430	34736 1	71312 1	00006 1	12444 0	41550 1	64751 0	00006 1	62454 0
07,2440	25550 0	47711 0	71312 1	55312 1	31551 1	71312 1	10000 0	12451 1
07,2450	12526 0	05567 0	C: 00114 0	05270 1	05567 0	C: 00107 1	02514 0	12627 1
07,2460	05270 1	02514 0	12507 0	35015 0	71312 1	10000 0	12472 0	05567 0
07,2470	C: 00115 1	05270 1	44355 1	71312 1	64737 0	57312 0	74737 1	10000 0
07,2500	12505 1	41551 0	71312 1	55312 1	12577 1	45015 1	12502 0	11550 1
07,2510	12512 1	12467 1	55550 1	05270 1	40104 0	74744 0	10000 0	24002 0
07,2520	00002 0	34755 1	54070 1	41312 1	75015 1	27312 1	35004 0	71312 1
07,2530	54071 0	00006 1	30062 0	53562 0	31550 0	00006 1	76242 1	56001 0
07,2540	60071 1	26070 1	55552 0	30063 1	50070 0	54000 0	30064 0	50070 0
07,2550	54002 1	30065 1	50070 0	54004 1	02514 0	12604 0	34737 0	61551 1
07,2560	40000 0	71312 1	61551 1	55312 1	75015 1	54001 1	35015 0	00006 1
07,2570	06001 0	10000 0	12577 1	41312 1	74736 0	27312 1	12577 1	35015 0
07,2600	71312 1	00006 1	74746 1	55552 0	35025 0	05072 1	C: 02611 0	C: 16067 1
07,2610	05270 1	02514 0	12527 1	51552 1	32616 1	02211 1	C: 15507 1	C: 15307 1
07,2620	C: 15107 0	C: 15507 1	C: 04000 0	C: 00000 1	C: 00034 0	C: 01507 1	C: 01517 0	32626 1
07,2630	04516 1	C: 20314 1	12060 1	12641 1	34746 0	70154 0	10000 0	12645 0
07,2640	12627 1	44736 0	71312 1	64736 1	55312 1	31236 1	51552 1	54001 1
07,2650	31240 0	51552 1	54003 0	41312 1	74736 0	00006 1	12216 1	31550 0
07,2660	64753 1	40000 0	64756 1	00006 1	62454 0	25550 0	12205 0	I: 77614 1
07,2670	C: 06466 0	I: 74345 0	C: 02355 0	C: 02303 0	I: 74325 0	C: 02361 1	C: 03726 1	I: 53455 0
07,2700	I: 50206 0	C: 02154 0	I: 45246 0	C: 13503 0	I: 71244 0	C: 30347 1	C: 03474 0	I: 51025 1
07,2710	C: 13505 0	C: 60774 0	I: 77650 1	C: 30347 1	00004 0	41036 1	74771 0	10000 0
07,2720	12724 0	05567 0	C: 00206 0	13657 1	03653 1	41303 1	74773 1	27303 1
07,2730	41302 0	75751 0	27302 0	44771 0	00006 1	03012 1	03266 0	34747 1
07,2740	00006 1	05012 1	05457 1	34746 0	05203 0	C: 02757 0	C: 16103 1	41302 0
07,2750	74743 1	10000 0	12755 0	05567 0	C: 00210 1	00003 1	14631 0	03641 1
07,2760	05457 1	44747 0	00306 1	03012 1	34741 1	05224 0	03641 1	45751 0
07,2770	71302 0	55302 0	44773 1	71303 1	55303 1	04674 0	C: 14703 0	15631 1

OCTAL LISTING FOR PARAGRAPH # 056, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

07,3000	00004 0	03653 1	03144 0	36242 0	05203 0	C: 03010 0	C: 16103 1	12755 0
07,3010	03641 1	34746 0	00006 1	05012 1	34752 0	55474 0	51474 1	30321 1
07,3020	00006 1	51474 1	20032 1	00006 1	74737 1	56001 0	60000 1	54061 1
07,3030	13032 1	26001 1	51474 1	23471 1	11474 0	03015 0	34752 0	05224 0
07,3040	03641 1	54061 1	34752 0	55474 0	51474 1	11471 0	03052 0	03061 0
07,3050	03117 0	03061 0	63745 1	00006 1	63127 0	51474 1	55471 0	43746 0
07,3060	24061 0	64754 0	51474 1	54050 0	11474 0	03043 0	10061 1	13133 1
07,3070	05221 0	C: 00226 1	34752 0	54061 1	50000 1	30032 0	00006 1	50061 0
07,3100	20321 0	10000 0	13110 0	13105 1	13110 0	10061 1	13073 1	13631 1
07,3110	63116 1	00006 1	63105 0	05567 0	C: 00211 0	13637 1	C: 77511 1	63745 1
07,3120	00006 1	63127 0	40000 0	51474 1	55471 0	33746 1	03060 1	34755 1
07,3130	51474 1	57471 1	03060 1	37740 0	00006 1	05014 1	33747 0	13037 1
07,3140	34746 0	00006 1	05012 1	05261 1	34750 1	00006 1	02012 0	10000 0
07,3150	00002 0	44746 1	00006 1	03012 1	44742 0	00006 1	03014 1	44755 0
07,3160	54047 0	34750 1	00006 1	05012 1	41036 1	73207 0	27036 1	41303 1
07,3170	74746 1	27303 1	41302 0	74750 0	27302 0	44747 0	70075 1	54075 1
07,3200	44735 0	70076 1	54076 1	44737 1	70077 0	54077 0	00002 0	C: 40010 1
07,3210	00004 0	03653 1	43744 1	00006 1	03012 1	44746 1	71303 1	55303 1
07,3220	03266 0	34742 1	05203 0	C: 03234 1	C: 16103 1	35000 1	05203 0	C: 03232 1
07,3230	C: 16103 1	12755 0	03641 1	13631 1	03646 0	15261 0	34750 1	00006 1
07,3240	02012 0	10000 0	15261 0	41302 0	74737 1	27302 0	44750 0	71302 0
07,3250	55302 0	04674 0	C: 14703 0	15261 0	03646 0	15261 0	41302 0	74742 0
07,3260	27302 0	41303 1	74737 1	27303 1	44747 0	13247 1	43207 0	71036 1
07,3270	64735 1	55036 1	00002 0	44755 0	54037 1	54040 1	54041 0	03646 0
07,3300	14631 0	00004 0	44753 0	71302 0	55302 0	04674 0	C: 14703 0	12755 0
07,3310	00004 0	41302 0	74753 0	27302 0	74742 0	10000 0	12755 0	05567 0
07,3320	C: 00212 0	00004 0	13305 0	54161 0	03653 1	11314 1	03367 0	54156 1
07,3330	34746 0	00006 1	05014 1	34751 0	05203 0	C: 03405 0	C: 16103 1	30161 1
07,3340	56003 1	56161 1	55314 1	74557 0	54061 1	34752 0	54157 0	60000 1
07,3350	60061 0	54160 1	00006 1	50000 1	31401 0	52155 1	07257 0	52155 1
07,3360	50160 0	53401 1	10157 0	13346 1	30161 1	54003 0	12755 0	00006 1
07,3370	30134 1	52155 1	33404 1	15133 1	11314 1	13372 0	54156 1	00006 1

DATA LISTING FOR PARAGRAPH # 057, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

07,3400	30155 0	52134 0	34753 1	13334 1	C: 17374 1	43626 1	00006 1	03014 1
07,3410	03641 1	31314 0	00006 1	74750 0	50000 1	13416 0	03433 0	C: 00202 1
07,3420	03433 0	C: 00302 0	03431 1	C: 00100 0	34755 1	55314 1	33404 1	05137 1
07,3430	13232 0	44751 1	27314 1	50002 0	30000 1	54064 1	74757 1	64737 0
07,3440	27314 1	54003 0	74357 0	54061 1	44757 1	70064 1	54064 1	00006 1
07,3450	50061 0	31401 0	52071 0	10070 1	13467 0	13457 0	13607 1	10071 0
07,3460	13464 0	13411 1	13504 1	13411 1	63520 0	00006 1	63411 0	00006 1
07,3470	33630 1	20071 0	30064 0	00006 1	05014 1	36074 1	70071 0	56071 1
07,3500	00006 1	74744 0	54062 1	20070 0	00006 1	74743 1	54070 1	30001 0
07,3510	00006 1	74736 0	26062 1	00006 1	30071 1	67747 1	10000 0	13543 1
07,3520	C: 77601 0	13525 1	24736 1	26062 1	34755 1	50061 0	53401 1	30062 0
07,3530	54047 0	00006 1	74742 0	66245 1	05203 0	C: 03405 0	C: 16103 1	34742 1
07,3540	00006 1	05014 1	15261 0	50061 0	53401 1	34736 1	60062 0	54047 0
07,3550	00006 1	74742 0	67745 0	05203 0	C: 03557 0	C: 16103 1	13537 1	03641 1
07,3560	34750 1	00006 1	02012 0	10000 0	13637 1	31314 0	54003 0	74357 0
07,3570	54061 1	50061 0	11400 0	13577 0	34736 1	26047 0	13531 1	50061 0
07,3600	55400 0	34736 1	26047 0	13550 0	63520 0	00006 1	63411 0	00006 1
07,3610	43630 0	20071 0	30064 0	64743 0	00006 1	05014 1	40070 1	54070 1
07,3620	40071 0	76074 0	40000 0	56071 1	40000 0	13500 0	C: 01700 1	C: 00000 1
07,3630	C: 00034 0	00006 1	00011 1	74753 0	10000 0	13637 1	13665 0	34755 1
07,3640	13662 1	34746 0	71302 0	10000 0	13637 1	00002 0	41302 0	74746 1
07,3650	10000 0	24002 0	00002 0	41302 0	74746 1	10000 0	00002 0	44755 0
07,3660	55304 0	12755 0	54071 0	44755 0	13667 1	54071 0	44753 0	54072 0
07,3670	50071 1	11304 0	13576 1	13706 1	00006 1	13707 0	34755 1	50071 1
07,3700	57304 1	05137 1	40072 0	50064 0	26164 0	15261 0	30072 1	50071 1
07,3710	55304 0	15261 0	34753 1	03717 0	34752 0	13717 1	34755 1	00004 0
07,3720	54071 0	50000 1	11304 0	13741 1	13735 1	13731 0	50071 1	55304 0
07,3730	12755 0	10000 0	13741 1	24133 0	13726 0	04645 1	50071 1	55304 0
07,3740	15133 1	52134 0	05716 1	C: 01210 0	C: 00030 1	C: 77500 1	C: 77477 0	C: 00074 1
07,3750	31307 1	00006 1	13755 1	05552 0	C: 01210 0	00006 1	30134 1	53310 0
07,3760	30006 1	74757 1	27310 0	30167 1	77725 1	55311 1	33772 0	54003 0
07,3770	04635 0	C: 44004 0	C: 03276 1	C: 03773 1	C: 03774 0	CKSM 66702 1	0	0

DCTAL LISTING FOR PARAGRAPH # 050. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

10,2000	I: 77160 0	C: 00002 0	C: 00000 1	I: 77614 1	C: 04343 1	C: 20011 0	I: 77160 0	C: 00012 1
10,2010	C: 00002 0	I: 66143 1	C: 10011 0	C: 02775 0	C: 22317 1	C: 10003 0	I: 54214 1	C: 04343 1
10,2020	C: 20022 0	C: 20607 1	C: 02321 0	I: 43134 0	C: 02777 1	C: 01271 1	I: 77650 1	C: 73606 0
10,2030	I: 77776 1	04616 1	C: 20036 0	06037 0	I: 77616 0	C: 02664 1	32035 0	54142 1
10,2040	56003 1	56142 0	74357 0	65007 0	54141 1	00006 1	30745 1	52155 1
10,2050	07103 1	C: 00746 1	52155 1	20001 1	50141 0	52001 1	00006 1	30741 0
10,2060	50141 0	52003 0	00006 1	40737 0	52155 1	07107 0	52155 1	20001 1
10,2070	50141 0	52005 0	00006 1	40743 0	52155 1	07107 0	52155 1	20001 1
10,2100	52160 1	00006 1	40743 0	52155 1	07103 1	C: 00740 1	00006 1	40155 1
10,2110	52162 0	07103 1	C: 00736 0	52155 1	20001 1	20001 1	52162 0	52155 1
10,2120	07103 1	C: 00744 0	52155 1	20001 1	20001 1	52131 0	00006 1	30745 1
10,2130	52155 1	07103 1	C: 00750 0	52155 1	20001 1	20132 0	00006 1	30737 1
10,2140	52155 1	07107 0	52155 1	20001 1	20131 0	52131 0	52155 1	00006 1
10,2150	30155 0	50141 0	52015 1	00006 1	30160 0	50141 0	52017 0	00006 1
10,2160	30162 1	50141 0	52021 0	30141 0	54116 0	00006 1	30006 1	64751 0
10,2170	52165 1	34744 1	54023 1	17460 0	52155 1	20001 1	50141 0	52007 1
10,2200	52160 1	20001 1	50141 0	52011 0	52162 0	20001 1	50141 0	52013 1
10,2210	30142 0	54003 0	14631 0	00004 0	52071 0	34355 0	05072 1	C: 03534 0
10,2220	C: 60102 1	52071 0	00003 1	52006 0	22073 0	30065 1	74757 1	60000 1
10,2230	54061 1	30065 1	75030 0	00003 1	74740 1	54062 1	30065 1	74101 1
10,2240	55065 1	75024 0	10000 0	15370 1	30062 0	50061 0	54751 0	10066 0
10,2250	12264 1	12252 1	40072 0	22072 1	50071 1	52751 0	10066 0	12260 0
10,2260	12264 1	40025 1	50071 1	55051 0	10065 0	12300 1	12303 1	40025 1
10,2270	50061 0	55051 0	30065 1	62276 0	10000 0	12276 1	C: 17777 0	12303 1
10,2300	00006 1	30025 0	53152 1	40062 1	50061 0	54750 1	30002 0	22073 0
10,2310	00003 1	52006 0	22073 0	30062 0	50061 0	54751 0	30070 0	50061 0
10,2320	55052 0	00006 1	30064 0	50061 0	53435 0	12247 0	05474 0	13421 1
10,2330	54155 1	34735 1	12500 1	34755 1	54155 1	33031 0	12500 1	54155 1
10,2340	33520 0	12500 1	54155 1	33505 1	12500 1	54155 1	33506 1	12500 1
10,2350	54155 1	34735 1	12453 0	54155 1	33031 0	12637 0	54155 1	33520 0
10,2360	12637 0	54155 1	33505 1	12637 0	34753 1	02735 1	30100 0	73521 0
10,2370	10000 0	12427 0	30100 0	74743 1	00006 1	12377 1	15155 1	00004 0

JCTIL LISTING FOR PARAGRAPH # 061. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

10,2400	44756 0	70100 1	64753 1	54100 1	00003 1	41071 1	74747 0	10000 0
10,2410	12413 1	40370 1	54370 1	34753 1	12616 0	30165 0	54156 1	50164 1
10,2420	33531 0	54162 0	50164 1	31070 1	54160 1	54003 0	00002 0	50100 0
10,2430	73254 0	10000 0	13454 0	40100 1	74751 1	00004 0	26100 1	12534 0
10,2440	30370 0	74144 0	13120 0	54155 1	34755 1	12500 1	54155 1	34746 0
10,2450	12500 1	54155 1	34755 1	54160 1	34755 1	12641 1	34755 1	54155 1
10,2460	33504 0	12500 1	54155 1	33504 0	12637 0	54155 1	34736 1	12500 1
10,2470	54155 1	34736 1	12453 0	54155 1	33543 0	12500 1	54155 1	34750 1
10,2500	54160 1	02722 1	00003 1	12546 0	54155 1	33523 0	12637 0	54155 1
10,2510	33523 0	12500 1	34755 1	54164 0	03374 1	12522 1	30100 0	73542 0
10,2520	10000 0	12575 0	30100 0	75642 0	00006 1	12530 1	34755 1	12774 0
10,2530	30100 0	73540 1	00006 1	12536 1	34753 1	12774 0	02734 0	03205 0
10,2540	05137 1	03222 0	30025 0	55165 0	34755 1	12616 0	30167 1	77725 1
10,2550	54162 1	37721 1	05146 1	30160 0	75522 0	10000 0	12512 1	12561 0
10,2560	12364 0	34752 0	54164 0	03374 1	12577 1	41072 1	74750 0	10000 0
10,2570	12577 1	30100 0	73513 1	00006 1	12577 1	05652 0	C: 01502 1	02736 1
10,2600	30163 0	00006 1	04007 1	54266 0	30100 0	73514 0	10000 0	12754 1
10,2610	12612 1	12754 1	03205 0	05137 1	03222 0	34752 0	54164 0	13070 1
10,2620	54155 1	37734 0	12500 1	55045 0	23476 1	54155 1	33475 1	12500 1
10,2630	54155 1	33501 0	12500 1	02715 0	12500 1	54155 1	34750 1	54160 1
10,2640	36245 1	00004 0	54072 0	30167 1	77725 1	54063 0	30160 0	74750 0
10,2650	10000 0	12657 0	50063 1	05072 1	C: 02546 1	C: 20067 1	12665 1	30006 1
10,2660	00006 1	04007 1	54001 1	33537 0	05116 1	02722 1	00006 1	30156 0
10,2670	50064 0	52156 1	00006 1	30160 0	50064 0	52160 1	30064 0	54161 0
10,2700	02727 1	00003 1	14640 0	55045 0	33476 1	54155 1	33475 1	12637 0
10,2710	54155 1	33501 0	12637 0	02715 0	12637 0	55144 0	33502 0	54155 1
10,2720	33503 1	00002 0	00004 0	43512 0	70160 1	60003 1	54160 1	22002 0
10,2730	04645 1	54157 0	60072 1	00001 0	34755 1	54164 0	00004 0	30160 0
10,2740	50164 1	55070 0	73530 0	00006 1	12750 0	30157 1	50164 1	54372 0
10,2750	30155 0	50164 1	54367 1	13231 0	50164 1	33531 0	72760 0	03544 1
10,2760	C: 03004 0	44752 0	60164 1	54154 0	50154 1	33510 0	00004 0	05137 1
10,2770	03222 0	50154 1	33510 0	15133 1	54154 0	03205 0	05137 1	30154 1

OCTAL LISTING FOR PARAGRAPH # 062. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

10,3000	50064 0	54154 0	33015 0	03223 1	50154 1	33532 0	73534 1	03554 0
10,3010	C: 74004 0	50154 1	34747 1	64751 0	03544 1	C: 02764 0	30100 0	74751 1
10,3020	10000 0	02377 0	12536 1	34755 1	54160 1	50160 0	33524 1	64751 0
10,3030	03554 0	C: 40010 1	50160 0	33510 0	00004 0	05137 1	13335 0	31072 0
10,3040	54003 0	30366 1	04727 1	77725 1	05146 1	46245 0	60374 1	14640 0
10,3050	00003 1	31073 1	54156 1	30100 0	77740 1	10000 0	13061 1	13471 1
10,3060	12377 1	05504 0	C: 00105 0	34736 1	70100 1	10000 0	12544 1	12615 0
10,3070	02417 1	30160 0	74757 1	54001 1	44737 1	50164 1	71070 0	50164 1
10,3100	55070 0	74744 0	54141 1	30156 0	54165 1	55073 0	50164 1	10367 1
10,3110	13117 1	13233 1	40370 1	54370 1	76074 0	63515 0	60141 0	64753 1
10,3120	04155 1	13245 0	04433 1	02415 0	05516 0	C: 00102 1	05516 0	C: 00103 0
10,3130	05516 0	C: 00104 1	30160 0	04255 1	13070 1	34747 1	70160 1	10000 0
10,3140	13163 1	34750 1	70160 1	10000 0	13260 1	40160 1	74746 1	10000 0
10,3150	13155 1	50164 1	30372 1	54157 0	13353 0	50164 1	30367 0	76074 0
10,3160	00006 1	13260 1	15155 1	30160 0	74737 1	10000 0	13141 1	34737 0
10,3170	50164 1	27070 0	22007 0	00006 1	62440 0	74740 1	00006 1	13203 1
10,3200	41067 0	63541 1	13120 0	33500 1	13120 0	44747 0	00006 1	03011 1
10,3210	30100 0	73516 1	10000 0	34753 1	54001 1	34755 1	50001 0	57042 0
10,3220	00004 0	00002 0	34217 1	56064 0	00006 1	63231 1	56064 0	50064 0
10,3230	54164 0	00003 1	00002 0	37720 0	05105 0	C: 04231 0	C: 04060 0	13261 0
10,3240	30100 0	73266 1	00006 1	12575 0	15155 1	11042 1	15155 1	13251 0
10,3250	15155 1	30162 1	73517 0	03544 1	C: 24100 0	50164 1	33507 0	04442 1
10,3260	04427 1	30164 1	54157 0	30162 1	73010 1	03544 1	C: 40040 1	31074 0
10,3270	50164 1	74751 1	10000 0	13360 0	11042 1	13240 0	13300 0	13240 0
10,3300	04207 0	13372 0	13411 1	43526 1	60154 1	00006 1	26000 0	00006 1
10,3310	13461 0	34752 0	54161 0	30100 0	74101 1	10000 0	13321 0	13427 1
10,3320	13413 0	40025 1	61165 1	10000 0	40000 0	67731 0	64753 1	63570 0
10,3330	00006 1	62544 0	13427 1	34753 1	13024 0	10161 0	64753 1	13341 0
10,3340	15155 1	50157 1	60372 1	54157 0	30162 1	73347 0	03554 0	C: 74044 1
10,3350	46245 0	04154 0	13353 0	30163 0	77725 1	05146 1	30157 1	14640 0
10,3360	50164 1	44751 1	71074 1	55074 1	34755 1	04727 1	36245 1	50164 1
10,3370	60372 1	14640 0	34755 1	13312 0	40160 1	74736 0	10000 0	16737 0

TOTAL LISTING FOR PARAGRAPH # 053. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

10,3400	40157 0	50164 1	60372 1	00006 1	13406 1	00002 0	11012 1	05155 0
10,3410	00002 0	34753 1	13312 0	46242 1	70100 1	00004 0	54100 1	00003 1
10,3420	13335 0	37747 1	54161 0	30100 0	74355 1	10000 0	13061 1	30100 0
10,3430	73524 0	10000 0	13023 1	30100 0	73525 1	10000 0	13333 0	31072 0
10,3440	74771 0	10000 0	13335 0	30371 1	00006 1	13335 0	35025 0	00004 0
10,3450	05072 1	C: 02615 1	C: 20060 0	13335 0	30100 0	73524 0	10000 0	15155 1
10,3460	12754 1	50157 1	30367 0	76074 0	40000 0	60155 0	00006 1	13311 0
10,3470	13050 0	46245 0	04154 0	15155 1	15155 1	C: 00036 1	C: 00231 1	C: 01407 0
10,3500	C: 14400 0	C: 00030 1	C: 01006 0	C: 00014 1	C: 20010 1	C: 40230 1	C: 40036 0	C: 20542 0
10,3510	C: 20377 0	C: 20615 1	C: 03400 0	C: 11210 1	C: 66521 1	C: 01177 1	C: 00700 0	C: 00704 1
10,3520	C: 40030 0	C: 34300 0	C: 40100 1	C: 00110 1	C: 02020 1	C: 01010 1	C: 00026 0	C: 77730 0
10,3530	C: 00050 1	C: 20144 1	C: 42424 0	C: 11254 1	C: 74704 1	C: 67777 1	C: 40420 0	C: 02546 1
10,3540	C: 10200 1	C: 30200 0	C: 20100 1	C: 24030 1	00004 0	75660 0	54001 1	40100 1
10,3550	70001 1	26100 1	00003 1	16737 0	00004 0	75660 0	40000 0	70100 1
10,3560	54100 1	13552 1	00004 0	54001 1	30133 0	55363 1	30134 1	05576 0
10,3570	C: 77467 1	35006 1	12504 0	00006 1	30025 0	16055 0	10154 0	34755 1
10,3600	13603 0	13602 1	44736 0	54155 1	34755 1	56154 1	00006 1	74736 0
10,3610	20155 1	16061 1	07257 0	16061 1	03644 1	34755 1	54155 1	16060 0
10,3620	03644 1	52162 0	52155 1	03644 1	54156 1	52160 1	52155 1	03644 1
10,3630	54155 1	50161 1	54154 0	34753 1	16060 0	03644 1	52160 1	52155 1
10,3640	03644 1	54001 1	30157 1	16055 0	52155 1	20001 1	10000 0	64753 1
10,3650	13652 1	40000 0	54154 0	00002 0	50000 1	34754 0	26154 0	00002 0
10,3660	54142 1	50130 0	10000 0	64753 1	13670 1	64753 1	64753 1	40000 0
10,3670	60142 0	10000 0	64753 1	13675 1	40000 0	54142 1	13702 0	50000 1
10,3700	34734 0	60142 0	50130 0	54000 0	00002 0	50120 1	30046 0	04616 1
10,3710	C: 17323 0	16061 1	00006 1	34733 1	52155 1	10000 0	34755 1	16057 1
10,3720	13721 1	00006 1	44733 0	16055 0	34753 1	13727 1	34755 1	60120 1
10,3730	54156 1	04616 1	C: 01010 1	10154 0	13770 0	13737 0	13770 0	10157 0
10,3740	13770 0	13743 0	13770 0	10161 0	13770 0	13747 1	13770 0	30155 0
10,3750	00006 1	74736 0	20155 1	30160 0	00006 1	74736 0	20160 1	30162 1
10,3760	00006 1	74736 0	20162 0	34761 0	50156 0	54045 1	04635 0	C: 01024 0
10,3770	34755 1	13764 0	04616 1	C: 01010 1	06061 0	C: 03775 1	C: 03776 1	CKSM 56105 0

OBJECT LISTING FOR PARAGRAPH # 064. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

11,2000	I: 77614 1	C: 00475 1	I: 44175 1	C: 03444 0	C: 03463 0	C: 03472 0	I: 77646 0	C: 03723 1
11,2010	I: 46135 1	C: 03000 1	C: 22026 0	I: 72575 0	C: 02323 1	C: 26323 1	C: 02331 1	I: 77752 1
11,2020	C: 26331 1	C: 03472 0	I: 77752 1	C: 03472 0	I: 77646 0	C: 03723 1	I: 71331 0	C: 03617 1
11,2030	C: 77776 1	I: 70546 1	C: 17567 0	I: 67154 0	C: 00154 1	C: 02701 0	I: 77775 1	C: 02323 1
11,2040	C: 26655 0	C: 03472 0	C: 16663 0	C: 03452 1	C: 02671 0	I: 77201 1	C: 00001 0	C: 02323 1
11,2050	I: 41456 0	I: 53435 0	C: 02331 1	C: 26674 0	C: 03472 0	I: 50256 0	I: 43015 1	C: 03667 0
11,2060	C: 03665 1	C: 03667 0	I: 43044 0	C: 22105 0	C: 03465 0	I: 41575 0	C: 02663 0	I: 63246 1
11,2070	I: 46206 1	C: 02674 0	I: 51352 1	I: 74256 0	I: 77772 0	C: 02663 0	I: 67351 1	C: 24007 0
11,2100	C: 03617 1	I: 77244 0	C: 22105 0	C: 02663 0	C: 03472 0	I: 63345 0	C: 26007 1	C: 02663 0
11,2110	I: 63256 0	C: 02655 0	I: 41456 0	I: 57425 1	C: 00003 1	I: 77606 1	I: 71350 1	C: 02776 0
11,2120	C: 00023 0	I: 62040 1	C: 22124 0	C: 77767 1	I: 67310 1	C: 00012 1	C: 00047 1	I: 77230 0
11,2130	C: 22132 1	I: 41476 1	I: 77775 1	I: 50235 0	I: 71244 0	C: 22137 1	I: 41476 1	I: 67154 0
11,2140	C: 00000 1	C: 02672 0	I: 45150 1	C: 02776 0	C: 23765 1	I: 77214 0	C: 00675 0	C: 02744 1
11,2150	C: 15337 1	C: 02702 0	I: 45030 0	C: 22230 0	C: 27414 0	I: 43135 1	C: 03000 1	C: 00263 0
11,2160	I: 43030 0	C: 22163 0	C: 00063 1	I: 77775 1	C: 02323 1	C: 02655 0	C: 25535 0	C: 02337 1
11,2170	C: 15543 1	C: 03610 0	C: 01517 0	I: 43015 1	C: 03452 1	C: 01673 1	C: 34041 0	C: 27107 1
11,2200	I: 77775 1	C: 00025 0	C: 02703 1	I: 63154 1	C: 03616 0	C: 00001 0	I: 55134 1	C: 03616 0
11,2210	C: 02701 0	I: 46135 1	C: 00050 1	C: 22225 1	I: 52375 1	C: 03472 0	C: 00017 1	I: 77655 1
11,2220	C: 02663 0	C: 16663 0	C: 03667 0	I: 77650 1	C: 22062 0	I: 77775 1	C: 02663 0	C: 03472 0
11,2230	I: 52375 1	C: 02337 1	C: 02331 1	C: 26366 0	C: 02703 1	C: 03566 1	I: 46135 1	C: 03000 1
11,2240	C: 22255 0	I: 70575 1	C: 03566 1	C: 27566 1	C: 02337 1	I: 77742 0	C: 26337 1	C: 03472 0
11,2250	I: 77742 0	C: 27472 0	C: 02366 0	I: 77742 0	C: 02366 0	I: 70750 1	C: 02776 0	C: 10003 0
11,2260	I: 41206 0	C: 02742 1	I: 56342 1	C: 00041 1	C: 17721 0	I: 77661 0	C: 20607 1	C: 03717 0
11,2270	I: 77201 1	C: 00001 0	C: 03472 0	C: 37444 1	C: 03463 0	56016 0	00006 1	22012 1
11,2300	05321 1	C: 00100 0	15270 0	00006 1	00031 0	40000 0	72373 0	55265 0
11,2310	34752 0	55264 1	34756 1	05173 1	C: 02321 0	15270 0	55264 1	34757 0
11,2320	05224 0	00006 1	00031 0	40000 0	72373 0	57265 1	54001 1	11265 0
11,2330	12317 1	10001 1	12341 1	11264 1	12316 0	34740 0	00006 1	05013 0
11,2340	15261 0	34737 0	00006 1	02031 1	00006 1	12335 1	30001 0	74746 1
11,2350	10000 0	42374 1	27266 0	30001 0	74747 0	10000 0	32374 0	27266 0
11,2360	30001 0	74753 0	10000 0	42375 0	27267 1	30001 0	74752 1	10000 0
11,2370	32375 1	27267 1	12335 1	C: 00063 1	C: 01074 0	C: 00217 0	I: 40354 1	C: 02030 0

OBJECT LISTING FOR PARAGRAPH # 055. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

11,2400	C: 00001 0	I: 75540 1	C: 51770 0	I: 53515 0	C: 01535 0	I: 60325 0	C: 00045 0	C: 00047 1
11,2410	I: 77715 1	I: 65241 0	C: 01543 1	C: 02074 0	I: 60225 1	C: 01551 1	C: 00051 0	I: 77742 0
11,2420	I: 65271 0	C: 00003 1	I: 41405 0	C: 00005 1	I: 65316 0	C: 00005 1	I: 64716 0	C: 51770 0
11,2430	I: 40442 1	I: 47515 0	C: 01543 1	I: 44205 0	C: 00045 0	I: 41271 0	C: 00003 1	I: 53605 1
11,2440	C: 25774 1	C: 20176 0	I: 43260 1	C: 00050 1	I: 45257 0	C: 20211 1	I: 41205 0	C: 00001 0
11,2450	C: 00005 1	I: 53657 0	C: 20211 1	C: 20201 0	I: 65215 1	C: 01553 0	I: 53605 1	C: 00001 0
11,2460	C: 20202 0	I: 43204 0	C: 57753 1	I: 77626 0	C: 75647 0	I: 74020 0	C: 02112 1	C: 00012 1
11,2470	I: 74014 1	C: 00303 1	C: 24023 0	C: 00002 0	I: 77650 1	C: 24023 0	I: 66350 1	C: 01500 0
11,2500	C: 00051 0	C: 77762 1	I: 54345 1	C: 02076 1	C: 20612 0	I: 61500 0	C: 22507 0	I: 43206 1
11,2510	C: 01551 1	C: 16074 0	I: 77615 0	C: 01517 0	C: 35517 1	C: 22376 0	I: 73150 1	C: 02030 0
11,2520	C: 02030 0	I: 77775 1	C: 24007 0	C: 26062 1	C: 02032 1	I: 53257 1	C: 57605 0	C: 01535 0
11,2530	C: 02040 1	I: 65014 1	C: 01756 1	C: 22540 0	C: 01500 0	C: 12132 1	I: 77724 0	C: 01500 0
11,2540	I: 53575 0	C: 02032 1	C: 16032 1	C: 00045 0	C: 02070 1	I: 77624 1	C: 22650 1	I: 66175 1
11,2550	C: 02040 1	C: 00051 0	C: 16032 1	C: 02072 0	C: 02070 1	I: 71214 0	C: 00342 1	C: 23022 0
11,2560	C: 01517 0	I: 77624 1	C: 13664 0	I: 72174 0	C: 00002 0	C: 00051 0	I: 77614 1	C: 00343 0
11,2570	C: 22573 0	I: 77076 0	C: 00000 1	C: 02040 1	C: 26105 1	C: 00003 1	C: 02122 1	I: 45335 0
11,2600	C: 01012 0	C: 25776 0	I: 43030 0	C: 22606 1	C: 01756 1	C: 22622 1	I: 74375 0	C: 02032 1
11,2610	C: 02070 1	I: 52257 0	C: 57175 0	C: 02040 1	I: 77724 0	C: 01500 0	C: 12140 1	C: 02114 1
11,2620	I: 77724 0	C: 01500 0	I: 62175 0	C: 02105 1	C: 00004 0	I: 43014 0	C: 04260 1	C: 00343 0
11,2630	C: 22635 1	I: 53261 1	C: 20612 0	C: 02122 1	C: 02122 1	I: 77624 1	C: 22650 1	I: 62174 1
11,2640	C: 00004 0	C: 00004 0	I: 77775 1	C: 02122 1	C: 36040 0	C: 22650 1	I: 77650 1	C: 23022 0
11,2650	I: 74575 0	C: 02040 1	I: 40236 1	C: 00001 0	I: 61501 1	C: 00040 0	I: 60325 0	C: 02070 1
11,2660	C: 00041 1	I: 63342 1	C: 02040 1	I: 77656 1	C: 16040 1	C: 00045 0	C: 02072 0	I: 55301 0
11,2670	C: 00042 1	I: 41562 0	I: 77743 1	C: 27710 1	C: 00051 0	I: 57124 1	C: 00050 1	C: 00040 0
11,2700	I: 71264 1	C: 00041 1	C: 00003 1	I: 65057 0	C: 57177 1	C: 00050 1	I: 74406 0	I: 50315 0
11,2710	C: 02032 1	C: 02040 1	I: 44372 1	I: 57206 1	C: 00005 1	I: 77752 1	I: 43206 1	C: 25756 1
11,2720	I: 75406 1	I: 41475 1	C: 00013 0	I: 43352 1	C: 25756 1	I: 43325 1	C: 00013 0	C: 24005 1
11,2730	I: 72475 1	C: 00011 1	I: 56215 1	C: 25750 1	C: 00017 1	I: 74275 1	C: 00007 0	C: 02040 1
11,2740	I: 64515 1	C: 02032 1	I: 41455 0	I: 41345 0	C: 00001 0	C: 00015 0	I: 61501 1	C: 00037 0
11,2750	I: 40665 0	C: 00003 1	C: 51770 0	I: 74276 1	I: 57124 1	C: 00050 1	C: 00051 0	I: 55064 0
11,2760	C: 00035 1	C: 00007 0	I: 77600 1	C: 22764 1	I: 65057 0	C: 57177 1	C: 00050 1	I: 77655 1
11,2770	C: 02062 1	C: 02062 1	I: 43400 1	C: 22774 0	I: 51575 1	C: 01521 0	I: 77654 0	C: 23017 0

JCTAL LISTING FOR PARAGRAPH # 065. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

11,3000	I: 54345 1	C: 02100 1	C: 20512 0	I: 44206 0	C: 01551 1	C: 16074 0	C: 01517 0	I: 45425 0
11,3010	C: 42260 0	C: 22376 0	I: 77624 1	C: 23441 1	I: 77614 1	C: 04020 1	C: 27257 1	I: 77776 1
11,3020	05652 0	C: 00430 0	I: 71354 0	C: 02030 0	C: 02070 1	I: 44601 0	C: 00001 0	C: 50053 1
11,3030	I: 43044 0	C: 23232 0	C: 00343 0	C: 23241 1	I: 65375 0	C: 02032 1	C: 01517 0	I: 45125 0
11,3040	C: 25746 0	C: 51670 1	C: 00017 1	I: 47375 0	C: 02013 1	C: 24001 0	I: 61255 1	C: 24001 0
11,3050	C: 00025 0	I: 77656 1	C: 00025 0	I: 57345 1	C: 00023 0	C: 25760 1	I: 63525 0	C: 00023 0
11,3060	I: 45275 0	C: 25762 0	C: 25754 0	I: 57206 1	C: 00023 0	I: 76405 1	C: 25766 1	I: 57325 1
11,3070	C: 00001 0	C: 25774 1	I: 41421 0	I: 57275 0	C: 00023 0	C: 25770 0	I: 57325 1	C: 00003 1
11,3100	C: 25772 1	I: 77621 1	I: 77503 1	C: 51764 0	I: 43271 1	C: 02070 1	C: 00005 1	I: 56273 1
11,3110	C: 51760 1	C: 02070 1	I: 74215 1	C: 00009 1	C: 02032 1	C: 14033 1	I: 70403 1	C: 51764 0
11,3120	I: 43271 1	C: 02070 1	I: 50473 1	C: 51760 1	I: 43271 1	C: 02070 1	I: 76561 1	C: 00025 0
11,3130	I: 77645 0	C: 00033 1	C: 14033 1	C: 02070 1	I: 63501 0	C: 00047 1	I: 60316 0	C: 00051 0
11,3140	I: 54606 0	C: 51754 0	I: 40161 0	C: 00033 1	C: 23145 0	I: 56070 0	C: 00046 0	C: 00046 0
11,3150	I: 53670 0	C: 00050 1	C: 20153 1	I: 40055 0	C: 02062 1	C: 22774 0	C: 36062 0	C: 27725 1
11,3160	I: 77716 1	I: 41206 0	C: 27712 0	I: 60525 0	I: 44215 1	C: 00011 1	C: 11043 0	I: 41205 0
11,3170	C: 00017 1	C: 27712 0	I: 56561 0	C: 00017 1	I: 77725 1	I: 43225 0	C: 11043 0	C: 00011 1
11,3200	C: 14011 1	C: 00017 1	I: 41205 0	C: 00023 0	C: 27712 0	I: 43352 1	I: 60325 0	C: 02070 1
11,3210	C: 00050 1	I: 67206 1	C: 01354 1	I: 74271 0	I: 53257 1	C: 57601 1	I: 70257 0	C: 20146 0
11,3220	I: 65325 0	C: 01517 0	C: 27712 0	I: 45154 0	C: 02030 0	C: 55716 1	I: 40055 0	C: 02062 1
11,3230	C: 22774 0	C: 02062 1	I: 72135 0	C: 01501 1	C: 00154 1	I: 73205 1	C: 27714 0	C: 00155 0
11,3240	C: 25247 1	I: 77745 1	C: 02036 0	C: 24023 0	C: 24001 0	I: 77650 1	C: 23052 1	C: 23466 1
11,3250	C: 23472 1	C: 23503 0	I: 77214 0	C: 00342 1	C: 23303 0	C: 01535 0	I: 41241 0	C: 01543 1
11,3260	C: 02076 1	I: 77640 0	C: 23303 0	I: 43014 0	C: 00303 1	C: 23360 0	C: 04340 1	C: 23355 0
11,3270	I: 45145 0	C: 01517 0	C: 33664 0	C: 02105 1	I: 77754 1	C: 02030 0	I: 51445 0	C: 01535 0
11,3300	I: 50025 0	C: 27720 1	C: 23375 1	I: 51575 1	C: 01521 0	I: 77600 1	C: 23331 1	I: 51025 1
11,3310	C: 25764 0	C: 23331 1	I: 53615 0	C: 25764 0	C: 57605 0	I: 45271 1	C: 00013 0	C: 27716 1
11,3320	I: 77244 0	C: 23331 1	C: 01527 0	I: 45246 0	C: 25764 0	I: 77600 1	C: 23331 1	I: 77640 0
11,3330	C: 23333 0	I: 77624 1	C: 23441 1	I: 77775 1	C: 01527 0	C: 25135 1	C: 01521 0	C: 01127 1
11,3340	I: 77614 1	C: 00261 1	I: 66375 0	C: 01127 1	C: 01501 1	C: 00000 1	C: 16032 1	C: 24007 0
11,3350	C: 02100 1	I: 52014 0	C: 00301 0	C: 23705 1	C: 22516 0	I: 52175 0	C: 02105 1	C: 23276 0
11,3360	I: 60545 0	C: 00013 0	I: 50025 0	C: 27720 1	C: 23303 0	I: 71214 0	C: 04340 1	C: 23375 1
11,3370	C: 01527 0	I: 77624 1	C: 33664 0	I: 77676 0	C: 02105 1	I: 77624 1	C: 23401 0	I: 77650 1

DATA LISTING FOR PARAGRAPH # 057. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

11,3400	C: 23333 0	I: 45020 1	C: 02112 1	C: 23441 1	I: 53775 1	C: 01535 0	C: 57576 1	I: 53651 0
11,3410	C: 02105 1	C: 57574 0	C: 01503 0	C: 15535 0	C: 01517 0	I: 77624 1	C: 33775 1	I: 57414 1
11,3420	C: 00343 0	C: 23422 1	I: 53715 1	C: 01543 1	C: 57576 1	I: 77651 0	I: 77657 0	C: 57574 0
11,3430	C: 01511 0	C: 01543 1	I: 67154 0	C: 02112 1	C: 00052 0	I: 52014 0	C: 00303 1	C: 26711 1
11,3440	C: 26716 0	I: 77354 0	C: 02030 0	C: 01521 0	I: 53257 1	C: 57605 0	C: 01535 0	C: 01503 0
11,3450	C: 25535 0	C: 01527 0	I: 53257 1	C: 57602 1	C: 01543 1	C: 01511 0	C: 25543 1	C: 24007 0
11,3460	C: 01521 0	C: 15527 0	C: 24007 0	C: 01551 1	C: 01553 0	I: 77616 0	I: 64575 1	C: 02062 1
11,3470	C: 36046 0	C: 23646 1	I: 74575 0	C: 02062 1	I: 53206 0	C: 02046 1	C: 26054 1	I: 53362 0
11,3500	C: 02046 1	C: 36046 0	C: 23646 1	I: 57345 1	C: 02100 1	C: 25774 1	I: 74206 0	C: 02046 1
11,3510	I: 53372 1	C: 01125 1	I: 53361 0	C: 02100 1	C: 01127 1	C: 25127 1	C: 02062 1	I: 53322 1
11,3520	C: 02054 1	I: 76561 1	I: 77655 1	C: 01135 1	C: 01135 1	I: 45014 0	C: 00341 1	C: 23577 0
11,3530	C: 11244 0	I: 77354 0	C: 01117 1	C: 01135 1	I: 77732 1	C: 12467 1	I: 77775 1	C: 01127 1
11,3540	I: 40132 0	C: 23671 0	C: 12401 1	I: 77624 1	C: 11244 0	I: 66354 0	C: 01117 1	C: 00052 0
11,3550	C: 00000 1	I: 67114 1	C: 00006 1	C: 01126 0	I: 45104 0	C: 23642 0	C: 11244 0	I: 67154 0
11,3560	C: 01126 0	C: 01117 1	I: 77624 1	C: 11244 0	I: 76754 0	C: 01117 1	C: 75376 1	I: 77722 0
11,3570	C: 01127 1	I: 76173 0	C: 75310 1	C: 00000 1	I: 77722 0	C: 35135 0	C: 23342 0	I: 77200 0
11,3600	C: 22774 0	C: 01135 1	C: 25527 0	C: 01127 1	C: 01521 0	I: 43014 0	C: 04715 0	C: 27633 1
11,3610	C: 01756 1	C: 27257 1	I: 77776 1	05353 1	C: 04022 0	05504 0	C: 00236 0	06037 0
11,3620	I: 77731 1	C: 00053 1	C: 23627 0	I: 52014 0	C: 01714 1	C: 26661 1	C: 26734 0	I: 66214 0
11,3630	C: 00061 0	C: 01120 0	C: 77741 0	I: 66214 0	C: 01755 1	C: 23562 1	C: 01120 0	C: 77717 0
11,3640	I: 77650 1	C: 23562 1	I: 77745 1	C: 01116 0	C: 34041 0	C: 27141 0	I: 43345 1	C: 02076 1
11,3650	C: 02100 1	I: 66110 1	C: 77763 0	C: 01500 0	C: 02100 1	I: 74561 0	C: 02062 1	I: 74255 0
11,3660	C: 01135 1	C: 02100 1	I: 77655 1	C: 01127 1	C: 02032 1	I: 52014 0	C: 00301 0	C: 23705 1
11,3670	C: 22476 1	I: 43014 0	C: 01576 1	C: 01671 0	I: 77614 1	C: 02676 1	I: 77414 0	C: 01472 1
11,3700	05567 0	C: 00421 0	05027 0	I: 77650 1	C: 27257 1	I: 70754 0	C: 02030 0	C: 51770 0
11,3710	C: 35072 1	C: 22774 1	C: 02062 1	I: 62014 0	C: 00342 1	C: 23232 0	C: 77771 0	I: 70744 1
11,3720	C: 02030 0	C: 51772 1	C: 36072 1	C: 23733 1	I: 50414 0	C: 00303 1	C: 23727 1	I: 77655 1
11,3730	C: 02062 1	C: 36062 0	C: 23232 0	I: 60575 0	C: 02032 1	I: 53513 0	C: 02132 0	I: 46315 1
11,3740	C: 02032 1	I: 52361 1	C: 25764 0	I: 60325 0	C: 00045 0	C: 00052 0	I: 63406 0	I: 77605 1
11,3750	I: 65301 0	C: 00043 0	C: 02072 0	I: 56342 1	I: 77761 1	I: 57154 0	C: 00051 0	C: 00051 0
11,3760	I: 57074 0	C: 00051 0	C: 00042 1	I: 43457 0	C: 57606 0	I: 43131 0	C: 00027 1	C: 00024 1
11,3770	C: 03752 1	C: 25212 1	I: 52131 0	C: 00027 1	C: 00005 1	C: 25212 1	C: 03776 1	CKSM 43373 1

DCTAL LISTING FOR PARAGRAPH # 070, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

12,2000	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 20000 0	C: 00000 1	C: 00000 1	C: 00000 1
12,2010	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 77777 0	C: 77771 0	C: 77763 0	C: 37777 1
12,2020	C: 37777 1	C: 37777 1	C: 37777 1	I: 40001 1	C: 00001 0	C: 24026 0	I: 77773 1	C: 10005 0
12,2030	C: 24017 1	C: 01503 0	I: 66256 0	C: 00027 1	C: 00024 1	C: 16647 0	C: 00045 0	C: 24041 1
12,2040	C: 01503 0	I: 76441 1	C: 01511 0	I: 76405 1	C: 00023 0	C: 24043 0	C: 01511 0	I: 57236 1
12,2050	C: 00017 1	I: 52405 1	C: 00041 1	I: 61425 0	C: 11035 1	C: 00045 0	I: 74421 0	C: 11035 1
12,2060	I: 77671 1	C: 00041 1	C: 00011 1	I: 71244 0	C: 24073 0	C: 11053 1	I: 40071 0	C: 00011 1
12,2070	C: 24077 1	I: 52166 1	C: 24077 1	I: 55366 1	C: 11055 1	I: 77600 1	C: 24077 1	C: 00013 0
12,2100	I: 65205 0	C: 00023 0	C: 00011 1	I: 65301 0	C: 00047 1	I: 56257 1	C: 20173 0	I: 50000 1
12,2110	C: 24124 0	C: 24124 0	I: 51525 1	C: 02074 0	I: 50025 0	C: 00001 0	C: 24124 0	I: 77765 0
12,2120	C: 02074 0	C: 16074 0	I: 77650 1	C: 24112 0	I: 71201 1	C: 00001 0	C: 02130 1	C: 00025 0
12,2130	I: 53165 0	C: 02074 0	C: 24302 0	I: 51440 0	C: 24302 0	I: 51025 1	C: 00013 0	C: 24302 0
12,2140	I: 51145 0	C: 02074 0	C: 24152 1	I: 57545 1	C: 00013 0	C: 14015 0	C: 24007 0	C: 00013 0
12,2150	I: 77650 1	C: 24155 0	I: 77745 1	C: 24007 0	C: 00015 0	I: 57345 1	C: 02074 0	C: 11046 0
12,2160	I: 77646 0	C: 16177 1	C: 01553 0	I: 77621 1	C: 00025 0	C: 02643 1	I: 63545 0	C: 00025 0
12,2170	I: 41501 0	C: 00047 1	I: 53605 1	C: 00011 1	C: 21573 0	C: 34031 1	C: 24421 0	I: 44200 0
12,2200	C: 24311 1	C: 02074 0	C: 02645 1	I: 44246 1	C: 02177 1	I: 71244 0	C: 24333 1	C: 00037 0
12,2210	I: 60225 1	C: 01551 1	C: 00047 1	I: 60325 0	C: 02643 1	C: 00050 1	I: 41260 0	C: 00047 1
12,2220	C: 02645 1	I: 56257 1	C: 21202 1	I: 41542 1	I: 71244 0	C: 24246 1	C: 00025 0	C: 00013 0
12,2230	I: 45221 1	C: 00015 0	I: 51000 0	C: 24240 1	C: 24240 1	I: 52145 0	C: 00001 0	C: 24260 0
12,2240	I: 45345 1	C: 00015 0	C: 00025 0	I: 52075 1	C: 11051 0	C: 24260 0	I: 77745 1	C: 00025 0
12,2250	C: 00015 0	I: 45221 1	C: 00013 0	I: 50000 1	C: 24274 0	C: 24274 0	I: 77745 1	C: 00001 0
12,2260	C: 02643 1	I: 43254 0	C: 24333 1	C: 00025 0	C: 14025 0	C: 00037 0	C: 01551 1	I: 46034 1
12,2270	C: 24644 1	C: 24333 1	I: 77650 1	C: 24166 0	I: 45345 1	C: 00013 0	C: 00025 0	I: 52075 1
12,2300	C: 11051 0	C: 24260 0	I: 70545 1	C: 00013 0	I: 77765 0	C: 02074 0	C: 00025 0	I: 77650 1
12,2310	C: 24140 1	I: 50145 1	C: 00025 0	C: 24330 1	C: 00013 0	I: 70545 1	C: 02643 1	C: 02643 1
12,2320	I: 44254 1	C: 02112 1	C: 00025 0	C: 14025 0	C: 01551 1	C: 00037 0	I: 77650 1	C: 24267 1
12,2330	C: 00015 0	I: 77650 1	C: 24315 0	I: 44545 0	C: 00041 1	I: 74225 1	C: 00035 1	C: 02647 0
12,2340	I: 65372 1	C: 00025 0	I: 60316 0	C: 00047 1	I: 57275 0	C: 00023 0	C: 00025 0	I: 53605 1
12,2350	C: 00033 1	C: 21572 1	I: 77621 1	C: 00037 0	I: 74352 0	C: 01511 0	I: 53372 1	I: 77712 0
12,2360	C: 01535 0	I: 60246 1	C: 00050 1	C: 14043 0	C: 00031 0	I: 45275 0	C: 00033 1	C: 11033 1
12,2370	I: 76405 1	C: 00021 1	I: 53605 1	C: 00025 0	C: 56601 0	I: 74271 0	C: 00043 0	C: 02647 0

OBJECT LISTING FOR PARAGRAPH # 071, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "Q" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

12,400	I: 65372 1	C: 00035 1	I: 56257 1	C: 56602 0	C: 00043 0	I: 74221 0	C: 11047 1	C: 01511 0
12,410	I: 42455 0	I: 77626 0	C: 62234 0	C: 00037 0	C: 15551 1	C: 00025 0	C: 01553 0	I: 77650 1
12,420	C: 02112 1	I: 77776 1	07222 1	C: 00010 0	C: 02525 1	C: 12526 0	C: 67356 0	C: 75666 0
12,430	C: 15001 1	C: 23771 1	C: 64342 0	C: 43674 0	C: 06563 1	C: 04645 1	C: 75173 0	C: 52672 0
12,440	C: 00656 1	C: 14331 0	C: 77533 1	C: 40512 0	C: 00023 0	C: 11210 1	C: 77774 0	C: 67506 0
12,450	06037 0	C: 14033 1	C: 00031 0	I: 77776 1	07222 1	C: 00010 0	C: 01000 0	C: 00000 1
12,460	C: 72525 0	C: 52535 0	C: 13301 1	C: 15337 1	C: 62776 0	C: 54733 1	C: 11176 1	C: 13267 0
12,470	C: 73410 0	C: 51674 0	C: 01446 0	C: 33641 1	C: 77451 1	C: 65233 0	C: 00055 1	C: 37266 1
12,500	C: 77767 1	C: 52336 0	06037 0	I: 53605 1	C: 00001 0	C: 21574 1	C: 00035 1	I: 72405 0
12,510	C: 00043 0	I: 65234 1	C: 21633 1	I: 53605 1	C: 00033 1	C: 21574 1	I: 72405 0	C: 00045 0
12,520	I: 65234 1	C: 21633 1	C: 00041 1	I: 76261 0	C: 20607 1	I: 41301 0	C: 00047 1	C: 00025 0
12,530	I: 76257 0	C: 20573 1	I: 57232 0	C: 00023 0	C: 00037 0	I: 77616 0	I: 71214 0	C: 00614 1
12,540	C: 24606 1	C: 00037 0	I: 60225 1	C: 02762 0	C: 00047 1	I: 60325 0	C: 00015 0	C: 00050 1
12,550	I: 41260 0	C: 00047 1	C: 02760 1	I: 56257 1	C: 21202 1	I: 43142 1	C: 04351 1	C: 24562 0
12,560	I: 75246 0	C: 02760 1	I: 51006 0	C: 24620 0	I: 43145 0	C: 02766 1	C: 04311 0	C: 24571 1
12,570	C: 00017 1	I: 45221 1	C: 00011 1	I: 51000 0	C: 24600 1	C: 24600 1	I: 77650 1	C: 24632 0
12,600	I: 45345 1	C: 00011 1	C: 02766 1	I: 52005 0	C: 11051 0	C: 24614 0	I: 41345 0	C: 00011 1
12,610	C: 00051 0	I: 41325 0	C: 00017 1	C: 00051 0	I: 77625 0	I: 52165 1	C: 02760 1	C: 24562 0
12,620	I: 43145 0	C: 02766 1	C: 04311 0	C: 24625 0	C: 00011 1	I: 45221 1	C: 00017 1	I: 50000 1
12,630	C: 24636 1	C: 24636 1	I: 77745 1	C: 00001 0	C: 00015 0	I: 77616 0	I: 45345 1	C: 00017 1
12,640	C: 02766 1	I: 52005 0	C: 11051 0	C: 24634 0	44753 0	50120 1	60026 0	50120 1
12,650	54026 1	54154 0	06061 0	I: 44545 0	C: 00041 1	I: 74225 1	C: 00035 1	C: 02722 1
12,660	I: 65372 1	C: 00025 0	I: 60316 0	C: 00047 1	I: 57275 0	C: 00023 0	C: 00025 0	I: 53605 1
12,670	C: 00033 1	C: 21572 1	I: 77521 1	C: 00037 0	I: 74352 0	C: 02744 1	I: 53372 1	I: 41512 1
12,700	I: 77646 0	I: 77701 1	C: 00047 1	C: 16720 0	C: 00031 0	I: 45205 1	C: 00033 1	C: 11033 1
12,710	I: 76405 1	C: 00021 1	I: 53605 1	C: 00025 0	C: 21176 1	I: 74271 0	C: 02720 0	C: 02722 1
12,720	I: 65372 1	C: 00035 1	I: 56257 1	C: 21175 1	C: 02720 0	I: 77621 1	C: 11047 1	I: 53361 0
12,730	C: 02744 1	I: 43411 1	I: 40220 0	C: 02710 0	C: 00001 0	I: 77600 1	C: 24737 1	I: 63375 0
12,740	C: 02655 0	C: 02744 1	I: 77524 1	C: 11064 0	I: 45000 0	C: 24764 1	C: 24767 1	I: 43145 0
12,750	C: 00031 0	C: 04310 1	C: 25742 1	I: 45014 0	C: 04273 0	C: 24421 0	I: 45014 0	C: 03706 0
12,760	C: 02710 0	C: 24655 1	I: 77650 1	C: 02710 0	I: 77614 1	C: 04033 0	C: 25742 1	I: 66374 1
12,770	C: 00003 1	C: 00052 0	C: 00001 0	I: 77614 1	C: 04276 0	I: 65366 1	C: 02732 0	I: 44342 1

OCTAL LISTING FOR PARAGRAPH # 072, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

12,3000	C: 11037 0	I: 54325 1	C: 02730 1	C: 21607 0	I: 77671 1	I: 77600 1	C: 25122 1	I: 41225 1
12,3010	C: 02766 1	I: 40132 0	C: 25122 1	I: 63406 0	I: 65351 0	C: 00155 0	C: 02742 1	I: 76202 0
12,3020	I: 75440 0	C: 25205 1	I: 43306 0	I: 61000 0	C: 25120 0	C: 25013 1	I: 40065 0	C: 11033 1
12,3030	C: 25205 1	I: 41440 1	C: 25205 1	I: 77716 1	I: 41301 0	C: 00047 1	C: 02742 1	I: 77457 1
12,3040	C: 21567 0	07222 1	C: 00005 1	C: 20000 0	C: 00000 1	C: 72525 0	C: 52471 1	C: 03146 1
12,3050	C: 15003 0	C: 75556 0	C: 45210 0	C: 01615 1	C: 13553 0	C: 76371 0	C: 63777 0	C: 01232 0
12,3060	C: 27367 0	06037 0	I: 76405 1	I: 43006 0	C: 04316 1	C: 25172 1	I: 60316 0	C: 00047 1
12,3070	I: 53605 1	C: 02742 1	C: 21565 1	C: 14031 0	C: 00041 1	I: 75542 0	I: 41206 1	I: 77632 0
12,3100	C: 00025 0	I: 60316 0	C: 00047 1	I: 41325 0	C: 02740 0	C: 00041 1	I: 75452 0	I: 56405 0
12,3110	C: 02766 1	C: 14043 0	C: 02742 1	I: 43021 0	C: 11035 1	C: 04270 0	C: 00045 0	I: 77616 0
12,3120	I: 77774 0	C: 00003 1	I: 51001 1	C: 00001 0	C: 25127 1	I: 77614 1	C: 04076 1	I: 75545 1
12,3130	C: 02740 0	I: 41325 0	C: 02730 1	C: 02766 1	I: 65352 0	C: 02732 0	I: 43202 0	C: 11043 0
12,3140	I: 41225 1	I: 55261 0	C: 00047 1	C: 02730 1	I: 51457 0	C: 21174 0	I: 63406 0	C: 14043 0
12,3150	C: 11041 1	I: 63406 0	I: 65234 1	C: 21633 1	C: 02742 1	I: 40405 1	C: 00043 0	I: 77771 0
12,3160	I: 75440 0	C: 25205 1	I: 77615 0	I: 60304 0	C: 25151 0	C: 00047 1	I: 77665 1	I: 52057 1
12,3170	C: 21172 0	C: 25031 1	I: 50145 1	C: 02742 1	C: 25205 1	I: 60366 1	C: 00047 1	I: 53665 1
12,3200	C: 11055 1	C: 20176 0	I: 41425 1	I: 77650 1	C: 25066 0	I: 40001 1	C: 00001 0	C: 25210 0
12,3210	I: 43414 1	C: 04070 1	I: 40220 0	C: 02710 0	C: 00001 0	I: 77600 1	C: 25217 1	I: 76614 0
12,3220	C: 02674 0	C: 10005 0	C: 14017 1	C: 02671 0	I: 77675 0	C: 11042 1	C: 02764 0	I: 77214 0
12,3230	C: 00474 0	C: 02655 0	I: 45115 0	C: 02663 0	C: 11130 0	C: 16730 1	C: 02720 0	I: 65301 0
12,3240	C: 00047 1	C: 00041 1	I: 55342 1	I: 65257 1	C: 20173 0	I: 77626 0	C: 75045 1	I: 44342 1
12,3250	C: 11037 0	C: 02734 0	I: 53106 0	C: 25463 1	I: 65301 0	C: 00047 1	C: 00001 0	I: 56342 1
12,3260	I: 75457 0	C: 20176 0	I: 54325 1	C: 02730 1	C: 20607 1	I: 43271 1	C: 02734 0	I: 77626 0
12,3270	C: 77760 0	I: 50000 1	C: 25277 1	C: 25302 1	I: 50025 0	C: 11061 0	C: 25302 1	I: 77745 1
12,3300	C: 11061 0	C: 00017 1	I: 77745 1	C: 02732 0	I: 45261 0	C: 20607 1	I: 77626 0	C: 61041 0
12,3310	C: 02673 1	I: 71240 1	C: 25503 0	C: 02736 1	I: 56352 0	C: 02730 1	I: 77600 1	C: 25503 0
12,3320	C: 00011 1	I: 66214 0	C: 00715 1	C: 25467 0	C: 00051 0	C: 00001 0	I: 77745 1	C: 02766 1
12,3330	I: 77605 1	C: 02730 1	I: 45342 0	C: 02736 1	I: 65301 0	C: 00047 1	C: 02734 0	I: 56257 1
12,3340	C: 20170 0	I: 53040 0	C: 25417 1	C: 25417 1	C: 16740 0	C: 02766 1	I: 43316 1	C: 11045 0
12,3350	I: 41301 0	C: 00047 1	C: 02740 0	I: 44257 1	C: 20571 0	C: 11043 0	C: 16742 1	C: 02740 0
12,3360	I: 45000 0	C: 25422 1	C: 24757 1	I: 77745 1	C: 00037 0	C: 16762 0	C: 00031 0	I: 45014 0
12,3370	C: 04310 1	C: 25417 1	C: 24421 0	I: 44200 0	C: 25437 0	C: 02671 0	C: 02760 1	I: 44246 1

DCTAL LISTING FOR PARAGRAPH # 070, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

12,3400	C: 02764 0	I: 47044 1	C: 25506 0	C: 24644 1	I: 45030 0	C: 25450 1	C: 24536 1	I: 53145 1
12,3410	C: 00155 0	C: 25450 1	I: 77615 0	C: 02766 1	C: 02766 1	I: 77650 1	C: 25330 0	I: 51145 0
12,3420	C: 00015 0	C: 25442 1	I: 71201 1	C: 00001 0	C: 02766 1	C: 00011 1	I: 70545 1	C: 00015 0
12,3430	C: 00015 0	I: 44254 1	C: 25450 1	C: 02766 1	C: 02766 1	I: 77650 1	C: 25330 0	I: 77745 1
12,3440	C: 02762 0	C: 00037 0	I: 71201 1	C: 00001 0	C: 02766 1	C: 00017 1	I: 77650 1	C: 25426 0
12,3450	I: 51545 1	C: 02760 1	I: 41325 0	C: 02671 0	C: 11030 1	I: 45215 0	C: 11057 0	I: 43044 0
12,3460	C: 25506 0	C: 02434 0	C: 25506 0	I: 43001 1	C: 00001 0	C: 02434 0	C: 02710 0	I: 71331 0
12,3470	C: 00051 0	C: 10000 0	C: 00011 1	I: 65342 1	C: 00017 1	I: 43342 0	I: 77626 0	C: 75011 0
12,3500	C: 00015 0	I: 77650 1	C: 25330 0	I: 52145 0	C: 11063 1	C: 25320 1	I: 60345 0	C: 00041 1
12,3510	C: 00047 1	I: 70525 1	C: 02740 0	I: 77671 1	I: 75457 0	C: 20175 0	I: 72405 0	C: 00021 1
12,3520	I: 41206 0	C: 02766 1	I: 74261 1	C: 20206 1	C: 02722 1	I: 77725 1	I: 76561 1	C: 02674 0
12,3530	I: 53235 0	C: 02722 1	I: 77772 0	C: 02744 1	I: 53135 0	C: 02702 0	C: 25541 0	I: 77650 1
12,3540	C: 02710 0	I: 45145 0	C: 02720 0	C: 24701 1	C: 02703 1	I: 77650 1	C: 02710 0	I: 40220 0
12,3550	C: 02710 0	C: 00001 0	I: 77600 1	C: 25554 1	I: 63375 0	C: 02655 0	C: 02744 1	I: 77624 1
12,3560	C: 11064 0	I: 71200 0	C: 24764 1	C: 11043 0	I: 41225 1	C: 02742 1	C: 02740 0	I: 41366 1
12,3570	C: 02766 1	I: 74212 0	C: 02712 1	I: 45325 1	C: 11035 1	C: 02742 1	I: 52361 1	C: 02722 1
12,3600	I: 53512 1	I: 77600 1	C: 25660 0	I: 60325 0	C: 02756 1	C: 00047 1	I: 41325 0	C: 00041 1
12,3610	C: 02740 0	I: 56257 1	C: 20201 0	I: 56225 1	C: 11041 1	C: 00045 0	C: 00031 0	I: 63400 0
12,3620	C: 25664 1	I: 50021 1	C: 11037 0	C: 25664 1	I: 75366 0	C: 02755 1	I: 77614 1	C: 04272 1
12,3630	I: 76561 1	C: 02674 0	I: 63235 0	C: 00001 0	I: 53361 0	C: 00031 0	I: 41572 1	I: 56241 0
12,3640	C: 02722 1	C: 25755 1	I: 40142 1	C: 25644 0	C: 26732 0	C: 02722 1	I: 76435 1	I: 72441 0
12,3650	C: 02674 0	C: 16730 1	C: 02740 0	I: 77624 1	C: 24767 1	I: 77614 1	C: 02634 1	C: 24747 0
12,3660	I: 43001 1	C: 00001 0	C: 02434 0	C: 25742 1	I: 75345 1	C: 24005 1	C: 00031 0	C: 14031 0
12,3670	C: 24007 0	I: 77614 1	C: 04032 1	C: 25630 0	I: 40220 0	C: 02710 0	C: 00001 0	I: 77600 1
12,3700	C: 25701 0	I: 63375 0	C: 02655 0	C: 02744 1	I: 77624 1	C: 11064 0	I: 77600 1	C: 25710 0
12,3710	I: 42405 0	C: 02742 1	I: 75421 1	C: 11035 1	C: 02752 0	I: 65215 1	C: 11031 0	C: 00041 1
12,3720	I: 72405 0	C: 02740 0	I: 77571 1	I: 60325 0	C: 02742 1	C: 00047 1	I: 53725 1	C: 00041 1
12,3730	C: 20174 1	I: 45271 1	I: 50000 1	C: 25737 0	C: 25737 0	I: 77650 1	C: 02710 0	I: 52145 0
12,3740	C: 24020 0	C: 02710 0	I: 77776 1	05652 0	C: 00607 0	C: 04531 1	C: 23146 0	C: 14000 1
12,3750	C: 00000 1	C: 02314 0	C: 31463 1	C: 01400 1	C: 00000 1	C: 10000 0	C: 00000 1	C: 03000 1
12,3760	C: 00000 1	C: 36000 1	C: 00000 1	C: 30000 1	C: 00000 1	C: 22525 0	C: 12525 0	C: 22000 1
12,3770	C: 00000 1	C: 01200 1	C: 00000 1	C: 25252 0	C: 25253 1	C: 00027 1	C: 03776 1	CKSM 73411 1

DCTAL LISTING FOR PARAGRAPH # 074, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "@" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

13,1000	C: 07112 1	C: 06620 0	C: 27446 1	C: 14620 0	C: 16471 1	C: 01352 1	C: 22437 1	C: 16067 1
13,2010	C: 08000 1	C: 00000 1	C: 02302 1	C: 24735 0	C: 77651 0	C: 75237 0	C: 77776 1	C: 53032 0
13,2020	C: 10407 0	C: 05344 1	C: 13710 0	C: 35320 0	C: 12160 0	C: 12124 0	I: 43014 0	C: 01474 1
13,2030	C: 04347 0	C: 26036 0	I: 43014 0	C: 02756 1	C: 26036 0	C: 01476 0	I: 45014 0	C: 01667 1
13,2040	C: 27134 1	I: 71214 0	C: 04307 1	C: 26063 0	C: 01571 0	C: 34041 0	C: 27414 0	I: 45014 0
13,2050	C: 01674 0	C: 26644 0	I: 77614 1	C: 02756 1	C: 26060 0	I: 43014 0	C: 01476 0	C: 01475 0
13,2060	I: 45014 0	C: 01467 0	C: 27134 1	I: 77614 1	C: 01236 1	C: 26632 1	I: 43414 1	C: 01674 0
13,2070	I: 43414 1	C: 04756 1	C: 26073 1	I: 53775 1	C: 01521 0	C: 57605 0	I: 53655 1	C: 01535 0
13,2100	C: 57576 1	C: 25221 1	C: 01527 0	I: 53257 1	C: 57602 1	C: 01543 1	I: 77657 0	C: 57576 1
13,2110	C: 15227 1	C: 01517 0	C: 01235 1	I: 77616 0	I: 53775 1	C: 01521 0	C: 57605 0	I: 53655 1
13,2120	C: 01535 0	C: 57576 1	C: 25720 0	C: 01527 0	I: 53257 1	C: 57602 1	C: 01543 1	I: 77657 0
13,2130	C: 57576 1	C: 01726 0	I: 77616 0	C: 00041 1	I: 57545 1	C: 00043 0	I: 67401 0	C: 00001 0
13,2140	I: 44206 0	C: 24005 1	C: 14005 1	C: 24007 0	C: 24043 0	C: 00041 1	I: 41056 1	C: 52421 1
13,2150	C: 14041 1	C: 00041 1	I: 44142 0	C: 00051 0	C: 14023 0	C: 00045 0	I: 77742 0	C: 34021 0
13,2160	C: 47320 0	I: 43206 1	C: 24005 1	C: 24007 0	C: 00005 1	I: 77634 0	C: 21635 1	C: 25112 1
13,2170	C: 00001 0	I: 77634 0	C: 21635 1	C: 01110 0	I: 77776 1	40110 0	74740 1	10000 0
13,2200	12204 1	53110 1	53112 0	53110 1	06037 0	I: 77650 1	C: 00051 0	05504 0
13,2210	C: 00031 0	06037 0	I: 77775 1	C: 03434 1	C: 02223 0	I: 77776 1	32336 0	04616 1
13,2220	C: 20476 0	12333 1	02224 1	02216 0	32337 1	04616 1	C: 20476 0	12333 1
13,2230	02232 0	02224 1	06037 0	I: 77745 1	C: 03442 0	C: 34041 0	C: 27043 0	I: 53575 0
13,2240	C: 00001 0	I: 77676 0	C: 00031 0	I: 53435 0	C: 00007 0	C: 00023 0	I: 53435 0	C: 00031 0
13,2250	C: 24015 0	C: 02223 0	I: 76505 0	C: 00015 0	I: 77655 1	C: 00007 0	C: 00007 0	I: 77624 1
13,2260	C: 27414 0	I: 77624 1	C: 26340 1	I: 53775 1	C: 00007 0	C: 57176 0	C: 25543 1	C: 00001 0
13,2270	I: 77657 0	C: 57176 0	C: 15535 0	C: 03442 0	C: 01517 0	I: 71214 0	C: 01673 1	C: 01643 1
13,2300	C: 34041 0	C: 27107 1	I: 77624 1	C: 27414 0	I: 77775 1	C: 00017 1	C: 01503 0	C: 15535 0
13,2310	C: 00015 0	C: 25517 0	C: 00025 0	I: 77624 1	C: 23455 1	I: 77776 1	05353 1	C: 04024 0
13,2320	05504 0	C: 00236 0	06037 0	I: 77624 1	C: 26661 1	I: 77531 0	C: 00053 1	C: 26332 1
13,2330	04616 1	C: 27445 1	I: 77776 1	34755 1	55462 1	16001 1	C: 01524 0	C: 01441 1
13,2340	I: 43174 1	C: 00002 0	C: 00063 1	I: 77014 1	C: 04303 0	C: 00052 0	C: 00000 1	I: 43414 1
13,2350	C: 00263 0	I: 40220 0	C: 03674 1	C: 00001 0	C: 24007 0	C: 02032 1	I: 51406 1	C: 16070 1
13,2360	C: 24007 0	I: 71414 0	C: 01743 0	C: 26364 1	I: 77624 1	C: 51670 1	I: 77656 1	C: 36032 0
13,2370	C: 26550 0	I: 77624 1	C: 26560 0	I: 63545 0	C: 02032 1	I: 63525 0	C: 02034 1	I: 75415 0

OCTAL LISTING FOR PARAGRAPH # 075, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

13,2400	I: 76405 1	C: 00011 1	C: 14021 1	C: 02036 0	C: 34023 1	C: 26510 1	C: 15121 1	C: 02032 1
13,2410	C: 14021 1	C: 02034 1	C: 34023 1	C: 26510 1	C: 15123 0	C: 02070 1	I: 77625 0	C: 03673 0
13,2420	C: 35125 1	C: 03674 1	I: 40220 0	C: 03674 1	C: 00001 0	C: 34007 1	C: 26550 0	I: 73545 1
13,2430	C: 01121 1	I: 65275 1	C: 00011 1	C: 01121 1	I: 65346 0	C: 01123 0	I: 57356 0	I: 71525 0
13,2440	C: 01121 1	I: 71525 0	C: 01123 0	I: 55475 1	I: 41456 0	C: 36032 0	C: 26560 0	I: 43145 0
13,2450	C: 24007 0	C: 01743 0	C: 26454 0	I: 77746 1	I: 77624 1	C: 55716 1	C: 16032 1	C: 03673 0
13,2460	I: 74215 1	C: 01125 0	C: 02032 1	I: 77772 0	C: 36032 0	C: 05674 1	I: 63545 0	C: 02036 0
13,2470	I: 44352 0	C: 24005 1	I: 44275 1	C: 26507 1	C: 24005 1	I: 75465 1	C: 26503 0	I: 77622 1
13,2500	C: 03673 0	I: 77616 0	C: 00446 1	C: 00305 1	C: 17711 0	C: 05254 1	C: 00155 0	C: 25250 1
13,2510	I: 77600 1	C: 26512 0	I: 63545 0	C: 00023 0	I: 63525 0	C: 00021 1	I: 77615 0	I: 75454 0
13,2520	C: 26536 0	I: 40065 0	C: 00023 0	C: 26543 1	I: 67542 0	C: 00025 0	I: 50125 1	C: 00021 1
13,2530	C: 26532 1	I: 43545 1	I: 57545 1	I: 43244 1	C: 26540 1	C: 24005 1	C: 00025 0	I: 77616 0
13,2540	I: 52025 1	C: 24005 1	C: 26536 0	I: 75345 1	C: 11037 0	C: 00023 0	C: 00025 0	I: 77616 0
13,2550	I: 43145 0	C: 26505 0	C: 01743 0	C: 26556 0	I: 77735 0	C: 24005 1	C: 00011 1	I: 77616 0
13,2560	I: 71220 1	C: 00051 0	C: 10003 0	I: 71214 0	C: 01703 1	C: 26575 1	C: 10001 1	I: 45014 0
13,2570	C: 00742 0	C: 26573 1	C: 26466 1	C: 37673 1	C: 00051 0	I: 77214 0	C: 00702 1	C: 26573 1
13,2600	C: 02023 1	I: 64446 0	I: 77650 1	C: 26573 1	05353 1	C: 00052 0	35017 1	05105 0
13,2610	C: 02613 1	C: 26063 0	05261 1	06037 0	I: 47014 1	C: 04712 1	C: 26653 0	C: 21573 0
13,2620	C: 00041 1	I: 77624 1	C: 27414 0	I: 45014 0	C: 01076 1	C: 26644 0	I: 77650 1	C: 26026 1
13,2630	C: 00003 1	C: 25140 0	I: 77414 0	C: 01672 0	05353 1	C: 20032 1	00006 1	32631 1
13,2640	05277 0	C: 02604 1	C: 26063 0	05155 0	I: 43014 0	C: 01472 1	C: 01673 1	I: 43014 0
13,2650	C: 01676 1	C: 01675 1	I: 77616 0	I: 77776 1	05353 1	C: 00002 0	05516 0	C: 00221 0
13,2660	05155 0	I: 47020 0	C: 00051 0	C: 26674 0	I: 45014 0	C: 04063 0	C: 26114 1	I: 43014 0
13,2670	C: 00303 1	C: 00051 0	C: 04223 0	C: 00051 0	03036 1	55500 1	51500 0	31502 1
13,2700	51500 0	55554 0	11500 1	12675 0	06061 0	I: 43034 1	C: 26723 0	C: 04303 0
13,2710	C: 25715 0	I: 66214 0	C: 00263 0	C: 02031 1	C: 00000 1	I: 77616 0	I: 66214 0	C: 00063 1
13,2720	C: 02031 1	C: 00002 0	I: 77616 0	03036 1	55500 1	51500 0	31554 1	51500 0
13,2730	55502 0	11500 1	12724 0	06061 0	I: 47020 0	C: 00051 0	C: 26747 1	I: 45014 0
13,2740	C: 04064 1	C: 26070 1	I: 43014 0	C: 00303 1	C: 00051 0	C: 04224 1	C: 00051 0	03036 1
13,2750	55500 1	51500 0	31502 1	51500 0	55626 0	11500 1	12750 0	06061 0
13,2760	I: 47014 1	C: 04307 1	C: 17001 0	C: 26770 0	I: 52014 0	C: 04304 1	C: 26715 0	C: 26711 1
13,2770	03036 1	55500 1	51500 0	31626 1	51500 0	55502 0	11500 1	12771 0

OBJECT LISTING FOR PARAGRAPH # 076, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

13,3000	06061 0	I: 77201 1	C: 00301 0	C: 02023 1	I: 41525 0	C: 00041 1	C: 15517 0	C: 27712 0
13,3010	I: 77624 1	C: 55716 1	C: 25535 0	C: 24001 0	C: 14001 0	C: 01517 0	C: 14007 0	C: 27712 0
13,3020	I: 45014 0	C: 00063 1	C: 55716 1	I: 74235 0	C: 01535 0	C: 26001 1	C: 25543 1	C: 24007 0
13,3030	C: 01521 0	I: 67174 1	C: 00002 0	C: 02030 0	C: 35527 1	C: 27157 1	33042 1	54006 0
13,3040	33452 1	00002 0	C: 26063 0	I: 45020 1	C: 00046 0	C: 27414 0	I: 43130 1	C: 02102 0
13,3050	C: 01474 1	I: 43014 0	C: 01467 0	C: 01676 1	I: 77614 1	C: 01633 0	C: 27136 0	I: 45020 1
13,3060	C: 00046 0	C: 27414 0	I: 43130 1	C: 02102 0	C: 01634 1	C: 27051 0	I: 45020 1	C: 00046 0
13,3070	C: 27414 0	I: 43130 1	C: 02102 0	C: 01474 1	I: 43014 0	C: 01676 1	C: 01433 1	C: 27136 0
13,3100	I: 45020 1	C: 00046 0	C: 27414 0	I: 43130 1	C: 02102 0	C: 01634 1	C: 27074 1	I: 66214 0
13,3110	C: 01467 0	C: 02031 1	C: 00300 1	I: 66214 0	C: 00343 0	C: 27120 1	C: 02031 1	C: 00002 0
13,3120	I: 77220 1	C: 02102 0	C: 24007 0	C: 01521 0	C: 35527 1	C: 23441 1	I: 43014 0	C: 01676 1
13,3130	C: 04062 1	I: 77614 1	C: 04020 1	C: 27150 0	I: 77620 0	C: 02102 0	I: 43014 0	C: 04060 0
13,3140	C: 04062 1	I: 77731 1	C: 00053 1	C: 27150 0	I: 52014 0	C: 01714 1	C: 26705 1	C: 26760 1
13,3150	I: 77745 1	C: 00041 1	C: 01116 0	I: 52014 0	C: 01753 1	C: 27257 1	C: 27243 1	I: 77414 0
13,3160	C: 01752 0	C: 27200 0	05353 1	C: 04022 0	05504 0	C: 00236 0	06037 0	I: 77731 1
13,3170	C: 00053 1	C: 27176 1	I: 52014 0	C: 01714 1	C: 26661 1	C: 26734 0	I: 77624 1	C: 11244 0
13,3200	I: 45001 1	C: 00001 0	C: 23441 1	I: 53775 1	C: 01503 0	C: 57576 1	I: 53715 1	C: 01511 0
13,3210	C: 57576 1	I: 63325 0	C: 01517 0	C: 01503 0	I: 64715 0	C: 01511 0	C: 51770 0	I: 76006 0
13,3220	C: 77765 0	I: 76014 0	C: 00203 1	C: 27225 1	C: 77775 1	I: 40001 1	C: 00001 0	C: 27230 0
13,3230	I: 43014 0	C: 04676 1	C: 01567 1	I: 77614 1	C: 01672 0	I: 77535 1	C: 02103 1	30154 1
13,3240	50120 1	54052 1	03425 1	I: 45345 1	C: 01116 0	C: 01517 0	C: 36074 1	C: 23441 1
13,3250	I: 77624 1	C: 22375 0	I: 43345 1	C: 01551 1	C: 01517 0	C: 35517 1	C: 27200 0	I: 43014 0
13,3260	C: 04752 0	C: 27264 1	C: 01632 1	C: 27225 1	I: 73001 1	C: 00013 0	C: 02030 0	I: 51575 1
13,3270	C: 01535 0	I: 43006 0	C: 00262 1	I: 50025 0	C: 53755 0	C: 27300 1	I: 77614 1	C: 00062 0
13,3300	I: 41345 0	C: 00013 0	C: 00043 0	I: 55762 1	C: 51770 0	I: 41366 1	C: 25752 0	I: 40442 1
13,3310	I: 54345 1	C: 00155 0	C: 20220 0	I: 40006 0	C: 27341 1	I: 50021 1	C: 27413 1	C: 27341 1
13,3320	I: 45345 1	C: 01116 0	C: 01517 0	I: 54004 0	C: 21612 1	C: 20211 1	C: 02076 1	I: 51400 1
13,3330	C: 27245 0	I: 50025 0	C: 00015 0	C: 27351 0	I: 75345 1	C: 00015 0	C: 02076 1	C: 36076 0
13,3340	C: 27351 0	I: 65345 0	C: 27413 1	I: 77650 1	C: 27320 0	I: 77634 0	C: 21712 0	C: 36076 0
13,3350	C: 27334 0	I: 51545 1	C: 02076 1	I: 50025 0	C: 27411 0	C: 27157 1	I: 45135 1	C: 01012 0
13,3360	C: 27363 1	I: 77650 1	C: 23252 0	I: 77614 1	C: 01707 0	C: 23252 0	I: 45345 1	C: 02076 1
13,3370	C: 00015 0	I: 43040 1	C: 27157 1	C: 04242 1	C: 23252 0	I: 45345 1	C: 01116 0	C: 01517 0

OCTAL LISTING FOR PARAGRAPH # 077, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "Q" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

13,3400	I: 77640 0	C: 27225 1	I: 40525 1	C: 02076 1	I: 44322 1	I: 52040 1	C: 27225 1	C: 23252 0
13,3410	C: 00000 1	C: 01400 1	C: 14152 1	C: 00000 1	I: 77776 1	30106 0	73466 1	00006 1
13,3420	13460 1	33465 0	05133 0	I: 77776 1	13445 0	40106 1	74745 1	10000 0
13,3430	03445 1	50120 1	00052 0	55055 1	05353 1	C: 04022 0	31055 0	50120 1
13,3440	54052 1	34745 0	70106 1	00006 1	13463 1	33465 0	00004 0	05137 1
13,3450	10064 1	13445 0	C: 00051 0	43466 1	70106 1	54106 1	00003 1	13463 1
13,3460	34736 1	00004 0	70106 1	06037 0	I: 77516 0	C: 27415 1	C: 20100 1	I: 43020 1
13,3470	C: 02772 1	C: 02715 0	C: 27536 1	I: 77614 1	C: 01711 1	C: 27536 1	I: 45145 0	C: 01235 1
13,3500	C: 27414 0	I: 45014 0	C: 01474 1	C: 26644 0	C: 34041 0	C: 27134 1	I: 45174 1	C: 00002 0
13,3510	C: 27414 0	I: 77014 1	C: 04304 1	C: 27515 0	C: 00000 1	I: 53775 1	C: 01221 1	C: 57176 0
13,3520	C: 01503 0	C: 15535 0	C: 01235 1	C: 25517 0	C: 01227 1	I: 45057 1	C: 57176 0	C: 23455 1
13,3530	I: 66234 1	C: 26747 1	C: 03463 0	C: 00000 1	I: 77650 1	C: 47226 1	I: 45145 0	C: 01235 1
13,3540	C: 27414 0	I: 43014 0	C: 01476 0	C: 04476 0	I: 43014 0	C: 01475 0	C: 01674 0	C: 34041 0
13,3550	C: 27134 1	I: 77650 1	C: 27476 1	I: 43020 1	C: 03744 0	C: 04634 1	C: 27572 1	I: 43020 1
13,3560	C: 03744 0	C: 04474 1	I: 43234 0	C: 21573 0	C: 27674 1	I: 51021 0	C: 00041 1	C: 27576 0
13,3570	I: 77624 1	C: 27662 0	I: 43234 0	C: 21573 0	C: 27674 1	C: 00041 1	I: 77624 1	C: 27414 0
13,3600	I: 45014 0	C: 01676 1	C: 26066 0	I: 43014 0	C: 01673 1	C: 04475 0	I: 77624 1	C: 27134 1
13,3610	I: 77214 0	C: 04675 1	C: 00001 0	C: 27545 0	C: 00007 0	C: 17553 1	C: 00015 0	C: 03561 0
13,3620	I: 66134 1	C: 02777 1	C: 02776 0	I: 77776 1	00004 0	00006 1	40025 1	20155 1
13,3630	07257 0	31744 1	04640 1	I: 47014 1	C: 04754 0	C: 27652 0	C: 21573 0	I: 44215 1
13,3640	C: 27674 1	C: 01116 0	I: 45044 0	C: 27257 1	C: 27662 0	I: 43234 0	C: 21573 0	C: 27674 1
13,3650	C: 35116 1	C: 27257 1	I: 45345 1	C: 01116 0	C: 01517 0	I: 45246 0	C: 27672 1	I: 52040 1
13,3660	C: 27157 1	C: 27645 0	I: 77414 0	C: 04674 0	25744 1	05567 0	C: 01703 1	06037 0
13,3670	I: 77616 0	C: 00000 1	C: 00003 1	C: 00000 1	C: 03720 1	C: 77764 1	C: 77775 1	C: 77766 0
13,3700	C: 77771 0	C: 77775 1	C: 77775 1	C: 00000 1	C: 77763 0	C: 77766 0	C: 77773 1	C: 77770 1
13,3710	C: 77771 0	C: 24000 1	C: 00000 1	C: 74631 0	C: 63145 1	C: 00243 1	C: 32703 1	C: 03654 0
13,3720	C: 21000 1	C: 03654 0	C: 21000 1	C: 04627 0	C: 25200 1	I: 71214 0	C: 00343 0	C: 23232 0
13,3730	C: 00017 1	I: 77716 1	I: 63525 0	C: 00021 1	I: 77625 0	I: 74205 0	C: 27712 0	C: 00017 1
13,3740	I: 65332 0	C: 00017 1	I: 43342 0	C: 00003 1	C: 14003 1	C: 00021 1	I: 44342 1	C: 00005 1
13,3750	C: 00005 1	I: 74335 1	C: 01353 0	I: 43525 1	C: 00023 0	44747 0	70077 0	54077 0
13,3760	44745 1	70106 1	54106 1	44753 0	70076 1	54076 1	00002 0	C: 03767 1
13,3770	C: 03770 1	CKSM 21126 1	Q	Q	Q	Q	Q	Q

TOTAL LISTING FOR PARAGRAPH # 100, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

14,2000	C: 25723 0	C: 00450 0	C: 00065 1	C: 01265 1	C: 00302 0	C: 24533 1	C: 00052 0	C: 04047 0
14,2010	C: 15262 0	C: 21773 1	C: 74130 0	C: 42420 1	C: 70033 0	C: 41533 1	C: 15014 0	C: 04650 0
14,2020	C: 67057 1	C: 60150 0	C: 02551 1	C: 15723 0	C: 07210 0	C: 01664 1	C: 67276 0	C: 62232 0
14,2030	C: 13262 0	C: 00563 1	C: 05076 0	C: 35561 0	C: 70716 0	C: 40260 1	C: 62466 1	C: 64656 0
14,2040	C: 10652 1	C: 04246 0	C: 63235 0	C: 44200 0	C: 73710 0	C: 66230 0	C: 07204 0	C: 33712 0
14,2050	C: 61747 1	C: 72343 0	C: 02343 1	C: 21362 0	C: 03237 1	C: 13301 1	C: 62030 0	C: 65332 0
14,2060	C: 70715 0	C: 71267 1	C: 01745 0	C: 06477 0	C: 63531 0	C: 75365 0	C: 12010 0	C: 03005 1
14,2070	C: 76146 0	C: 77014 1	C: 60371 1	C: 75073 1	C: 03370 0	C: 12003 1	C: 76125 0	C: 40037 1
14,2100	C: 72436 0	C: 77062 0	C: 61041 0	C: 54164 0	C: 72277 0	C: 51044 0	C: 62641 0	C: 45471 1
14,2110	C: 70711 1	C: 70546 1	C: 67364 1	C: 47073 0	C: 64425 0	C: 77777 0	C: 07157 0	C: 16322 0
14,2120	C: 63327 1	C: 64446 0	C: 67515 1	C: 55266 0	C: 05230 0	C: 25476 0	C: 64754 0	C: 72604 0
14,2130	C: 71235 0	C: 72553 1	C: 65427 0	C: 42171 0	C: 66546 0	C: 70765 1	C: 73260 1	C: 71643 0
14,2140	C: 14121 0	C: 30153 0	C: 61247 1	C: 73310 1	C: 72313 0	C: 41247 0	C: 74744 0	C: 44566 1
14,2150	C: 70606 0	C: 54564 1	C: 77153 0	C: 61536 0	C: 61601 1	C: 47046 0	C: 60604 0	C: 76224 1
14,2160	C: 77031 0	C: 73354 1	C: 73161 0	C: 63065 1	C: 60431 1	C: 51702 0	C: 00656 1	C: 33013 0
14,2170	C: 04044 0	C: 10627 0	C: 62164 0	C: 45040 1	C: 07325 1	C: 37443 0	C: 03267 1	C: 06626 0
14,2200	C: 65471 0	C: 50471 0	C: 11660 1	C: 04151 0	C: 75501 1	C: 46664 1	C: 70430 1	C: 46540 1
14,2210	C: 07507 1	C: 20100 1	C: 13727 1	C: 05455 0	C: 72160 0	C: 64202 0	C: 11144 0	C: 05203 0
14,2220	C: 64200 1	C: 65301 0	C: 71322 1	C: 41512 1	C: 16402 0	C: 16205 1	C: 01365 0	C: 04034 1
14,2230	C: 75054 1	C: 56052 0	C: 17030 1	C: 17635 1	C: 73321 0	C: 57603 0	C: 77010 0	C: 47623 0
14,2240	C: 11515 0	C: 01640 1	C: 63215 1	C: 52176 0	C: 02143 0	C: 26755 1	C: 12715 1	C: 31470 0
14,2250	C: 13401 0	C: 31222 1	C: 03157 1	C: 27504 0	C: 17402 1	C: 12312 1	C: 75552 1	C: 63657 0
14,2260	C: 05471 0	C: 06122 0	C: 16220 0	C: 16362 1	C: 04417 1	C: 32762 0	C: 06443 1	C: 12622 1
14,2270	C: 07766 1	C: 10237 0	C: 14154 1	C: 36154 1	C: 13200 1	C: 31553 0	C: 13244 1	C: 21036 1
14,2300	C: 01067 1	C: 23106 1	C: 10560 0	C: 27227 0	C: 10402 0	C: 00275 1	C: 65477 0	C: 77044 1
14,2310	C: 00153 0	C: 11212 0	C: 00377 1	C: 36275 1	C: 17777 0	C: 01417 1	C: 07674 0	C: 21771 0
14,2320	C: 03416 1	C: 07626 1	C: 62413 0	C: 57536 0	C: 07510 1	C: 06414 0	C: 01373 1	C: 06065 1
14,2330	C: 15735 1	C: 31531 1	C: 16745 0	C: 17555 1	C: 02615 1	C: 13716 0	C: 73010 1	C: 40311 0
14,2340	C: 15776 0	C: 34660 0	C: 00325 0	C: 26625 1	C: 07572 0	C: 05105 0	C: 15472 1	I: 45575 1
14,2350	C: 74515 0	I: 77775 1	C: 03537 0	C: 37254 0	C: 60721 0	I: 77634 0	C: 21573 0	I: 43225 0
14,2360	C: 01235 1	C: 03454 1	I: 77476 1	07257 0	35016 0	54093 0	00004 0	10155 1
14,2370	12373 0	12373 0	34755 1	64753 1	55644 1	05173 1	C: 02410 0	05353 1

DCTAL LISTING FOR PARAGRAPH # 101, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

14,2400	C: 47014 1	C: 76133 1	C: 02410 0	C: 30067 0	06037 0	I: 52014 0	C: 03470 1	C: 60451 1
14,2410	04674 0	C: 75551 1	25027 1	05105 0	C: 02424 1	C: 30067 0	05353 1	C: 07024 0
14,2420	C: 17000 1	C: 02424 1	C: 30067 0	15261 0	05504 0	C: 00214 0	32445 0	04616 1
14,2430	C: 20476 0	12434 1	12436 0	12426 1	04635 0	C: 61007 1	00004 0	04674 0
14,2440	C: 40153 1	04674 0	C: 40140 0	04635 0	C: 60777 0	C: 04077 0	I: 77620 0	C: 02746 0
14,2450	C: 35243 1	C: 26351 1	I: 70545 1	C: 01123 0	C: 16711 1	C: 01125 0	C: 16713 0	C: 01121 1
14,2460	C: 16707 0	I: 77776 1	32505 0	04616 1	C: 20476 0	16001 1	12479 1	12462 1
14,2470	06037 0	I: 72545 0	C: 02711 1	C: 15123 0	C: 02713 0	C: 15125 0	C: 02707 0	C: 15121 1
14,2500	C: 01243 0	I: 77624 1	C: 26422 1	I: 77650 1	C: 02746 0	C: 01531 1	I: 77620 0	C: 02745 0
14,2510	C: 37562 1	C: 33664 0	I: 77745 1	C: 02562 0	C: 34041 0	C: 27057 0	I: 61131 0	C: 00052 0
14,2520	C: 00000 1	C: 30543 0	I: 74375 0	C: 02723 0	C: 30001 0	I: 52372 0	C: 00001 0	I: 77656 1
14,2530	C: 26723 0	C: 00001 0	I: 57456 1	C: 16707 0	C: 30005 1	I: 77624 1	C: 30575 0	C: 14017 1
14,2540	C: 30504 0	C: 34023 1	C: 30570 0	I: 74375 0	C: 02723 0	C: 30007 0	I: 53445 1	C: 02715 0
14,2550	C: 26715 0	C: 02723 0	I: 53361 0	C: 30001 0	C: 00001 0	I: 57456 1	C: 26707 0	C: 00001 0
14,2560	I: 57456 1	C: 16723 0	C: 30003 1	I: 77624 1	C: 30575 0	C: 14023 0	C: 30604 0	C: 00017 1
14,2570	I: 77745 1	C: 30603 1	C: 00021 1	I: 77650 1	C: 02745 0	I: 70471 1	C: 00045 0	I: 43336 0
14,2600	C: 30610 0	I: 70546 1	I: 77616 0	C: 07760 1	C: 14473 1	C: 04000 0	C: 00000 1	C: 00343 0
14,2610	C: 21616 0	04645 1	55745 1	06037 0	I: 77624 1	C: 47537 0	I: 77624 1	C: 20030 0
14,2620	I: 77601 0	C: 00001 0	I: 71214 0	C: 01465 1	C: 24007 0	C: 26756 1	C: 02655 0	I: 63361 0
14,2630	C: 24005 1	C: 02701 0	I: 74370 0	C: 00344 1	C: 24005 1	I: 77655 1	I: 53505 1	C: 01734 0
14,2640	C: 02731 0	I: 56321 0	C: 00351 0	C: 00006 1	C: 00052 0	C: 00006 1	I: 52100 1	C: 30651 0
14,2650	C: 30766 0	I: 50373 0	C: 30347 1	C: 02731 0	I: 50025 0	C: 30765 0	C: 30646 0	I: 77754 1
14,2660	C: 00046 0	I: 52104 0	C: 30664 0	C: 30646 0	I: 50373 0	C: 47430 0	C: 02731 0	I: 50025 0
14,2670	C: 30765 0	C: 30661 0	I: 47773 1	C: 30347 1	C: 47430 0	I: 51025 1	C: 30763 0	C: 30661 0
14,2700	I: 45173 0	C: 30347 1	C: 30740 1	I: 77614 1	C: 01710 0	C: 30646 0	I: 45173 0	C: 47430 0
14,2710	C: 30740 1	I: 77614 1	C: 01710 0	C: 30661 0	I: 77614 1	C: 01605 0	C: 30733 0	I: 65120 1
14,2720	C: 02755 1	C: 02756 1	I: 47773 1	C: 30347 1	C: 47430 0	I: 43006 0	C: 01545 1	C: 30717 0
14,2730	I: 45345 1	I: 77644 1	C: 30661 0	I: 67130 1	C: 02755 1	C: 02756 1	I: 77650 1	C: 30661 0
14,2740	I: 51321 0	C: 02707 0	C: 00017 1	I: 77654 0	C: 30757 1	I: 75240 0	C: 30757 1	C: 00160 0
14,2750	I: 75240 0	C: 30757 1	C: 00162 1	I: 43040 1	C: 30757 1	C: 01630 0	C: 00052 0	I: 77614 1
14,2760	C: 01430 1	C: 00052 0	C: 05110 1	C: 35052 0	C: 05110 1	C: 35052 0	I: 77414 0	C: 01745 0
14,2770	C: 30772 0	03013 0	I: 73150 1	C: 02755 1	C: 02756 1	I: 47775 1	C: 02731 0	C: 30347 1

DOTAL LISTING FOR PARAGRAPH # 102, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

14,3000	I: 47715 1	C: 02751 0	C: 47430 0	I: 77625 0	I: 66044 1	C: 31011 0	C: 02756 1	I: 77734 1
14,3010	C: 02755 1	I: 77776 1	25745 0	31745 0	04622 0	I: 77620 0	C: 02746 0	I: 77776 1
14,3020	05353 1	C: 04024 0	34761 0	04616 1	C: 20623 1	06001 0	03030 1	03053 1
14,3030	05037 0	I: 43234 0	C: 21573 0	C: 31163 1	I: 77624 1	C: 30506 1	I: 77776 1	04616 1
14,3040	C: 30611 1	03043 0	03053 1	05567 0	C: 00405 0	35006 1	04616 1	C: 20476 0
14,3050	05001 0	03053 1	03022 1	34755 1	55757 1	06037 0	I: 77776 1	05353 1
14,3060	C: 04024 0	06037 0	I: 77524 1	C: 31670 1	I: 77776 1	04616 1	C: 16000 0	04616 1
14,3070	C: 17712 0	05711 0	11757 1	13075 1	03145 1	06037 0	I: 77775 1	C: 02715 0
14,3100	C: 02767 0	I: 77776 1	05353 1	C: 04024 0	06037 0	I: 45145 0	C: 03562 0	C: 32472 1
14,3110	I: 53521 1	C: 01734 0	C: 26715 0	C: 03554 0	I: 53521 1	C: 01734 0	C: 26707 0	C: 02761 0
14,3120	C: 24007 0	C: 02767 0	C: 34015 1	C: 31256 1	I: 45014 0	C: 00354 0	C: 31134 0	C: 47441 0
14,3130	I: 77524 1	C: 31224 1	I: 77514 1	C: 01273 0	I: 77776 1	35751 1	04616 1	C: 20623 1
14,3140	06001 0	03022 1	06037 0	I: 77650 1	C: 02746 0	06037 0	I: 77775 1	C: 02715 0
14,3150	C: 02761 0	I: 45145 0	C: 03562 0	C: 32472 1	C: 03554 0	I: 77731 1	C: 02760 1	C: 00001 0
14,3160	I: 77650 1	C: 31056 0	C: 00002 0	C: 06240 1	I: 45020 1	C: 02746 0	C: 47247 0	I: 43014 0
14,3170	C: 01260 1	C: 01662 1	I: 77776 1	35223 1	04616 1	C: 20451 0	33255 0	04616 1
14,3200	C: 17323 0	04616 1	C: 17716 1	05711 0	05353 1	C: 04024 0	06037 0	I: 75160 1
14,3210	C: 03606 1	C: 01733 1	I: 77624 1	C: 31377 0	I: 43014 0	C: 01273 0	C: 01462 0	I: 77624 1
14,3220	C: 31602 1	I: 77650 1	C: 31134 0	C: 04024 0	I: 77620 0	C: 02745 0	I: 77624 1	C: 47247 0
14,3230	I: 77776 1	33254 1	04616 1	C: 20476 0	06001 0	03237 1	03251 1	05353 1
14,3240	C: 00214 0	33255 0	04616 1	C: 17323 0	04616 1	C: 17716 1	05711 0	05353 1
14,3250	C: 04024 0	06037 0	I: 77650 1	C: 02745 0	C: 01535 0	C: 02737 0	I: 43020 1	C: 02745 0
14,3260	C: 00074 1	I: 77760 0	C: 02706 1	I: 47773 1	C: 00001 0	C: 00007 0	I: 65552 0	C: 00025 0
14,3270	I: 43014 0	C: 00354 0	C: 31302 1	C: 00174 0	I: 71360 1	C: 00006 1	C: 00025 0	C: 00023 0
14,3300	I: 77650 1	C: 31263 1	I: 45345 1	C: 00025 0	C: 00023 0	I: 47046 0	C: 21612 1	C: 01046 1
14,3310	I: 77414 0	C: 00074 1	33326 0	04616 1	C: 20476 0	16001 1	03323 0	06037 0
14,3320	I: 52014 0	C: 00274 0	C: 02745 0	06037 0	I: 77650 1	C: 02745 0	C: 01405 1	I: 77624 1
14,3330	C: 31617 0	I: 56234 1	C: 31413 0	C: 00051 0	C: 00001 0	I: 40370 1	C: 00003 1	C: 00005 1
14,3340	I: 70543 1	C: 00325 0	I: 70523 1	C: 00005 1	I: 51425 0	I: 45206 1	C: 31412 1	I: 71240 1
14,3350	C: 31366 0	I: 51025 1	C: 31413 0	C: 31366 0	I: 77776 1	05353 1	C: 04024 0	06037 0
14,3360	I: 77524 1	C: 31565 0	I: 77524 1	C: 31602 1	I: 77650 1	C: 31370 1	I: 77700 0	C: 31340 1
14,3370	I: 75160 1	C: 02642 0	C: 01733 1	I: 77624 1	C: 31377 0	I: 77650 1	C: 32161 0	I: 77773 1

ACTUAL LISTING FOR PARAGRAPH # 103, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

14,3400	C: 00001 0	C: 10001 1	I: 77773 1	C: 00007 0	C: 10007 1	I: 77773 1	C: 00015 0	C: 10015 1
14,3410	I: 77616 0	C: 00055 1	C: 37722 1	00004 0	30032 0	50120 1	54001 1	30033 1
14,3420	50120 1	54002 1	30034 0	50120 1	54003 0	00003 1	06061 0	04616 1
14,3430	C: 33652 0	34761 0	04616 1	C: 20623 1	06001 0	13461 0	05353 1	C: 04024 0
14,3440	34755 1	54321 0	54322 0	54323 1	35010 0	04616 1	C: 20446 0	33564 0
14,3450	04616 1	C: 20446 0	06037 0	I: 77624 1	C: 31565 0	I: 77776 1	05353 1	C: 04024 0
14,3460	13431 0	05353 1	C: 00014 1	06037 0	I: 77624 1	C: 31602 1	I: 40331 1	C: 02760 1
14,3470	C: 00000 1	C: 00001 0	I: 77776 1	05353 1	C: 04024 0	04616 1	C: 16000 0	04616 1
14,3500	C: 17712 0	05711 0	11757 1	13511 0	06037 0	I: 77775 1	C: 02715 0	C: 02761 0
14,3510	I: 77776 1	05353 1	C: 04024 0	11757 1	13530 0	05353 1	C: 04024 0	06037 0
14,3520	I: 45145 0	C: 03562 0	C: 32472 1	C: 03554 0	I: 77776 1	34753 1	55757 1	13473 0
14,3530	05353 1	C: 04024 0	06037 0	I: 45145 0	C: 03562 0	C: 32472 1	C: 24015 0	C: 03554 0
14,3540	C: 24007 0	C: 02761 0	C: 26707 0	C: 02767 0	C: 36715 1	C: 31256 1	I: 77414 0	C: 00314 1
14,3550	C: 31552 1	03431 1	I: 77624 1	C: 47441 0	I: 75160 1	C: 02664 1	C: 01733 1	I: 77624 1
14,3560	C: 31377 0	I: 77414 0	C: 01462 0	06001 0	C: 12200 0	I: 77776 1	04616 1	C: 17000 1
14,3570	04616 1	C: 17716 1	05711 0	04616 1	C: 17210 1	04616 1	C: 17716 1	05711 0
14,3600	06037 0	I: 77616 0	I: 77776 1	30025 0	55075 0	44755 0	54037 1	54040 1
14,3610	54041 0	06037 0	I: 77775 1	C: 24007 0	C: 01472 1	I: 43414 1	C: 01060 0	I: 45020 1
14,3620	C: 02746 0	C: 47537 0	I: 77624 1	C: 20030 0	I: 66370 0	C: 00022 1	C: 00051 0	C: 00006 1
14,3630	I: 61373 1	C: 02707 0	C: 01734 0	I: 77656 1	C: 06707 1	I: 77700 0	C: 31630 0	I: 75160 1
14,3640	C: 03606 1	C: 02642 0	I: 77624 1	C: 31377 0	I: 77624 1	C: 47353 1	I: 77650 1	C: 02746 0
14,3650	I: 77620 0	C: 02746 0	C: 34041 0	C: 27100 0	I: 53575 0	C: 00001 0	C: 27607 0	C: 00007 0
14,3660	I: 53425 0	C: 00001 0	C: 27615 0	C: 03607 0	I: 53435 0	C: 03615 0	C: 37623 1	C: 02746 0
14,3670	I: 77420 1	C: 03665 1	51757 0	31755 1	00006 1	73771 1	64744 1	54735 1
14,3700	33772 0	04616 1	C: 20476 0	06001 0	13706 1	13700 1	05516 0	C: 00124 0
14,3710	30735 0	77744 0	00306 1	74743 1	54001 1	00006 1	63734 1	65660 1
14,3720	00006 1	13734 0	35016 0	54003 0	50001 0	31403 1	54001 1	35014 1
14,3730	54003 0	34737 0	56001 0	13744 1	33773 1	04616 1	C: 20476 0	06001 0
14,3740	13742 1	13734 0	00006 1	31350 0	50120 1	52011 0	06037 0	I: 77624 1
14,3750	C: 10536 0	I: 45034 1	C: 21573 0	C: 32472 1	I: 53521 1	C: 01734 0	C: 03773 1	I: 77776 1
14,3760	04616 1	C: 54113 0	77744 1	70735 1	00005 1	13700 1	06037 0	I: 77650 1
14,3770	C: 03665 1	C: 05253 0	C: 00306 1	C: 01527 0	C: 03774 0	C: 03775 1	CKSM-56616 0	@

OBJECT LISTING FOR PARAGRAPH # 104, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

15,2000	I: 77773 1	C: 00001 0	C: 00767 1	I: 47133 0	C: 00002 0	C: 21576 0	C: 00031 0	I: 77654 0
15,2010	C: 15171 1	I: 71406 0	I: 73525 1	I: 65361 0	C: 00023 0	I: 52361 1	C: 00015 0	I: 47256 0
15,2020	C: 03765 0	I: 41456 0	I: 47133 0	C: 00004 0	C: 21576 0	C: 00033 1	I: 43225 0	C: 00031 0
15,2030	C: 32047 0	I: 77605 1	C: 32466 1	C: 00033 1	I: 74356 1	I: 65372 1	C: 00033 1	I: 74346 0
15,2040	C: 03765 0	I: 53372 1	I: 45056 0	C: 47664 0	C: 34031 1	C: 16276 0	C: 37777 1	C: 37775 0
15,2050	04616 1	C: 11254 1	34750 1	70076 1	10000 0	02060 0	34752 0	02061 1
15,2060	34753 1	55145 1	34753 1	04616 1	C: 20713 0	06001 0	12073 0	02062 1
15,2070	05353 1	C: 00014 1	05155 0	31145 0	76245 0	50000 1	02077 0	12105 0
15,2100	12153 0	12110 1	06037 0	I: 77650 1	C: 32164 0	00006 1	31401 0	12112 0
15,2110	00006 1	34755 1	53046 0	32170 0	04616 1	C: 20476 0	06001 0	02121 1
15,2120	02113 0	53046 0	00006 1	62125 0	12127 0	00006 1	30025 0	53775 1
15,2130	31145 0	74752 1	10000 0	02137 0	06037 0	I: 77650 1	C: 32220 0	06037 0
15,2140	I: 45145 0	C: 02775 0	C: 31650 0	I: 77624 1	C: 31617 0	I: 77776 1	35010 0	04616 1
15,2150	C: 20476 0	06001 0	12171 0	06037 0	I: 77650 1	C: 32143 0	06037 0	I: 77624 1
15,2160	C: 31327 0	I: 43014 0	C: 01462 0	C: 01273 0	I: 77624 1	C: 31015 1	I: 77776 1	06001 0
15,2170	C: 01442 1	32217 1	04616 1	C: 20623 1	16001 1	12156 0	06037 0	I: 64375 1
15,2200	C: 03607 0	C: 01734 0	I: 77656 1	C: 26665 0	C: 03615 0	I: 53521 1	C: 01734 0	C: 26673 1
15,2210	C: 03623 0	I: 53521 1	C: 01734 0	C: 36701 1	C: 31164 0	I: 77650 1	C: 32166 1	C: 00013 0
15,2220	I: 43014 0	C: 01463 1	C: 00562 0	I: 77201 1	C: 00001 0	C: 02023 1	I: 41525 0	C: 02775 0
15,2230	C: 35401 1	C: 55715 1	I: 77742 0	C: 16032 1	C: 02775 0	I: 77624 1	C: 30446 1	I: 53575 0
15,2240	C: 02032 1	C: 37607 1	C: 11013 0	I: 77650 1	C: 32143 0	40077 0	74737 1	10000 0
15,2250	12455 0	32463 1	04616 1	C: 20476 0	06001 0	12257 1	12245 1	47744 0
15,2260	70735 1	00006 1	76242 1	56001 0	51757 0	55755 0	50120 1	54046 1
15,2270	00006 1	12455 0	40000 0	62561 1	00006 1	62455 1	06037 0	I: 64373 1
15,2300	C: 30347 1	C: 01734 0	I: 45056 0	C: 47646 0	C: 02731 0	I: 77776 1	34753 1	55242 0
15,2310	35016 0	54003 0	51242 1	31403 1	54001 1	35014 1	54003 0	34737 0
15,2320	56001 0	55745 1	50120 1	52011 0	06037 0	I: 77624 1	C: 10536 0	I: 50375 0
15,2330	C: 02731 0	C: 03765 0	I: 65552 0	C: 00031 0	I: 51025 1	C: 32466 1	C: 32420 0	I: 45345 1
15,2340	C: 00031 0	C: 32470 0	I: 71240 1	C: 32413 0	C: 00031 0	I: 42405 0	C: 25764 0	C: 24031 0
15,2350	C: 03765 0	I: 53435 0	C: 24005 1	I: 47206 0	C: 03765 0	I: 77676 0	I: 63256 0	C: 03765 0
15,2360	I: 53435 0	C: 02731 0	I: 50206 0	C: 00001 0	I: 65552 0	C: 24033 1	I: 77641 1	I: 71244 0
15,2370	C: 32375 1	C: 32047 0	I: 77625 0	C: 00033 1	C: 00033 1	I: 70535 0	C: 02746 0	I: 41415 1

OCTAL LISTING FOR PARAGRAPH # 105, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

15,2400	C: 00033 1	I: 77634 0	C: 21614 1	C: 15237 0	C: 00031 0	I: 77615 0	I: 77634 0	C: 21614 1
15,2410	C: 01241 1	I: 77776 1	12437 1	I: 77776 1	34755 1	55236 0	55240 1	12437 1
15,2420	I: 77776 1	25242 1	41242 0	64757 0	00006 1	62427 1	12310 0	05567 0
15,2430	C: 00404 1	35006 1	04616 1	C: 20476 0	16001 1	12455 0	12245 1	32464 0
15,2440	04616 1	C: 20476 0	16001 1	12445 1	12245 1	34757 0	71242 0	00006 1
15,2450	74745 1	47744 0	70735 1	60001 0	54735 1	04616 1	C: 16000 0	04616 1
15,2460	C: 17712 0	05711 0	16054 1	C: 00306 1	C: 01517 0	C: 02525 1	C: 12525 0	C: 00026 0
15,2470	C: 30131 1	C: 12525 0	C: 27562 0	C: 24007 0	C: 02707 0	I: 77420 1	C: 02736 1	47744 0
15,2500	70735 1	00006 1	76242 1	56001 0	51757 0	55755 0	10000 0	12523 0
15,2510	32562 1	04616 1	C: 20476 0	02510 1	02516 1	02510 1	06037 0	I: 53575 0
15,2520	C: 02707 0	I: 77650 1	C: 02736 1	40000 0	62561 1	00006 1	62537 1	51757 0
15,2530	31755 1	50120 1	54046 1	06037 0	I: 52173 0	C: 30347 1	C: 02736 1	06037 0
15,2540	I: 45145 0	C: 03562 0	C: 30506 1	I: 77340 0	C: 02757 0	C: 02707 0	C: 24001 0	C: 02715 0
15,2550	C: 26707 0	C: 00001 0	C: 02715 0	I: 70143 0	C: 02756 1	C: 00154 1	I: 52173 0	C: 02343 1
15,2560	C: 02736 1	C: 00343 0	C: 01530 0	32772 1	54321 0	40000 0	54322 0	32773 0
15,2570	54323 1	06037 0	I: 45014 0	C: 01662 1	C: 32670 1	I: 66370 0	C: 00022 1	C: 00051 0
15,2600	C: 00006 1	I: 77744 0	C: 00050 1	I: 45173 0	C: 54000 0	C: 47673 0	C: 06707 1	I: 77775 1
15,2610	C: 02731 0	I: 73744 1	C: 00047 1	C: 75040 1	I: 71152 1	C: 00047 1	I: 63047 1	C: 54000 0
15,2620	C: 00002 0	C: 06665 1	I: 45100 1	C: 32603 0	C: 47353 1	I: 74575 0	C: 02715 0	C: 36723 1
15,2630	C: 32670 1	I: 74575 0	C: 02715 0	I: 53455 0	C: 02723 0	C: 02761 0	I: 77641 1	C: 02231 0
15,2640	I: 65552 0	C: 01045 1	I: 77776 1	05516 0	C: 00014 1	32771 1	04616 1	C: 20476 0
15,2650	06001 0	12654 0	05504 0	C: 00014 1	05353 1	C: 04024 0	06037 0	I: 77775 1
15,2660	C: 02761 0	C: 02231 0	I: 77776 1	34751 0	70074 0	10000 0	12563 1	13553 0
15,2670	I: 77220 1	C: 02745 0	C: 24007 0	C: 02707 0	I: 77776 1	05353 1	C: 04024 0	04616 1
15,2700	C: 17000 1	04616 1	C: 17716 1	05711 0	04616 1	C: 17210 1	04616 1	C: 17716 1
15,2710	05711 0	32770 0	55738 0	377 6 0	55075 0	04616 1	C: 15701 0	05353 1
15,2720	C: 04024 0	04616 1	C: 77544 1	06037 0	I: 77776 1	35000 1	05173 1	C: 02731 0
15,2730	05155 0	04674 0	C: 77544 1	35023 0	05105 0	C: 02740 0	C: 32065 0	05261 1
15,2740	04616 1	C: 15262 1	25736 1	06037 0	I: 53375 0	C: 00325 0	C: 02707 0	C: 02707 0
15,2750	I: 50135 0	C: 02737 0	C: 32724 1	I: 53575 0	C: 02707 0	C: 36731 1	C: 47537 0	I: 77624 1
15,2760	C: 47671 1	C: 02715 0	I: 77776 1	05353 1	C: 04024 0	06037 0	I: 77650 1	C: 02745 0
15,2770	C: 77753 0	C: 01464 0	C: 07357 1	C: 06211 0	I: 71220 1	C: 02745 0	C: 00322 1	I: 65325 0

OBJECT LISTING FOR PARAGRAPH # 106. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

15,3000	C: 00324 1	C: 00323 0	I: 77565 1	C: 24767 1	C: 24005 1	I: 77624 1	C: 47564 0	C: 25707 0
15,3010	C: 24003 1	I: 77624 1	C: 47573 0	C: 36715 1	C: 47537 0	I: 77624 1	C: 20030 0	I: 77775 1
15,3020	C: 02665 0	C: 24007 0	C: 02673 1	C: 34015 1	C: 47441 0	I: 77624 1	C: 47247 0	I: 77776 1
15,3030	04616 1	C: 17210 1	04616 1	C: 17716 1	05711 0	33044 1	04616 1	C: 17323 0
15,3040	04616 1	C: 17716 1	05711 0	12765 0	C: 02737 0	34755 1	13050 0	34753 1
15,3050	55757 1	05353 1	C: 04024 0	12245 1	31757 0	00006 1	13067 1	05353 1
15,3060	C: 04024 0	06037 0	I: 45145 0	C: 03562 0	C: 32472 1	C: 36731 1	C: 33101 1	06037 0
15,3070	I: 77775 1	C: 02715 0	C: 02761 0	I: 45145 0	C: 03562 0	C: 32472 1	C: 02723 0	I: 77776 1
15,3100	13047 0	I: 77131 1	C: 00052 0	C: 00006 1	C: 00014 1	I: 64373 1	C: 75040 1	C: 03607 0
15,3110	I: 77656 1	C: 12723 1	I: 77773 1	C: 75002 1	C: 10023 1	I: 43104 0	C: 33105 0	C: 04315 1
15,3120	C: 33126 1	I: 77624 1	C: 31256 1	I: 77614 1	C: 00354 0	C: 33206 0	I: 77624 1	C: 47441 0
15,3130	I: 77624 1	C: 47247 0	I: 77776 1	34752 0	70104 0	10000 0	13145 0	33313 0
15,3140	04616 1	C: 20476 0	06001 0	13145 0	13207 0	06037 0	I: 40175 0	C: 02740 0
15,3150	C: 33151 1	C: 02750 1	I: 40141 1	C: 30610 0	C: 33254 1	I: 52131 0	C: 02746 0	C: 33161 1
15,3160	C: 33027 1	I: 77776 1	05353 1	C: 04024 0	06037 0	I: 75160 1	C: 03606 1	C: 01733 1
15,3170	I: 45014 0	C: 01462 0	C: 31377 0	I: 77776 1	11145 1	13177 1	13207 0	34752 0
15,3200	70104 0	10000 0	13561 1	06037 0	I: 77624 1	C: 33506 1	I: 77776 1	35751 1
15,3210	04616 1	C: 20623 1	16301 1	13561 1	44752 1	61145 0	00006 1	13221 1
15,3220	16001 1	05353 1	C: 04024 0	06037 0	I: 45175 0	C: 02231 0	C: 47661 0	I: 43105 1
15,3230	C: 01734 0	C: 01463 1	I: 51515 1	C: 02023 1	I: 45561 1	C: 75745 0	I: 47014 1	C: 00662 0
15,3240	C: 21573 0	I: 77624 1	C: 30446 1	C: 01221 1	I: 65352 0	C: 01243 0	I: 77606 1	C: 35235 0
15,3250	C: 51670 1	C: 02023 1	I: 77776 1	16001 1	I: 75160 1	C: 02634 1	C: 02642 0	I: 77624 1
15,3260	C: 31377 0	I: 77624 1	C: 47537 0	I: 77624 1	C: 20030 0	I: 77624 1	C: 47353 1	I: 77414 0
15,3270	C: 04355 0	C: 33303 1	35010 0	04616 1	C: 20476 0	06001 0	13300 0	13272 1
15,3300	05353 1	C: 04024 0	06037 0	I: 77624 1	C: 31565 0	I: 77624 1	C: 31602 1	I: 77624 1
15,3310	C: 32774 1	I: 77650 1	C: 33161 1	C: 01535 0	04616 1	C: 33652 0	36245 1	55145 1
15,3320	34753 1	04616 1	C: 20713 0	06001 0	13331 1	13320 1	05353 1	C: 00014 1
15,3330	05155 0	31145 0	76245 0	50000 1	13335 0	13350 0	13411 1	13320 1
15,3340	06037 0	I: 75160 1	C: 01733 1	C: 03606 1	I: 77624 1	C: 31377 0	I: 77650 1	C: 33410 1
15,3350	06037 0	I: 77745 1	C: 03442 0	C: 01046 1	I: 77776 1	32170 0	04616 1	C: 20476 0
15,3360	15001 1	13263 0	13355 0	06037 0	I: 65234 1	C: 21573 0	C: 01046 1	I: 65254 1
15,3370	C: 33400 0	I: 51025 1	C: 01046 1	C: 33400 0	I: 45545 1	C: 74335 1	C: 36775 1	C: 33402 1

OCTAL LISTING FOR PARAGRAPH # 107. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

15,3400	I: 45545 1	C: 75002 1	C: 34041 0	C: 27057 0	I: 53575 0	C: 00001 0	C: 37607 1	C: 11013 0
15,3410	I: 77776 1	34755 1	55145 1	55146 1	34737 0	70077 0	10000 0	34745 0
15,3420	27146 1	34753 1	70102 0	10000 0	34750 1	27146 1	34750 1	55144 0
15,3430	33651 0	04616 1	C: 20476 0	16001 1	13436 1	13430 1	34737 0	70077 0
15,3440	10000 0	13541 0	34753 1	70102 0	10000 0	13545 1	34752 0	71145 1
15,3450	10000 0	13545 1	05567 0	C: 00701 1	35006 1	04616 1	C: 20476 0	16001 1
15,3460	13430 1	13430 1	I: 40220 0	C: 02746 0	C: 00001 0	I: 77634 0	C: 21573 0	C: 27562 0
15,3470	C: 02723 0	I: 41525 0	C: 03562 0	I: 77624 1	C: 55716 1	C: 26723 0	C: 02731 0	I: 65201 1
15,3500	C: 00001 0	C: 03562 0	I: 45006 0	C: 55716 1	C: 36731 1	C: 02746 0	I: 45020 1	C: 02746 0
15,3510	C: 47537 0	I: 40234 0	C: 21573 0	C: 00001 0	C: 37562 1	C: 20030 0	I: 61375 1	C: 02673 1
15,3520	C: 01734 0	I: 65256 0	C: 03562 0	I: 45006 0	C: 51670 1	C: 26237 0	C: 02701 0	I: 53505 1
15,3530	C: 01734 0	I: 41525 0	C: 03562 0	I: 77624 1	C: 51670 1	C: 02245 0	I: 77614 1	C: 03036 1
15,3540	C: 02746 0	06037 0	I: 77624 1	C: 33506 1	I: 77776 1	05504 0	C: 00205 0	34753 1
15,3550	71145 1	10000 0	12563 1	05353 1	C: 04024 0	34753 1	70102 0	10000 0
15,3560	13575 1	05353 1	C: 04024 0	05516 0	C: 00205 0	36245 1	71145 1	50000 1
15,3570	13571 0	13575 1	13616 1	12634 1	13635 0	06037 0	I: 77775 1	C: 02237 0
15,3600	C: 26723 0	C: 02245 0	C: 36731 1	C: 47537 0	I: 77624 1	C: 20030 0	I: 77775 1	C: 02673 1
15,3610	C: 25761 0	C: 02701 0	C: 36767 1	C: 32462 1	I: 77650 1	C: 33101 1	06037 0	I: 53575 0
15,3620	C: 02023 1	C: 26723 0	C: 02245 0	C: 36731 1	C: 47537 0	I: 77624 1	C: 20030 0	I: 45175 0
15,3630	C: 02231 0	C: 47661 0	I: 77550 1	C: 33610 0	13045 1	06037 0	I: 53575 0	C: 02023 1
15,3640	C: 02723 0	C: 26731 0	C: 02231 0	I: 77624 1	C: 47661 0	C: 36761 1	C: 33462 1	I: 77776 1
15,3650	13047 0	C: 01206 1	41302 0	74743 1	10000 0	13661 1	05567 0	C: 00210 1
15,3660	06001 0	05504 0	C: 00007 0	04631 1	I: 54201 0	C: 00001 0	C: 20617 0	I: 56371 1
15,3670	C: 01707 0	C: 12024 1	C: 00031 0	I: 77170 1	C: 00000 1	C: 00000 1	I: 77614 1	C: 00274 0
15,3700	I: 77745 1	C: 12004 0	C: 00027 1	I: 40745 0	C: 00031 0	C: 12050 1	I: 42661 0	C: 20211 1
15,3710	C: 12046 0	I: 40756 1	C: 12044 1	I: 62015 1	C: 00027 1	C: 77771 0	C: 00027 1	I: 77614 1
15,3720	C: 00054 0	C: 33703 0	I: 40745 0	C: 00031 0	C: 65747 0	I: 42661 0	C: 20206 1	C: 65741 0
15,3730	I: 77625 0	C: 00027 1	C: 10021 0	I: 63135 0	C: 00050 1	C: 77775 1	I: 53015 0	C: 12026 0
15,3740	C: 33770 1	I: 77644 1	C: 33700 0	I: 45345 1	C: 00021 1	C: 00025 0	I: 65356 1	C: 00021 1
15,3750	I: 65356 1	C: 00021 1	I: 55546 0	I: 53521 1	C: 12002 0	C: 02723 0	I: 65345 0	C: 12004 0
15,3760	C: 00023 0	I: 65356 1	C: 00023 0	I: 55546 0	I: 53521 1	C: 12002 0	C: 02715 0	I: 77616 0
15,3770	I: 77745 1	C: 12004 0	C: 00027 1	I: 77650 1	C: 33722 0	I: 77616 0	C: 03776 1	CKSH 47112 0

OCTAL LISTING FOR PARAGRAPH # 110. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

16,2000	00006 1	00031 0	40000 0	74355 1	00006 1	12157 1	41303 1	74746 1
16,2010	10000 0	12206 0	41273 1	74751 1	27273 1	12163 0	34742 1	00006 1
16,2020	02030 0	10000 0	12157 1	00002 0	22016 0	00006 1	22012 1	31273 0
16,2030	74737 1	10000 0	12041 1	34737 0	27273 1	37715 0	05072 1	C: 02447 1
16,2040	C: 40106 1	02000 0	30111 0	74751 1	00006 1	12157 1	04674 0	C: 40153 1
16,2050	34755 1	55524 1	55525 0	55526 0	55421 0	55422 0	55423 1	55430 0
16,2060	55431 1	55432 1	55537 0	55540 0	55541 1	55542 1	55424 0	55425 1
16,2070	55501 0	55503 1	55545 0	55546 0	55510 0	55512 1	55502 0	55631 0
16,2100	55633 1	55632 0	55634 0	55460 0	55461 1	55767 1	55770 1	55771 0
16,2110	42202 1	71273 1	55273 1	00006 1	30033 1	53441 0	30034 0	55442 0
16,2120	41273 1	74740 1	27273 1	34751 0	55535 1	55536 1	34733 1	54031 1
16,2130	55466 0	55470 1	34755 1	55467 1	55471 0	55465 0	55472 0	55473 1
16,2140	55474 0	44363 1	55757 1	34752 0	55433 0	55434 1	55435 0	00006 1
16,2150	32205 1	53275 1	37727 1	54030 0	15270 0	C: 02024 0	C: 34106 1	04674 0
16,2160	C: 36626 0	04674 0	C: 35446 1	00006 1	32156 1	53275 1	34755 1	55472 0
16,2170	55473 1	55474 0	00006 1	01005 0	00006 1	01006 0	42203 0	00006 1
16,2200	03012 1	12152 1	C: 03021 1	C: 07400 1	C: 02213 0	C: 34106 1	00006 1	32212 1
16,2210	52006 0	C: 02226 0	C: 40106 1	37727 1	26030 0	22016 0	00006 1	22012 1
16,2220	11757 1	05634 0	C: 02000 0	02000 0	30032 0	55750 0	30033 1	55751 1
16,2230	30034 0	55752 1	21635 0	00006 1	21640 0	02256 1	55635 1	31636 0
16,2240	00006 1	21641 1	02256 1	55536 1	31637 1	00006 1	21642 1	02256 1
16,2250	55637 0	00006 1	27445 1	00006 1	27457 1	12647 1	10000 0	64753 1
16,2260	00002 0	40000 0	00002 0	00006 1	71741 0	21427 0	00006 1	31427 1
16,2270	53744 0	11426 1	12274 0	12304 0	62315 1	00006 1	62304 1	11426 1
16,2300	34733 1	00002 0	44733 0	00002 0	53427 0	00006 1	11750 0	00002 0
16,2310	54007 1	00002 0	50300 1	44734 1	00002 0	C: 77147 0	31737 0	00006 1
16,2320	71530 1	55745 1	31750 1	54001 1	00006 1	21440 1	23440 0	55737 1
16,2330	33620 0	55750 0	41745 1	00006 1	74736 0	27430 0	31746 0	61545 1
16,2340	00006 1	77736 0	27431 1	31747 1	61546 1	00006 1	77736 0	27432 1
16,2350	31751 0	54001 1	00006 1	21441 0	23441 1	55740 1	00006 1	71414 0
16,2360	61737 0	53427 0	02266 1	00006 1	61421 1	27430 0	02310 1	55430 0
16,2370	00006 1	31744 1	21447 0	41454 1	00006 1	73620 1	21447 0	31752 0

OCTAL LISTING FOR PARAGRAPH # 111. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

16,2400	54001 1	00006 1	21442 0	55741 0	23442 1	31415 0	00006 1	71740 1
16,2410	53427 0	31417 1	02263 1	00006 1	61422 1	27431 1	02310 1	55431 1
16,2420	00006 1	31744 1	21451 1	41455 0	00006 1	73620 1	21451 1	31416 0
16,2430	00006 1	71740 1	53427 0	31420 0	02263 1	00006 1	61423 0	27432 1
16,2440	02310 1	55432 1	00006 1	31744 1	21453 0	41456 0	00006 1	73620 1
16,2450	21453 0	30111 0	74737 1	00006 1	12462 1	00006 1	31405 1	53751 1
16,2460	31403 1	12466 0	00006 1	31410 0	53751 1	31406 1	55752 1	11430 0
16,2470	12472 0	12507 0	61752 0	00006 1	62507 1	22007 0	23430 1	34755 1
16,2500	00006 1	11433 0	27421 0	02310 1	55421 0	31750 1	55433 0	25433 1
16,2510	31745 0	27421 0	02310 1	55421 0	11431 1	12517 1	12544 1	61752 0
16,2520	00006 1	62544 0	22007 0	23431 0	34755 1	00006 1	11434 1	55737 1
16,2530	27422 0	02310 1	55422 0	31750 1	57434 0	61751 0	57737 0	00006 1
16,2540	74756 0	00006 1	11737 1	27537 0	25434 0	31746 0	61545 1	27422 0
16,2550	02310 1	55422 0	11432 1	12555 1	12602 0	61752 0	00006 1	62602 1
16,2560	22007 0	23432 0	34755 1	00006 1	11435 0	55740 1	27423 1	02310 1
16,2570	55423 1	31750 1	57435 1	61751 0	57740 0	00006 1	74756 0	00006 1
16,2600	11740 1	27541 1	25435 1	31747 1	61546 1	27423 1	02310 1	55423 1
16,2610	40111 1	74744 0	10000 0	12624 1	55424 0	55425 1	55545 0	55546 0
16,2620	55537 0	55541 1	12667 0	C: 00074 1	31510 1	00006 1	74766 0	21540 0
16,2630	31537 1	55424 0	00006 1	73616 1	55545 0	31512 0	00006 1	74766 0
16,2640	21542 1	31541 0	55425 1	00006 1	73616 1	55546 0	12667 0	34747 1
16,2650	71273 1	10000 0	03736 0	52011 0	53754 1	32666 0	56017 1	22012 1
16,2660	53756 0	32665 0	52016 1	53760 0	15275 0	C: 02667 1	13641 0	11632 0
16,2670	12710 1	12714 0	11634 0	12712 0	12724 0	00006 1	27767 1	00006 1
16,2700	27770 1	00006 1	27771 0	34740 0	71273 1	00006 1	12734 1	02740 0
16,2710	55632 0	12672 1	55634 0	12675 0	55501 0	55510 0	45007 1	00006 1
16,2720	03012 1	34735 1	55632 0	12672 1	55503 1	55512 1	45020 1	00006 1
16,2730	03012 1	34735 1	55634 0	12675 0	41273 1	74740 1	27273 1	13624 0
16,2740	00006 1	00031 0	40000 0	73613 1	00006 1	13014 0	00006 1	74745 1
16,2750	50000 1	33572 1	55744 0	36242 0	03551 0	46242 1	61743 0	00006 1
16,2760	13013 1	44756 0	61744 1	00006 1	63002 0	41743 1	64751 0	00006 1
16,2770	63013 0	05537 0	C: 02001 1	34752 1	23273 0	00006 1	06001 0	55273 1

OCTAL LISTING FOR PARAGRAPH # 112. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

16,3000	34755 1	13014 0	34753 1	23273 0	00006 1	06001 0	55273 1	74753 0
16,3010	64751 0	27744 0	12753 0	31741 1	55472 0	34737 0	00006 1	02031 1
16,3020	00006 1	13017 0	30111 0	74743 1	10000 0	13453 1	13071 0	34735 1
16,3030	70111 1	00006 1	13071 0	34755 1	55464 1	30032 0	55635 1	11460 0
16,3040	13054 1	34751 0	00006 1	02031 1	00006 1	13064 1	34750 1	00006 1
16,3050	02031 1	00006 1	13062 1	13442 1	00006 1	00031 0	40000 0	75751 0
16,3060	55460 0	13442 1	44363 1	13065 0	34363 0	55524 1	34753 1	55460 0
16,3070	13350 0	00006 1	00031 0	55443 1	74735 0	00006 1	13223 0	34740 0
16,3100	70111 1	00006 1	13463 1	34743 0	71273 1	00006 1	13120 0	34737 0
16,3110	00006 1	02031 1	00006 1	13220 0	45014 0	71273 1	55273 1	13220 0
16,3120	31273 0	74742 0	00006 1	13125 0	13220 0	31273 0	74741 0	00006 1
16,3130	13135 1	13220 0	C: 00001 0	C: 00050 1	C: 74777 0	C: 00056 1	44740 1	00004 0
16,3140	70111 1	54111 1	34737 0	00006 1	02031 1	00006 1	13152 0	30032 0
16,3150	55635 1	03154 1	04674 0	C: 40153 1	00003 1	13463 1	55464 1	34740 0
16,3160	25111 1	34755 1	55446 1	55447 0	55450 0	55451 1	55452 1	55453 0
16,3170	55454 1	55455 0	55456 0	54042 0	54044 0	33134 1	71273 1	55273 1
16,3200	41273 1	74743 1	27273 1	03205 0	13442 1	22044 1	30042 1	53463 0
16,3210	34755 1	54043 1	54042 0	54044 0	33617 1	00006 1	05013 0	00002 0
16,3220	34755 1	54043 1	13227 1	34740 0	70111 1	00006 1	13156 1	30032 0
16,3230	55635 1	10043 1	13235 1	13235 1	13235 1	60000 1	60000 1	63135 0
16,3240	00006 1	70043 1	30001 0	00006 1	71444 0	57454 0	40000 0	61454 0
16,3250	55737 1	03205 0	41454 1	61421 1	55427 0	11737 1	13261 0	13267 0
16,3260	13261 0	61476 0	00006 1	63267 1	33133 0	55445 1	03300 1	31273 0
16,3270	74742 0	00006 1	13274 1	03300 1	31446 0	55752 1	55464 1	03467 1
16,3300	30032 0	55635 1	34755 1	55446 1	55447 0	55464 1	11427 0	03312 1
16,3310	03312 1	03312 1	55737 1	61476 0	00006 1	63325 0	31445 0	00006 1
16,3320	63325 0	41273 1	74742 0	27273 1	13330 0	44742 0	71273 1	55273 1
16,3330	41427 0	00006 1	71551 0	20001 1	02310 1	00006 1	77716 1	55524 1
16,3340	31737 0	61475 0	00006 1	63346 0	36242 0	13355 0	31524 0	27524 1
16,3350	34747 1	70111 1	10000 0	34753 1	54751 0	55743 1	34753 1	54001 1
16,3360	11524 1	13366 0	13442 1	13365 0	13442 1	22007 0	64753 1	55737 1
16,3370	23744 1	03531 0	46242 1	61743 0	00006 1	13377 0	44752 1	64751 0

JCTAL LISTING FOR PARAGRAPH # 113, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

16,3400	55521 1	31741 1	05754 1	41737 1	63612 1	00006 1	63624 1	63572 1
16,3410	00006 1	63416 1	27727 1	51744 1	33621 1	55524 1	31737 0	22007 0
16,3420	00004 0	53471 0	04674 0	C: 37114 1	44740 1	71273 1	55273 1	03431 1
16,3430	13624 0	30111 0	54001 1	34747 1	00006 1	06001 0	54111 1	00003 1
16,3440	03002 0	03431 1	05753 0	34755 1	55524 1	13624 0	30033 1	00006 1
16,3450	21636 1	00006 1	71414 0	57752 0	30032 0	00006 1	21635 1	61277 1
16,3460	27752 1	57464 0	00002 0	03446 1	41643 0	61421 1	55427 0	44753 0
16,3470	55505 1	30111 0	74737 1	00006 1	13505 0	00004 0	04674 0	C: 43727 1
16,3500	31524 0	00006 1	13441 1	00003 1	13350 0	34755 1	55500 1	00004 0
16,3510	04674 0	C: 37252 0	00003 1	41741 0	63530 1	00006 1	63350 1	11524 1
16,3520	13522 0	13442 1	63527 1	00006 1	63350 1	36242 0	13355 0	C: 77377 1
16,3530	C: 75117 1	36242 0	55742 0	51743 0	33563 1	51744 1	73554 1	55741 0
16,3540	71263 0	10000 0	13544 0	00002 0	11742 0	13551 1	05567 0	C: 02003 0
16,3550	13442 1	55743 1	13532 1	12773 1	C: 00252 1	C: 00125 1	C: 00140 1	C: 00006 1
16,3560	C: 00220 1	C: 00011 1	C: 00151 1	C: 00146 1	C: 00226 1	C: 00231 1	C: 00151 1	C: 00132 1
16,3570	C: 00245 1	C: 00277 1	C: 77445 1	C: 00004 0	C: 00002 0	C: 07776 0	C: 00005 1	C: 00011 1
16,3600	C: 00012 1	C: 07776 0	C: 00003 1	C: 00010 0	C: 00007 0	C: 07776 0	C: 07776 0	C: 07776 0
16,3610	C: 07776 0	C: 07776 0	C: 00360 1	C: 07400 1	C: 00266 0	C: 74631 0	C: 06315 0	C: 00600 1
16,3620	C: 00632 0	C: 77751 1	C: 00026 0	C: 02734 0	41645 0	61423 0	02310 1	55437 1
16,3630	41644 1	61422 1	02310 1	55436 0	00006 1	33640 0	52006 0	C: 02072 0
16,3640	C: 36106 0	34752 0	55744 0	60000 1	54002 1	51744 1	11524 1	13651 1
16,3650	13670 1	63731 1	00006 1	63707 1	51744 1	11524 1	33731 1	13661 1
16,3660	43731 0	51744 1	27524 1	51744 1	11524 1	43615 1	13670 1	33615 0
16,3670	00006 1	51744 1	71521 1	30001 0	51744 1	55737 1	00006 1	74742 0
16,3700	00006 1	63732 1	50002 0	27513 0	11744 0	13642 0	13716 0	34755 1
16,3710	51744 1	57524 0	00006 1	74760 0	30001 0	13670 1	31740 0	61741 1
16,3720	00006 1	71532 0	55747 0	41741 0	61740 0	00006 1	71531 0	55746 1
16,3730	12316 0	C: 77537 0	40000 0	24002 0	13702 0	C: 07400 1	41501 0	00006 1
16,3740	71507 0	23510 1	41503 1	00006 1	71511 1	23512 0	11501 0	34742 1
16,3750	12752 0	34743 0	54066 0	11503 1	34740 0	13757 0	34741 1	26066 0
16,3760	43735 1	00006 1	02012 0	60066 1	00006 1	01012 0	44747 0	71273 1
16,3770	55273 1	00002 0	C: 03772 0	C: 03773 1	CKSM 10415 0	@	@	@

DATA LISTING FOR PARAGRAPH # 114. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

17,2000	35026 0	05072 1	C: 03241 0	C: 74067 0	05353 1	C: 00006 1	15261 0	00006 1
17,2010	32026 1	53253 0	04574 0	C: 62370 1	12022 1	34737 0	54055 0	34750 1
17,2020	00006 1	05014 1	05353 1	C: 00003 1	15261 0	C: 02462 0	C: 62067 1	10031 1
17,2030	00002 0	05705 0	02032 1	34733 1	00006 1	03013 0	34732 1	22007 0
17,2040	53471 0	53467 1	23465 1	54031 1	67725 0	54000 0	12052 0	34733 1
17,2050	54031 1	12063 1	34735 1	00006 1	05013 0	31466 1	67725 0	54000 0
17,2060	12063 1	34733 1	55466 0	50001 0	15753 1	22016 0	00006 1	22012 1
17,2070	02027 0	15270 0	34737 0	00006 1	02031 1	10000 0	12103 0	40111 1
17,2100	74740 1	00006 1	12104 1	02626 1	11631 0	12607 0	12574 1	34755 1
17,2110	55631 0	53437 1	03146 1	53427 0	34745 0	00006 1	02031 1	00006 1
17,2120	12146 1	34744 1	00006 1	02031 1	00006 1	12147 0	34746 0	70111 1
17,2130	10000 0	12146 1	55473 1	55474 0	40111 1	74744 0	00006 1	12144 0
17,2140	30106 0	74737 1	10000 0	34752 0	55500 1	12200 0	34753 1	64751 0
17,2150	55744 0	67745 0	55500 1	30111 0	74741 0	10000 0	12321 1	30111 0
17,2160	74742 0	10000 0	34753 1	64752 0	55743 1	03173 1	11741 0	12172 0
17,2170	05567 0	C: 02002 1	35774 0	71741 0	55473 1	45774 1	71741 0	55474 0
17,2200	34737 0	00006 1	02031 1	10000 0	12561 0	34735 1	70111 1	00006 1
17,2210	12323 0	00004 0	04674 0	C: 40153 1	34755 1	55450 0	55452 1	00003 1
17,2220	00006 1	00031 0	55737 1	11461 1	12246 1	31737 0	74753 0	00006 1
17,2230	12252 1	31737 0	74752 1	00006 1	12256 0	31737 0	74747 0	00006 1
17,2240	12262 1	31737 0	74746 1	00006 1	12264 1	13063 0	41737 1	72320 0
17,2250	55461 1	13063 0	33107 1	55525 0	43107 0	12266 0	43107 0	55525 0
17,2260	33107 1	12266 0	33107 1	12265 0	43107 0	55525 0	55526 0	32317 0
17,2270	55477 0	34753 1	55461 1	55505 1	30111 0	74737 1	00006 1	12307 0
17,2300	51505 0	11525 0	32316 1	12305 1	42316 0	51505 0	55525 0	30111 0
17,2310	74742 0	10000 0	34753 1	64752 0	55743 1	12727 0	C: 00140 1	C: 02273 0
17,2320	C: 00063 1	34751 0	12164 1	55633 1	44753 0	55631 0	34735 1	71443 1
17,2330	00006 1	12350 1	34740 0	70111 1	00006 1	12661 0	44743 1	71273 1
17,2340	55273 1	12345 0	C: 00050 1	C: 00001 0	C: 00056 1	34755 1	55462 1	55463 0
17,2350	11462 1	12354 0	12354 0	12354 0	60000 1	60000 1	62344 0	00006 1
17,2360	71462 1	30001 0	00006 1	71444 0	57455 1	40000 0	61455 1	55741 0
17,2370	11463 0	12374 1	12374 1	12374 1	60000 1	60000 1	62344 0	00006 1

OCTAL LISTING FOR PARAGRAPH # 115, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

17,2400	71463 0	30001 0	00006 1	71444 0	57456 1	40000 0	61456 1	55742 0
17,2410	41455 0	61422 1	55436 0	41456 0	61423 0	55437 1	53437 1	03146 1
17,2420	53427 0	11741 0	02425 0	02425 0	02425 0	61476 0	00006 1	62431 0
17,2430	12447 0	11742 0	02435 1	02435 1	02435 1	61476 0	00006 1	62441 1
17,2440	12447 0	31273 0	74741 0	00006 1	12446 1	12451 1	12661 0	32342 0
17,2450	55457 1	00004 0	04674 0	C: 40153 1	00003 1	34755 1	55450 0	55451 1
17,2460	55452 1	55453 0	11426 1	12466 0	12466 0	12466 0	61476 0	00006 1
17,2470	62504 1	11427 0	12475 1	12475 1	12475 1	61476 0	00006 1	62501 1
17,2500	12515 0	34755 1	55427 0	12515 0	11427 0	02510 1	02510 1	02510 1
17,2510	61476 0	00006 1	62524 0	34755 1	55426 1	31457 0	00006 1	62524 0
17,2520	41273 1	74741 0	27273 1	02527 0	44741 0	71273 1	55273 1	32573 1
17,2530	55477 0	34753 1	55505 1	34751 0	55743 1	51505 0	51535 0	12540 0
17,2540	34751 0	51505 0	55525 1	13005 0	51505 0	11426 1	34755 1	12551 0
17,2550	34753 1	51505 0	63722 0	50000 1	41571 1	00006 1	51505 0	71426 1
17,2560	54002 1	20001 1	60002 0	54000 0	12566 1	30002 0	51505 0	55525 0
17,2570	12727 0	34755 1	12566 1	C: 02532 1	34736 1	70111 1	10000 0	12107 1
17,2600	11502 0	12603 1	12107 1	00006 1	00005 1	10000 0	12612 1	00006 1
17,2610	32625 1	52006 0	11633 1	12615 0	12107 1	00004 0	04674 0	C: 43330 0
17,2620	00003 1	34755 1	55633 1	12107 1	C: 03077 1	C: 42106 0	30033 1	00006 1
17,2630	21636 1	55737 1	00006 1	71415 1	55752 1	30034 0	00006 1	21637 0
17,2640	55740 1	00006 1	71417 0	61300 0	61752 0	57450 1	31737 0	00006 1
17,2650	71416 1	55752 1	31740 0	00006 1	71420 1	61301 1	61752 0	57452 0
17,2660	00002 0	31452 0	22000 1	31450 1	03146 1	53752 1	33113 1	55477 0
17,2670	34753 1	55505 1	51505 0	51535 0	12675 0	34751 0	51505 0	55535 1
17,2700	13005 0	51505 0	31751 0	55752 1	51505 0	31426 0	55427 0	30111 0
17,2710	74737 1	10000 0	12715 1	03252 1	12727 0	40111 1	74736 0	10000 0
17,2720	55631 0	00004 0	04674 0	C: 43727 1	00003 1	34751 0	55743 1	30101 1
17,2730	74737 1	00006 1	12743 1	40106 1	74737 1	00006 1	12743 1	30111 0
17,2740	74744 0	00006 1	13063 0	34752 0	54001 1	51505 0	11525 0	12754 1
17,2750	12777 0	12753 0	12777 0	22007 0	64753 1	55737 1	31505 0	60001 0
17,2760	55744 0	31737 0	63110 1	00006 1	63010 0	03173 1	51505 0	33105 0
17,2770	54001 1	31741 1	00004 0	50001 0	05754 1	00003 1	13051 1	51505 0

OCTAL LISTING FOR PARAGRAPH # 116, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

17,3000	33105 0	00004 0	50000 1	05753 0	00003 1	11505 1	01477 1	13236 1
17,3010	41737 1	63107 1	00006 1	63032 0	27737 1	51505 0	11525 0	33107 1
17,3020	13022 0	43107 0	51505 0	55525 0	11500 1	13031 1	00006 1	00004 0
17,3030	74752 0	55745 1	03173 1	51505 0	33105 0	00004 0	55471 0	31741 1
17,3040	51471 1	05754 1	31737 0	55470 1	03114 0	00003 1	34755 1	51505 0
17,3050	55535 1	46245 0	61743 0	00006 1	63057 0	34752 0	13060 0	34753 1
17,3060	51505 0	55522 1	13005 0	34755 1	55525 0	55526 0	34751 0	00004 0
17,3070	57535 0	00005 1	13074 0	05757 1	34751 0	57536 0	00003 1	00006 1
17,3100	13236 1	00004 0	05770 1	00003 1	13236 1	C: 00004 0	C: 00015 0	C: 00026 0
17,3110	C: 77417 0	C: 00600 1	C: 00266 0	C: 02671 0	41470 1	60031 0	00006 1	63131 1
17,3120	23465 1	53467 1	53471 0	54031 1	23465 1	34735 1	00006 1	05013 0
17,3130	03002 0	61466 1	00006 1	63142 0	53467 0	53471 0	00006 1	60031 0
17,3140	53467 1	00002 0	40000 0	64754 0	55470 1	00002 0	23740 0	00006 1
17,3150	71627 1	57740 0	00006 1	71630 1	54001 1	61740 0	55737 1	13163 1
17,3160	50000 1	44734 1	55737 1	41740 1	60001 0	54007 1	13171 1	50000 1
17,3170	44734 1	23737 0	00002 0	51744 1	33225 1	51743 0	73231 0	55741 0
17,3200	71262 1	10000 0	13204 0	00002 0	36245 1	55743 1	51744 1	33225 1
17,3210	51743 0	73231 0	55741 0	71262 1	00006 1	13203 1	11743 1	13205 1
17,3220	51505 0	55525 0	05567 0	C: 02004 1	12777 0	C: 00110 1	C: 00022 1	C: 00204 1
17,3230	C: 00041 1	C: 00125 1	C: 00252 1	C: 00146 1	C: 00231 1	C: 00377 1	33240 1	07754 0
17,3240	C: 03241 0	53754 1	52011 0	53756 0	56017 1	22002 0	34735 1	53760 0
17,3250	52016 1	15272 1	00006 1	23745 0	51505 0	33722 0	55746 1	31427 1
17,3260	00006 1	63266 0	31746 0	55744 0	33724 0	13276 0	41752 1	55752 1
17,3270	41427 0	55427 0	34753 1	27746 1	55744 0	43724 1	55740 1	31752 0
17,3300	00006 1	74747 0	10000 0	13664 1	13306 0	13630 0	34737 0	00006 1
17,3310	70031 1	55752 1	31427 1	00006 1	74750 0	00006 1	13320 1	13672 0
17,3320	23427 1	31427 1	00006 1	70000 0	00006 1	74737 1	55737 1	11752 1
17,3330	63725 1	13203 0	63725 1	00006 1	51746 0	61601 1	00006 1	63344 1
17,3340	34752 0	27744 0	34751 0	13347 0	11500 1	13347 0	13340 1	55743 1
17,3350	41737 1	00006 1	51744 1	71567 0	51746 0	61601 1	00006 1	61752 0
17,3360	55741 0	00006 1	63542 1	51746 0	31573 1	00006 1	71737 1	61752 0
17,3370	51746 0	51603 0	00006 1	63426 1	51505 0	41525 0	00006 1	71740 1

JCTAL LISTING FOR PARAGRAPH # 120, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

20,2000	C: 01150 1	C: 01046 1	C: 07361 1	C: 00666 1	32114 1	70111 1	55343 0	40106 1
20,2010	74737 1	10000 0	34736 1	27343 0	31343 1	74355 1	00006 1	12034 0
20,2020	31343 1	72113 1	55343 0	32112 1	04616 1	C: 20353 0	15472 1	12037 0
20,2030	12014 1	36242 0	05464 1	15155 1	34737 0	27343 0	12021 1	00004 0
20,2040	44737 1	70106 1	54001 1	41343 0	74736 0	10000 0	34737 0	60001 0
20,2050	54106 1	41343 0	74355 1	10000 0	44737 1	62114 1	71343 0	54001 1
20,2060	42114 0	70111 1	60001 0	54111 1	74737 1	10000 0	31332 1	61331 1
20,2070	55244 0	30111 0	74741 0	00006 1	12101 1	44735 0	70075 1	54075 1
20,2100	12104 1	40075 1	74735 0	26075 1	30111 0	76245 0	60000 1	55325 0
20,2110	04635 0	C: 02206 1	C: 00256 0	C: 33113 1	C: 13113 0	74745 1	10000 0	44752 1
20,2120	64753 1	27746 1	15270 0	30111 0	74750 0	00006 1	12140 1	32151 0
20,2130	55346 0	00006 1	22070 0	37715 0	05072 1	C: 02454 0	C: 40106 1	00070 0
20,2140	32150 1	12130 0	00006 1	22070 0	02153 1	32152 0	55346 0	12133 0
20,2150	C: 00155 0	C: 03434 1	C: 00554 0	35015 0	56003 1	54001 1	30032 0	55635 1
20,2160	30023 1	55636 1	30034 0	55637 0	12170 1	35015 0	56002 1	54001 1
20,2170	34755 1	55643 0	55644 1	55645 0	55640 0	55641 1	55642 1	55277 0
20,2200	55300 1	55301 0	22003 1	00002 0	00006 1	22071 1	02165 1	22003 1
20,2210	55537 0	55540 0	55541 1	55542 1	55424 0	55425 1	55545 0	55546 0
20,2220	22003 1	40111 1	74744 0	26111 1	02124 1	00071 1	31273 0	54001 1
20,2230	34750 1	00006 1	06001 0	55273 1	74750 0	10000 0	12322 1	30074 1
20,2240	74750 0	10000 0	12252 1	41450 0	55762 1	41452 1	55763 0	41464 1
20,2250	57761 0	12442 0	00006 1	22061 0	30322 1	00006 1	20033 0	55761 1
20,2260	00006 1	71415 1	57762 0	30323 0	00006 1	20034 1	55763 0	00006 1
20,2270	71417 0	61762 0	02435 1	55762 1	31761 0	00006 1	71416 1	57763 1
20,2300	00006 1	71420 1	61763 1	02435 1	55763 0	31761 0	00006 1	71414 0
20,2310	57761 0	30321 1	00006 1	20032 1	61761 0	02435 1	55761 1	00006 1
20,2320	22061 0	12442 0	31273 0	76242 1	00006 1	12362 0	74751 1	00006 1
20,2330	12353 1	44746 1	00006 1	03012 1	44755 0	55761 1	55762 1	55763 0
20,2340	55764 1	55765 0	55766 0	54050 0	54051 1	54052 1	46242 1	71273 1
20,2350	64752 0	55273 1	12442 0	34746 0	00006 1	05012 1	46242 1	71273 1
20,2360	55273 1	12442 0	34746 0	00006 1	02012 0	10000 0	12373 0	41273 1
20,2370	74751 1	27273 1	12442 0	34752 0	54063 0	42434 1	00006 1	50063 1

DETAIL LISTING FOR PARAGRAPH # 121, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

20,2400	71761 1	54001 1	10000 0	32432 0	12406 0	42432 1	60001 0	54061 1
20,2410	12414 0	50000 1	32432 0	54001 1	50063 1	41764 1	60001 0	50063 1
20,2420	26050 0	50063 1	23764 0	10063 0	12374 1	37740 0	00006 1	05014 1
20,2430	12442 0	C: 77177 0	C: 37200 1	C: 00600 1	C: 03146 1	54007 1	00002 0	50000 1
20,2440	44734 1	00002 0	00006 1	32446 0	52006 0	C: 02016 1	C: 34106 1	34755 1
20,2450	55537 0	55541 1	55424 0	55425 1	04616 1	C: 40461 0	05155 0	35015 0
20,2460	54003 0	04645 1	54117 1	30111 0	74737 1	54157 0	10000 0	41332 0
20,2470	61244 1	55331 0	00004 0	30106 0	74737 1	00006 1	12522 1	44733 0
20,2500	55475 1	35751 1	54154 0	41331 0	61400 1	00006 1	62513 1	41331 0
20,2510	62001 1	00006 1	62540 1	27331 0	22007 0	10157 0	31332 1	61331 1
20,2520	55245 1	12540 0	44742 0	55475 1	36242 0	54154 0	41331 0	62002 1
20,2530	00006 1	62513 1	41331 0	62003 0	61400 1	00006 1	62540 1	12513 0
20,2540	00003 1	10157 0	13105 1	34752 0	54155 1	44752 1	26154 0	31331 1
20,2550	50154 1	63060 1	54156 1	00006 1	50154 1	33042 1	00006 1	10156 1
20,2560	50154 1	63057 0	50155 0	55530 1	10155 1	12544 1	12570 0	12667 0
20,2570	41532 0	61531 1	00006 1	62617 0	00006 1	11531 0	54155 1	63104 1
20,2600	00006 1	52604 1	43104 0	54155 1	30155 0	00006 1	73100 1	63102 1
20,2610	55630 1	44733 0	60155 0	00006 1	71630 1	55627 1	12642 1	00006 1
20,2620	11532 0	54155 1	40155 1	63104 1	00006 1	62630 0	33104 1	54155 1
20,2630	30155 0	00006 1	73100 1	63103 0	55627 1	40155 1	64735 1	00006 1
20,2640	71627 1	55630 1	41627 1	00006 1	71531 0	55533 1	31630 0	00006 1
20,2650	71532 0	61533 0	00006 1	74736 0	55533 1	55534 0	10154 0	34755 1
20,2660	55502 0	13230 1	44752 1	54154 0	44753 0	54155 1	12547 1	31246 0
20,2670	00006 1	71244 0	02776 0	C: 03101 1	00006 1	71527 1	00004 0	54154 0
20,2700	00006 1	71532 0	02776 0	C: 02000 0	55511 1	30154 1	00006 1	71531 0
20,2710	02776 0	C: 02000 0	55507 0	00006 1	73077 0	55504 0	31511 0	00006 1
20,2720	73077 0	55506 1	00006 1	00012 1	54155 1	34752 0	12730 0	34755 1
20,2730	54154 0	30155 0	50154 1	73073 1	00006 1	12751 1	30155 0	50154 1
20,2740	73074 0	00006 1	12746 1	50154 1	41507 0	12752 1	50154 1	31507 1
20,2750	12752 1	34755 1	50154 1	55510 0	10154 0	12727 0	40111 1	74736 0
20,2760	00006 1	13706 1	41274 0	63765 0	00006 1	12767 1	13706 1	11633 1
20,2770	12773 1	04674 0	C: 43330 0	10157 0	13671 0	13231 0	54161 0	54160 1

OCTAL LISTING FOR PARAGRAPH # 122. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

20,3000	50002 0	30000 1	24002 0	50000 1	30000 1	00006 1	13035 0	54162 0
20,3010	10000 0	64753 1	13014 0	64753 1	56161 1	00006 1	63020 0	40000 0
20,3020	60161 1	00006 1	63027 1	30160 0	00006 1	10162 0	00002 0	10160 1
20,3030	10162 0	13035 0	10162 0	34735 1	00002 0	34733 1	00002 0	C: 01240 0
20,3040	C: 22513 0	C: 00141 0	C: 07416 0	C: 00030 1	C: 21261 1	C: 00021 1	C: 03766 0	C: 00153 0
20,3050	C: 07111 1	C: 00072 1	C: 24103 0	C: 00135 0	C: 11511 1	C: 04754 0	C: 77142 0	C: 00061 0
20,3060	C: 00217 0	C: 00464 1	C: 75642 0	C: 00536 1	C: 75705 1	C: 00001 0	C: 77616 0	C: 05154 1
20,3070	C: 00052 0	C: 00231 1	C: 77174 0	C: 01400 1	C: 01000 0	C: 06000 1	C: 04000 0	C: 23146 0
20,3100	C: 13241 1	C: 00337 0	C: 26501 1	C: 51276 0	C: 62362 1	34753 1	54160 1	34753 1
20,3110	54161 0	50160 0	33212 0	00006 1	71331 0	00006 1	71332 0	50160 0
20,3120	63213 1	54154 0	13126 0	54161 0	00006 1	26160 1	50160 0	33215 1
20,3130	00006 1	50161 1	71331 0	50160 0	63217 0	00006 1	50161 1	71331 0
20,3140	25154 0	10161 0	13123 0	10160 1	13153 1	C: 00000 1	C: 20354 1	30154 1
20,3150	54155 1	34757 0	13106 1	33212 0	22007 0	02776 0	C: 01244 1	55530 1
20,3160	34733 1	55551 0	55571 1	55572 1	55611 1	55612 1	00006 1	33146 1
20,3170	00006 1	10155 1	00004 0	55531 0	55532 0	33103 0	55627 1	33102 1
20,3200	55630 1	31244 1	00006 1	70154 0	00006 1	71246 1	02776 0	C: 00155 0
20,3210	55511 1	12712 0	C: 00167 1	C: 06176 1	C: 77650 1	C: 72260 0	C: 76637 1	C: 02167 0
20,3220	C: 00645 0	C: 06335 1	C: 04256 1	C: 30163 0	C: 64072 0	C: 53632 0	C: 15133 1	C: 71777 0
20,3230	55633 1	31346 1	00006 1	74737 1	54001 1	60000 1	54115 0	41346 0
20,3240	60001 0	54114 1	00004 0	31541 0	54001 1	31537 1	04674 0	C: 37146 0
20,3250	53544 1	00003 1	30111 0	74744 0	10000 0	34753 1	54116 0	61502 1
20,3260	10000 0	33763 0	54151 0	00006 1	13270 0	10116 0	33762 1	54152 0
20,3270	31530 0	64743 0	54157 0	31530 0	05700 0	00004 0	55551 0	55552 0
20,3300	44743 1	00006 1	71551 0	00006 1	10157 0	55557 0	55560 1	34733 1
20,3310	55553 1	55554 0	00003 1	22007 0	10116 0	53544 1	34755 1	54154 0
20,3320	54163 1	50154 1	11543 0	64753 1	13327 0	64753 1	24163 0	54162 0
20,3330	40163 1	54164 0	31346 1	54143 0	54144 1	30162 1	63764 1	00006 1
20,3340	63432 1	10151 0	13372 0	31346 1	50164 1	26144 1	50163 0	54145 0
20,3350	33227 0	60162 1	00006 1	63356 1	40115 0	13365 0	40162 0	60000 1
20,3360	60000 1	64736 1	60000 1	00006 1	71346 0	50163 0	54143 0	30114 0
20,3370	50164 1	54146 0	30162 1	00006 1	74740 1	60162 1	03700 0	50164 1

DATA LISTING FOR PARAGRAPH # 123. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

20,3400	54130 1	34733 1	50163 0	54127 1	30162 1	61533 0	61533 0	64743 0
20,3410	54000 0	13456 1	30162 1	00006 1	74736 0	61533 0	54157 0	64744 1
20,3420	56157 1	03700 0	00006 1	74736 0	54160 1	33431 1	54161 0	44744 0
20,3430	13733 1	13463 1	54001 1	34733 1	54127 1	54130 1	10151 0	13456 1
20,3440	34744 1	60001 0	00006 1	63453 0	30115 1	50164 1	54146 0	60000 1
20,3450	50163 0	54145 0	13456 1	31346 1	54146 0	54145 0	30162 1	61533 0
20,3460	61533 0	54157 0	03724 0	50164 1	54134 0	30160 0	50164 1	54126 0
20,3470	30162 1	61533 0	64743 0	54000 0	13476 0	34733 1	63764 1	54157 0
20,3500	03724 0	50164 1	54132 0	30160 0	50164 1	54124 1	40162 0	61533 0
20,3510	61533 0	03712 0	50163 0	54133 1	54001 1	30160 0	50163 0	54125 0
20,3520	40162 0	61533 0	54157 0	63764 1	00006 1	63743 1	03720 1	50163 0
20,3530	54131 0	30163 0	50163 0	54123 0	50154 1	33770 1	71262 1	00006 1
20,3540	13545 1	30124 0	54126 0	30132 1	54134 0	50154 1	33766 0	71262 1
20,3550	00006 1	13556 0	30123 1	54125 0	30131 1	54133 1	40146 0	60143 1
20,3560	60151 1	54147 1	40145 0	60144 0	60151 1	54150 1	00004 0	10154 0
20,3570	13612 0	30122 0	55547 1	34320 1	05545 0	C: 00123 1	C: 01567 1	00003 1
20,3600	52144 1	52136 1	52146 0	52140 0	52150 1	52142 1	34753 1	54154 0
20,3610	34755 1	13320 1	30122 0	55550 1	34320 1	05545 0	C: 00123 1	C: 01607 1
20,3620	52152 0	53556 1	31346 1	55561 0	55562 0	61555 0	55564 0	55563 1
20,3630	34755 1	55565 1	55566 1	11555 1	13652 1	52136 1	53602 0	52140 0
20,3640	53604 0	52142 1	53606 1	52144 1	53622 1	52146 0	53624 1	52150 1
20,3650	53626 0	13672 0	51346 1	55601 0	55602 0	55621 1	55622 1	61555 0
20,3660	55603 1	55604 0	55623 0	55624 1	34755 1	55605 1	55606 1	55625 0
20,3670	55626 0	00004 0	40111 1	74751 1	26111 1	00003 1	30117 0	04640 1
20,3700	54165 1	34743 0	22007 0	00006 1	10165 1	00002 0	34755 1	55502 0
20,3710	55633 1	12773 1	22007 0	22122 0	54157 0	63764 1	00006 1	63740 1
20,3720	30157 1	00006 1	50164 1	70130 1	64743 0	56157 1	00006 1	22161 1
20,3730	03700 0	54160 1	44743 1	00006 1	70160 1	00006 1	10157 0	00161 1
20,3740	43764 0	54157 0	13721 1	10163 1	34752 0	67747 1	54122 1	60154 1
20,3750	50000 1	33767 1	71262 1	00006 1	13760 1	43764 0	54157 0	13526 1
20,3760	30001 0	13527 0	C: 00110 1	C: 00443 1	C: 77377 1	C: 02213 0	C: 00110 1	C: 00022 1
20,3770	C: 00204 1	C: 00041 1	C: 03772 0	C: 03773 1	CKSM 41116 1	0	0	0

DATA LISTING FOR PARAGRAPH # 124. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

21,2000	C: 24402 1	C: 01551 1	C: 21357 0	C: 22316 0	C: 01507 1	C: 00547 1	40103 1	74747 0
21,2010	10000 0	15261 0	11056 1	12015 0	12130 0	55714 0	36010 0	05173 1
21,2020	C: 02006 0	41303 1	74753 0	00006 1	12042 1	70107 0	00006 1	12033 1
21,2030	34747 1	54001 1	04606 0	34752 0	70107 0	00006 1	12042 1	34751 0
21,2040	54001 1	04606 0	30105 0	74743 1	00006 1	12154 1	41011 1	62107 0
21,2050	00006 1	12154 1	00006 1	00030 1	40000 0	54001 1	74750 0	10000 0
21,2060	12076 0	41011 1	62106 1	00006 1	12154 1	30001 0	74753 0	10000 0
21,2070	12073 0	12154 1	02110 0	44755 0	12077 1	02110 0	34752 0	54002 1
21,2100	00004 0	00006 1	32105 1	52006 0	C: 03402 1	C: 12067 0	C: 00106 0	C: 00107 1
21,2110	40775 0	61011 0	00006 1	12124 0	40105 1	74743 1	10000 0	12124 0
21,2120	30103 0	74747 0	10000 0	00002 0	04364 1	04457 0	04635 0	C: 21050 1
21,2130	40107 0	74735 0	00006 1	12150 0	34746 0	70107 0	00006 1	12150 0
21,2140	40107 0	74742 0	00006 1	12150 0	37720 0	05072 1	C: 03716 1	C: 70067 1
21,2150	00006 1	34755 1	52755 1	12021 1	23714 1	40025 1	53056 1	40103 1
21,2160	74741 0	10000 0	13053 0	31303 0	74745 1	10000 0	12240 1	02324 0
21,2170	41303 1	74745 1	27303 1	34752 0	00006 1	05014 1	31743 0	00006 1
21,2200	71706 0	56070 0	31744 1	00006 1	71707 1	26070 1	31745 0	00006 1
21,2210	71710 1	26070 1	32000 0	00006 1	70070 1	20001 1	20001 1	56070 0
21,2220	31716 0	00006 1	71715 1	60070 0	55711 0	41711 0	00006 1	62231 0
21,2230	12233 0	31711 1	64735 1	54060 0	34751 0	00006 1	05014 1	15261 0
21,2240	02324 0	44745 1	71303 1	55303 1	44752 1	00006 1	03014 1	11741 0
21,2250	12254 1	12254 1	12272 0	55741 0	44753 0	53742 0	53713 1	34742 1
21,2260	56002 0	22007 0	31715 0	00006 1	10002 1	00006 1	72002 0	12273 1
21,2270	53713 1	12313 0	22001 1	00006 1	71711 0	20001 1	61713 0	55713 1
21,2300	34755 1	27712 0	34733 1	64753 1	61713 0	55713 1	34755 1	64733 1
21,2310	61712 1	55712 0	13050 0	11713 1	12320 0	12320 0	34755 1	55713 1
21,2320	11712 0	34735 1	61713 0	12233 0	00006 1	23714 1	34746 0	00006 1
21,2330	02030 0	10000 0	13053 0	40075 1	74736 0	00006 1	12374 1	40075 1
21,2340	74736 0	26075 1	44745 1	71303 1	55303 1	40074 0	74752 1	00006 1
21,2350	15261 0	34744 1	00006 1	05012 1	34755 1	55702 1	55703 0	55676 0
21,2360	55677 1	34750 1	05173 1	C: 02365 0	15261 0	34752 0	00006 1	05012 1
21,2370	41303 1	74744 0	27303 1	15261 0	41235 0	60025 0	64736 1	64736 1

DATA LISTING FOR PARAGRAPH # 125. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

21,2400	57715 0	34777 1	54065 0	00006 1	31237 0	20001 1	20001 1	00006 1
21,2410	71715 1	00005 1	10065 0	57706 1	00006 1	31527 0	20001 1	20001 1
21,2420	27706 0	30037 0	61160 1	00006 1	72004 0	27706 0	00006 1	31241 1
21,2430	20001 1	20001 1	00006 1	71715 1	00006 1	10065 0	57707 0	00006 1
21,2440	31531 1	20001 1	20001 1	27707 1	30040 0	61161 0	00006 1	72004 0
21,2450	27707 1	00006 1	31243 0	20001 1	20001 1	00006 1	71715 1	00006 1
21,2460	10065 0	57710 0	00006 1	31533 0	20001 1	20001 1	27710 1	30041 1
21,2470	61162 0	00006 1	72004 0	27710 1	34751 0	05224 0	40074 0	74752 1
21,2500	10000 0	12502 1	01714 1	31733 1	61706 1	54061 1	31735 1	61707 0
21,2510	54062 1	31737 0	61710 0	54063 0	30061 0	00006 1	71717 0	56070 0
21,2520	30062 0	00006 1	71721 0	26070 1	30063 1	00006 1	71723 1	26070 1
21,2530	30070 0	60000 1	57704 0	30061 0	00006 1	71725 1	56070 0	30062 0
21,2540	00006 1	71727 0	26070 1	30063 1	00006 1	71731 1	26070 1	30070 0
21,2550	60000 1	57705 1	25015 0	54002 0	31417 1	54063 0	31420 0	54064 1
21,2560	35016 0	54003 0	30064 0	00006 1	71704 1	56070 0	30063 1	00006 1
21,2570	71705 0	26070 1	32003 0	00006 1	70070 1	20001 1	57700 1	30064 0
21,2600	00006 1	71705 0	56070 0	30063 1	00006 1	71704 1	40000 0	26070 1
21,2610	32003 0	00005 1	70070 1	20001 1	57701 0	42005 1	54066 0	34753 1
21,2620	54065 0	50065 1	11700 0	12627 1	12730 0	12635 1	12730 0	50065 1
21,2630	41700 0	62005 0	00006 1	62643 1	12730 0	50065 1	31700 1	62005 0
21,2640	00006 1	62643 1	12730 0	50065 1	11676 0	12651 0	12662 0	12656 1
21,2650	12662 0	50065 1	31700 1	00006 1	62701 0	12662 0	50065 1	41700 0
21,2660	00006 1	62716 0	50065 1	11702 1	12674 1	12667 0	12712 0	50065 1
21,2670	31700 1	00006 1	62720 0	12703 0	50065 1	31700 1	00006 1	62701 0
21,2700	12703 0	42005 1	13024 0	50065 1	41676 0	62005 0	50065 1	56072 1
21,2710	34753 1	13027 0	50065 1	31700 1	00006 1	62720 0	32005 0	13024 0
21,2720	50065 1	31676 1	62005 0	40000 0	50065 1	56072 1	44752 0	13027 0
21,2730	50065 1	11702 1	12761 1	12735 0	12766 0	50065 1	41676 0	00006 1
21,2740	62742 1	12775 1	50065 1	41700 0	00006 1	63020 0	60066 1	50065 1
21,2750	61676 1	00006 1	63020 0	50065 1	61700 1	00006 1	50065 1	61676 1
21,2760	13024 0	50065 1	41700 0	00006 1	63020 0	12772 0	50065 1	31700 1
21,2770	00006 1	63020 0	50065 1	41676 0	13024 0	50065 1	31700 1	00006 1

OBJECT LISTING FOR PARAGRAPH # 126. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

21,3000	63020 0	32005 0	50065 1	61676 1	40000 0	50065 1	61700 1	00006 1
21,3010	63020 0	00006 1	50065 1	61700 1	50065 1	61676 1	40000 0	13024 0
21,3020	50065 1	41676 0	50065 1	61700 1	50065 1	56072 1	34755 1	50065 1
21,3030	55702 1	50065 1	30072 1	64754 0	50065 1	54053 0	50065 1	30072 1
21,3040	50065 1	27676 0	10065 0	12620 0	35020 0	00006 1	05014 1	01714 1
21,3050	34755 1	54001 1	12270 1	40074 0	74752 1	00006 1	13067 1	34744 1
21,3060	71303 1	10000 0	34752 0	64744 1	40000 0	00006 1	03012 1	43076 1
21,3070	71303 1	55303 1	44736 0	70075 1	54075 1	15261 0	C: 00300 1	37747 1
21,3100	55631 0	34751 0	55535 1	55536 1	34752 0	55633 1	55632 0	55634 0
21,3110	30021 1	60000 1	55505 1	34752 0	13116 0	34755 1	55750 0	51750 1
21,3120	31537 1	00006 1	74752 1	00006 1	13130 1	50000 1	44734 1	56001 0
21,3130	11750 0	50000 1	31436 1	53744 0	51750 1	31504 1	55741 0	00006 1
21,3140	13576 1	51750 1	31450 1	00006 1	71741 0	23737 0	00006 1	74747 0
21,3150	53740 1	00006 1	74747 0	27740 1	41744 0	00006 1	74736 0	00006 1
21,3160	71744 0	61741 1	00006 1	63200 0	00006 1	40001 1	61741 1	00006 1
21,3170	11741 0	57746 0	30001 0	22007 0	00006 1	11741 0	57747 1	13203 1
21,3200	34733 1	54001 1	53747 0	31743 0	00006 1	74743 1	53743 1	00006 1
21,3210	31743 0	53752 1	31744 1	00006 1	63220 1	00006 1	31747 1	13222 1
21,3220	00006 1	41747 0	21752 1	11751 1	13230 1	13227 1	13232 0	11752 1
21,3230	34753 1	13233 1	44753 0	55745 1	11745 1	13247 1	13240 0	13244 1
21,3240	55742 0	55743 1	13247 1	C: 65252 1	00006 1	41743 1	53743 1	00006 1
21,3250	31747 1	21743 1	21746 0	00006 1	73243 0	53747 0	30001 0	00006 1
21,3260	73243 0	27747 0	54001 1	13265 1	27746 1	00006 1	31743 0	21747 0
21,3270	31746 0	00006 1	71744 0	21740 1	31747 1	00006 1	71744 0	27740 1
21,3300	54001 1	13303 0	27737 1	31742 1	00006 1	71741 0	53752 1	31743 0
21,3310	00006 1	71741 0	27752 1	54001 1	13316 1	27751 1	11745 1	13524 0
21,3320	13566 0	13323 1	13566 0	00006 1	41743 1	53743 1	13524 0	C: 23146 0
21,3330	34753 1	55502 0	34752 0	22002 0	22071 1	13337 1	34755 1	54066 0
21,3340	50066 1	31507 1	00006 1	63413 1	54063 0	50066 1	41537 0	00006 1
21,3350	13413 0	54002 1	00006 1	73327 0	60002 0	54001 1	13363 0	40000 0
21,3360	50066 1	57501 1	13417 1	00006 1	63371 1	40000 0	54062 1	44753 0
21,3370	13372 1	54062 1	34753 1	50066 1	55501 0	30063 1	00006 1	74740 1

JCTAL LISTING FOR PARAGRAPH # 127; WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

21,3400	60062 0	00006 1	63417 0	40062 1	00006 1	73440 0	00006 1	10063 0
21,3410	00005 1	13413 0	13425 0	34755 1	50066 1	55501 0	13427 1	36010 0
21,3420	50066 1	55632 0	34755 1	55502 0	13427 1	50066 1	55632 0	10066 0
21,3430	13336 0	52073 1	52063 0	04674 0	C: 35736 0	52063 0	52073 1	00071 1
21,3440	C: 00240 1	11751 1	13460 1	13445 0	13451 0	31752 0	00006 1	63451 1
21,3450	13454 0	34755 1	55741 0	00002 0	57751 0	57752 0	34757 0	13461 0
21,3460	34755 1	55741 0	35751 1	55744 0	13473 0	31751 0	13507 1	37746 0
21,3470	27744 0	00006 1	63465 0	41751 1	51744 1	64735 1	00006 1	63467 1
21,3500	51744 1	34735 1	57747 1	00006 1	31752 0	00006 1	11747 0	00006 1
21,3510	23752 0	00006 1	74736 0	55747 0	74737 1	10000 0	33634 0	63632 0
21,3520	03636 1	03636 1	03636 1	01752 0	03441 0	57742 1	00006 1	71742 0
21,3530	53743 1	00006 1	70001 1	27743 1	54001 1	13537 1	27742 0	31744 1
21,3540	00006 1	74736 0	27741 0	00006 1	13563 0	51741 1	34735 1	57742 1
21,3550	00006 1	71742 0	21740 1	57742 1	00006 1	71743 1	27740 1	54001 1
21,3560	13562 1	27737 1	13566 0	00006 1	31743 0	21740 1	11737 1	13573 1
21,3570	13572 0	13575 1	11740 1	34753 1	13576 1	44753 0	54001 1	51750 1
21,3600	57501 1	00006 1	70001 1	10001 1	13621 0	13616 1	13610 1	13616 1
21,3610	51750 1	55510 0	51750 1	43633 0	00006 1	03012 1	41273 1	74747 0
21,3620	27273 1	11750 0	13115 0	31505 0	54021 0	00006 1	33631 0	52006 0
21,3630	C: 03236 0	C: 36106 0	C: 26501 1	C: 01400 1	C: 11276 1	C: 06000 1	55746 1	54021 0
21,3640	31747 1	22037 0	00006 1	11746 1	60021 1	00002 0	C: 00632 0	34736 1
21,3650	51505 0	55525 0	11745 1	13673 1	13576 1	51505 0	41525 0	10000 0
21,3660	00002 0	13663 0	13663 0	51505 0	33705 0	51505 0	55770 1	34755 1
21,3670	51505 0	55525 0	00002 0	51505 0	31525 1	13657 1	51505 0	11770 1
21,3700	13702 0	00002 0	13667 1	00002 0	C: 00004 0	C: 00012 1	C: 00012 1	44753 0
21,3710	55745 1	31427 1	13716 0	34753 1	55745 1	41427 0	22000 1	40111 1
21,3720	74744 0	10000 0	34767 0	60001 0	00006 1	63735 0	13652 1	51505 0
21,3730	11525 0	13713 0	13734 0	13707 0	55745 1	31427 1	00006 1	74766 0
21,3740	10000 0	13760 1	13744 1	13647 0	31427 1	61752 0	00006 1	71411 0
21,3750	00006 1	13766 1	00006 1	63762 1	31427 1	63646 0	00006 1	63766 0
21,3760	44736 0	13650 0	43546 1	61427 1	00006 1	63647 1	34755 1	13650 0
21,3770	C: 03770 1	C: 03771 0	CKSM 67517 0	a	a	a	a	a

OCTAL LISTING FOR PARAGRAPH # 130, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

22,2000	C: 27533 1	C: 07571 0	C: 25004 1	C: 06702 1	06037 0	I: 77634 0	C: 44403 0	C: 03277 0
22,2010	I: 51535 0	C: 00324 1	I: 51025 1	C: 04403 1	C: 44724 0	I: 72364 0	C: 03246 1	C: 03277 0
22,2020	I: 77624 1	C: 44410 1	I: 77364 0	C: 02230 1	C: 00322 1	I: 77624 1	C: 44410 1	I: 45160 1
22,2030	C: 03246 1	C: 44326 0	I: 45575 1	C: 50457 1	I: 77626 0	C: 50465 0	I: 77626 0	C: 74473 1
22,2040	I: 75160 1	C: 03303 1	C: 02230 1	I: 77624 1	C: 44312 1	I: 45575 1	C: 51532 1	I: 77626 0
22,2050	C: 51540 1	I: 77626 0	C: 75546 1	I: 45001 1	C: 00023 0	C: 44335 1	I: 45575 1	C: 50457 1
22,2060	I: 77626 0	C: 50465 0	I: 77626 0	C: 74473 1	I: 45345 1	C: 03306 1	C: 02233 1	I: 45325 1
22,2070	C: 02235 1	C: 03310 0	I: 45325 1	C: 03316 0	C: 02243 0	I: 77666 1	C: 03326 0	I: 43345 1
22,2100	C: 02231 0	C: 02251 0	I: 43225 0	C: 06512 1	C: 02241 1	C: 03334 0	I: 77726 1	C: 03336 1
22,2110	I: 51025 1	C: 04363 0	C: 44117 0	I: 77751 1	C: 00322 1	C: 37236 1	C: 44742 0	I: 45345 1
22,2120	C: 03336 1	C: 04365 0	I: 77244 0	C: 44131 1	C: 03326 0	I: 77656 1	C: 03271 0	I: 77650 1
22,2130	C: 44744 0	I: 53375 0	C: 02231 0	C: 03304 0	I: 77762 1	C: 27304 0	C: 02237 0	I: 74455 0
22,2140	C: 05512 1	C: 27312 1	C: 02245 0	I: 74455 0	C: 03320 0	C: 03320 0	I: 70545 1	C: 03334 0
22,2150	I: 45325 1	C: 06520 0	C: 03334 0	I: 65204 1	C: 21712 0	C: 03324 1	I: 56225 1	C: 00001 0
22,2160	C: 00003 1	I: 65366 1	C: 03314 1	I: 56225 1	C: 00001 0	C: 00003 1	I: 65366 1	C: 03304 0
22,2170	I: 56225 1	C: 00001 0	C: 00003 1	I: 55566 1	I: 77656 1	C: 03271 0	I: 45345 1	C: 03271 0
22,2200	C: 03273 1	I: 71240 1	C: 44211 0	C: 03271 0	I: 50025 0	C: 03275 1	C: 44266 0	I: 77650 1
22,2210	C: 44242 0	I: 45345 1	C: 03273 1	C: 03275 1	I: 77640 0	C: 44266 0	I: 51145 0	C: 03330 1
22,2220	C: 44224 0	I: 57575 1	C: 03271 0	C: 03271 0	I: 51145 0	C: 03306 1	C: 44232 1	I: 57545 1
22,2230	C: 03271 0	C: 03271 0	I: 51145 0	C: 03316 0	C: 44744 0	I: 57545 1	C: 03275 1	C: 03275 1
22,2240	I: 77650 1	C: 44744 0	I: 51145 0	C: 03326 0	C: 44250 0	I: 57575 1	C: 03271 0	C: 03271 0
22,2250	I: 51145 0	C: 03306 1	C: 44256 0	I: 57545 1	C: 03273 1	C: 03273 1	I: 51145 0	C: 03310 0
22,2260	C: 44744 0	I: 57545 1	C: 03275 1	C: 03275 1	I: 77650 1	C: 44744 0	I: 51145 0	C: 03332 0
22,2270	C: 44274 0	I: 57575 1	C: 03271 0	C: 03271 0	I: 51145 0	C: 03310 0	C: 44302 0	I: 57545 1
22,2300	C: 03271 0	C: 03271 0	I: 51145 0	C: 03316 0	C: 44744 0	I: 57545 1	C: 03273 1	C: 03273 1
22,2310	I: 77650 1	C: 44744 0	I: 76601 1	C: 00001 0	C: 00001 0	I: 62703 1	C: 77776 1	C: 00007 0
22,2320	I: 62703 1	C: 77776 1	C: 00015 0	I: 41503 1	C: 77776 1	I: 77616 0	I: 76601 1	C: 00001 0
22,2330	C: 00001 0	I: 62713 0	C: 00007 0	C: 00015 0	I: 77606 1	I: 77776 1	50120 1	52013 1
22,2340	50120 1	52017 0	50120 1	52013 1	50120 1	52015 1	50120 1	52005 0
22,2350	50120 1	52015 1	50120 1	52003 0	50120 1	52007 1	50120 1	52003 0
22,2360	06037 0	I: 77616 0	C: 00013 0	C: 13553 0	C: 17070 0	C: 34343 1	C: 15666 0	C: 20443 0
22,2370	C: 05555 1	C: 01106 1	C: 67777 1	C: 77777 0	C: 04000 0	C: 00000 1	C: 00216 1	C: 36323 0

OCTAL LISTING FOR PARAGRAPH # 131, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

22,2400	C: 17777 1	C: 00057 0	C: 14344 1	30034 0	54156 1	00006 1	30033 1	16476 0
22,2410	I: 66370 0	C: 00003 1	C: 00051 0	C: 00001 0	C: 00010 0	I: 77601 0	C: 00001 0	I: 47133 0
22,2420	C: 00013 0	C: 21576 0	C: 00013 0	I: 65356 1	C: 00013 0	I: 41546 0	I: 71300 1	C: 44417 0
22,2430	C: 00007 0	I: 72405 0	C: 00013 0	C: 10001 1	I: 41345 0	C: 00005 1	C: 00001 0	I: 41325 0
22,2440	C: 00007 0	C: 00011 1	I: 72405 0	C: 00003 1	I: 72421 0	C: 00015 0	C: 10003 0	I: 41345 0
22,2450	C: 00003 1	C: 00005 1	I: 41325 0	C: 00007 0	C: 00011 1	I: 72405 0	C: 00001 0	I: 72415 1
22,2460	C: 00017 1	C: 10005 0	I: 77745 1	C: 00011 1	C: 10007 1	I: 77745 1	C: 00013 0	I: 72405 0
22,2470	C: 00003 1	C: 10011 0	I: 41345 0	C: 00013 0	C: 00001 0	I: 72476 1	C: 10013 1	I: 41345 0
22,2500	C: 00005 1	C: 00013 0	I: 72476 1	C: 10015 1	I: 77745 1	I: 72405 0	C: 00011 1	I: 41325 0
22,2510	C: 00007 0	C: 00001 0	I: 72415 1	I: 77626 0	C: 67760 1	I: 77745 1	I: 72405 0	C: 00011 1
22,2520	I: 41325 0	C: 00007 0	C: 00003 1	I: 72425 1	I: 77626 0	C: 67756 1	I: 77616 0	I: 41401 1
22,2530	C: 00001 0	I: 65356 1	I: 41546 0	I: 65502 0	I: 41021 1	C: 06520 0	C: 21712 0	I: 77725 1
22,2540	C: 03271 0	I: 41316 0	C: 00005 1	I: 52415 0	C: 00003 1	I: 77604 0	C: 21712 0	C: 16231 0
22,2550	C: 03273 1	I: 41316 0	C: 00005 1	I: 52415 0	C: 00003 1	I: 77604 0	C: 21712 0	C: 16241 1
22,2560	C: 03275 1	I: 41316 0	C: 00005 1	I: 52415 0	C: 00003 1	I: 77604 0	C: 21712 0	C: 02251 0
22,2570	I: 41345 0	C: 03271 0	C: 03273 1	I: 72405 0	C: 00005 1	I: 41325 0	C: 03275 1	C: 00001 0
22,2600	I: 43206 1	C: 00007 0	I: 41112 0	C: 21712 0	C: 16237 0	I: 62421 1	I: 77604 0	C: 21712 0
22,2610	C: 15233 1	C: 03271 0	I: 41205 0	C: 03275 1	C: 00005 1	I: 65352 0	C: 03273 1	I: 41405 0
22,2620	C: 00001 0	I: 62415 0	C: 00007 0	I: 77604 0	C: 21712 0	C: 16235 1	I: 62421 1	I: 77604 0
22,2630	C: 21712 0	C: 16245 0	C: 03273 1	I: 41205 0	C: 03275 1	C: 00005 1	I: 65352 0	C: 03271 0
22,2640	I: 41405 0	C: 00001 0	I: 62415 0	C: 00007 0	I: 77604 0	C: 21712 0	C: 16247 1	I: 62421 1
22,2650	I: 77604 0	C: 21712 0	C: 02243 0	I: 77616 0	I: 67543 1	C: 00007 0	I: 71406 0	I: 41152 1
22,2660	C: 21712 0	C: 00051 0	I: 57543 1	C: 00015 0	I: 67471 1	C: 00051 0	I: 51123 0	C: 00001 0
22,2670	C: 44702 1	I: 57545 1	I: 43244 1	C: 44677 1	C: 06520 0	I: 77650 1	C: 44701 1	I: 77625 0
22,2700	C: 06520 0	I: 77606 1	I: 57543 1	C: 00013 0	I: 67471 1	C: 00051 0	I: 51123 0	C: 00011 1
22,2710	C: 44722 0	I: 57545 1	I: 43244 1	C: 44717 0	C: 06520 0	I: 77650 1	C: 44723 1	I: 52025 1
22,2720	C: 06520 0	C: 44723 1	I: 77745 1	I: 43466 1	I: 77776 1	05567 0	C: 00401 1	12732 1
22,2730	04616 1	C: 40153 1	04616 1	C: 40165 1	34752 0	00004 0	05203 0	C: 03234 1
22,2740	C: 44066 1	15155 1	I: 77776 1	12732 1	I: 77614 1	C: 01074 0	I: 70740 0	C: 01325 1
22,2750	C: 04772 1	I: 45002 1	C: 44527 1	I: 74343 0	C: 04772 1	C: 03271 0	C: 17326 0	C: 03336 1
22,2760	I: 55605 1	C: 05000 0	C: 04772 1	I: 77561 0	C: 20606 0	C: 03334 0	I: 77614 1	C: 01035 0
22,2770	C: 45010 1	C: 00221 0	C: 24255 0	C: 00554 0	C: 02660 0	C: 02660 0	C: 13301 1	C: 16161 0

JCTAL LISTING FOR PARAGRAPH # 132, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

22,3000	C: 30707 1	C: 00003 1	C: 04000 0	04616 1	C: 54262 0	10000 0	12730 0	06037 0
22,3010	I: 75160 1	C: 03246 1	C: 02230 1	I: 77624 1	C: 44312 1	I: 45575 1	C: 50514 1	I: 77626 0
22,3020	C: 50522 1	I: 77626 0	C: 74530 1	I: 45160 1	C: 03246 1	C: 44654 0	I: 77634 0	C: 21620 0
22,3030	C: 03304 0	I: 77414 0	C: 01215 0	C: 45122 1	34752 0	55272 0	51272 1	31676 1
22,3040	00006 1	51272 1	21703 0	00006 1	73121 1	10000 0	64753 1	13051 1
22,3050	40000 0	51272 1	55540 0	51272 1	31703 1	51272 1	57676 1	51272 1
22,3060	55635 1	11272 0	13035 0	00003 1	03075 0	13170 0	34753 1	00004 0
22,3070	05203 0	C: 03213 1	C: 44066 1	00003 1	15155 1	00006 1	40025 1	53710 1
22,3100	00006 1	31734 0	21710 1	11707 1	00002 0	13107 0	13117 1	11710 1
22,3110	00002 0	13113 0	40000 0	63166 0	00006 1	63117 0	24002 0	24002 0
22,3120	00002 0	C: 03146 1	I: 77776 1	00006 1	30025 0	21734 1	00006 1	43166 1
22,3130	21734 1	00004 0	34752 0	55701 1	60000 1	55702 1	50000 1	31725 0
22,3140	51701 0	55643 0	00006 1	63145 1	40000 0	00006 1	73167 0	00006 1
22,3150	51702 0	71725 1	00006 1	51701 0	11530 1	51701 0	55277 0	11701 1
22,3160	13133 1	30025 0	63166 0	57706 1	13034 1	C: 00000 1	C: 00144 0	C: 75777 1
22,3170	40025 1	61706 1	10000 0	64753 1	13177 1	64735 1	40000 0	00004 0
22,3200	05203 0	C: 03206 0	C: 44066 1	33166 0	27706 0	15155 1	37714 1	05105 0
22,3210	C: 03003 1	C: 44066 1	05261 1	34755 1	55642 1	55645 0	55301 0	55641 1
22,3220	55644 1	55300 1	30323 0	55637 0	30322 1	55636 1	30321 1	55635 1
22,3230	34755 1	55643 0	55640 0	55277 0	31311 0	54063 0	34755 1	53310 0
22,3240	05116 1	05261 1	06037 0	I: 52014 0	C: 03712 0	C: 45465 1	C: 45247 1	I: 77776 1
22,3250	34752 0	55051 0	34753 1	55052 0	33316 0	04616 1	C: 20334 1	05472 0
22,3260	03262 1	03254 1	34750 1	05203 0	C: 03430 0	C: 44064 0	00003 1	33320 0
22,3270	54003 0	34755 1	55537 0	35021 1	05105 0	C: 03321 1	C: 44064 0	00003 1
22,3300	36245 1	71537 0	10000 0	03310 0	34777 1	04616 1	C: 01735 1	03300 1
22,3310	33317 1	04616 1	C: 20334 1	05553 1	05563 1	03267 1	C: 01014 0	C: 04054 1
22,3320	C: 02140 0	06037 0	I: 77634 0	C: 21573 0	C: 00041 1	C: 02205 1	I: 77776 1	41052 0
22,3330	64753 1	00006 1	13356 0	06037 0	I: 77624 1	C: 27043 0	I: 77775 1	C: 00001 0
22,3340	C: 26207 0	C: 00007 0	C: 02215 0	I: 77743 1	C: 73774 1	C: 00037 0	I: 77743 1	C: 72411 0
22,3350	C: 02201 0	I: 46135 1	C: 00050 1	C: 45367 1	I: 77650 1	C: 45373 1	06037 0	I: 77624 1
22,3360	C: 27057 0	I: 77650 1	C: 45336 0	C: 00001 0	C: 11530 1	C: 00002 0	C: 31230 1	I: 43145 0
22,3370	C: 06315 0	C: 03635 1	C: 45377 0	I: 51575 1	C: 02023 1	I: 77614 1	C: 03475 1	C: 36203 0

OCTAL LISTING FOR PARAGRAPH # 131, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "2" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

22,3400	C: 45551 1	I: 45234 0	C: 21573 0	C: 02205 1	C: 02205 1	I: 53145 1	C: 02143 0	C: 45420 0
22,3410	I: 43345 1	C: 02143 0	C: 02205 1	C: 02143 0	I: 77776 1	34753 1	55537 0	05155 0
22,3420	I: 43345 1	C: 02141 1	C: 02205 1	C: 02141 1	I: 77776 1	34752 0	55537 0	05155 0
22,3430	34747 1	71044 1	10000 0	03441 0	37713 0	05072 1	C: 05472 0	C: 04062 1
22,3440	05261 1	34777 1	05203 0	C: 03430 0	C: 44064 0	36245 1	71537 0	50000 1
22,3450	03451 1	05261 1	03460 0	34777 1	54001 1	34755 1	21541 1	05261 1
22,3460	34777 1	54001 1	34755 1	21543 0	05261 1	I: 77776 1	25021 1	05105 0
22,3470	C: 03503 1	C: 44064 0	00003 1	10067 1	05122 0	33317 1	04616 1	C: 20334 1
22,3500	05563 1	05563 1	03475 1	06037 0	I: 52175 0	C: 01221 1	C: 45507 1	C: 26207 0
22,3510	C: 01227 1	C: 02215 0	I: 52014 0	C: 04304 1	C: 45516 1	C: 45527 0	I: 71214 0	C: 03475 1
22,3520	C: 04001 1	C: 14037 0	C: 05364 0	C: 26201 0	C: 02023 1	I: 52046 1	C: 45536 0	I: 71214 0
22,3530	C: 03675 0	C: 04003 0	C: 14037 0	C: 05366 1	C: 16201 0	C: 06315 0	C: 36203 0	C: 45551 1
22,3540	I: 77776 1	34747 1	71044 1	00006 1	15472 1	34777 1	04616 1	C: 01735 1
22,3550	03503 1	I: 44001 0	C: 00001 0	C: 00051 0	I: 77214 0	C: 03755 0	C: 45565 0	C: 02207 0
22,3560	I: 77752 1	C: 26207 0	C: 02215 0	I: 77752 1	C: 02215 0	I: 77624 1	C: 57361 1	I: 77624 1
22,3570	C: 57427 1	I: 77625 0	C: 02203 1	I: 64414 1	C: 03755 0	C: 45576 1	I: 77624 1	C: 45636 0
22,3600	C: 16120 0	C: 00017 1	I: 77625 0	C: 02203 1	C: 00161 1	I: 64414 1	C: 03755 0	C: 45610 1
22,3610	I: 77624 1	C: 45616 0	C: 16122 1	C: 00161 1	I: 51025 1	C: 02201 0	C: 45622 0	I: 52145 0
22,3620	C: 06522 1	C: 45626 1	I: 45145 0	C: 00017 1	C: 57465 1	I: 77676 0	C: 16143 0	C: 02201 0
22,3630	I: 45015 1	C: 02203 1	C: 57470 0	I: 77676 0	C: 36141 0	C: 00051 0	I: 51025 1	C: 05646 0
22,3640	C: 45643 1	I: 43415 0	C: 05646 0	I: 43545 1	C: 05646 0	C: 01065 0	C: 05603 1	C: 00021 1
22,3650	C: 14161 1	C: 01440 0	C: 00000 1	C: 14000 1	C: 00000 1	C: 30000 1	C: 00000 1	C: 77534 0
22,3660	C: 45074 0	31215 1	55075 0	05504 0	C: 00036 1	04616 1	C: 17310 0	44743 1
22,3670	00006 1	03011 1	05327 1	C: 00005 1	C: 05022 1	C: 20000 0	06037 0	I: 43014 0
22,3700	C: 01464 0	C: 03664 0	I: 45014 0	C: 03267 1	C: 27467 1	I: 77414 0	C: 03671 1	31260 1
22,3710	04640 1	I: 51575 1	C: 02543 1	C: 24045 0	C: 02651 1	I: 41446 1	I: 53025 0	C: 00045 0
22,3720	C: 45723 0	I: 45545 1	C: 77732 1	I: 51575 1	C: 02657 1	I: 45206 1	C: 00045 0	I: 71240 1
22,3730	C: 45733 1	I: 77626 0	C: 77732 1	I: 66145 1	C: 00045 0	C: 00044 1	I: 62101 0	C: 00047 1
22,3740	C: 00002 0	I: 53775 1	C: 02643 1	C: 20201 0	C: 26643 1	C: 02651 1	I: 77657 0	C: 20201 0
22,3750	C: 26651 1	C: 02657 1	I: 66057 0	C: 20201 0	C: 00045 0	C: 02657 1	I: 54150 1	C: 02103 1
22,3760	C: 00045 0	I: 77660 1	C: 00045 0	I: 70130 1	C: 02103 1	C: 00045 0	I: 40270 0	C: 00044 1
22,3770	C: 00003 1	I: 77650 1	C: 46667 1	C: 03773 1	C: 03774 0	CKSM 00471 0	2	2

JCTAL LISTING FOR PARAGRAPH # 134, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

23,2000	04645 1	55113 1	34752 0	55052 0	36242 0	55051 0	32037 1	04616 1
23,2010	C: 20353 0	15472 1	12017 1	12006 1	34751 0	05464 1	05155 0	31052 1
23,2020	74752 1	10000 0	12026 0	05504 0	C: 00012 1	12034 0	05516 0	C: 00012 1
23,2030	05504 0	C: 00264 1	05504 0	C: 00126 1	00003 1	31113 0	14640 0	C: 01014 0
23,2040	C: 77757 1	I: 47135 0	C: 03753 0	C: 21576 0	I: 41401 1	C: 00001 0	I: 57556 0	C: 14043 0
23,2050	I: 41546 0	I: 47135 0	C: 03754 1	C: 21576 0	I: 71406 0	I: 72405 0	C: 00001 0	C: 14045 0
23,2060	I: 41356 1	I: 77752 1	C: 24041 1	C: 00041 1	I: 77616 0	C: 14025 0	C: 00155 0	I: 40234 0
23,2070	C: 21576 0	C: 00701 0	I: 73406 1	I: 77676 0	C: 14043 0	I: 41546 0	I: 47135 0	C: 00026 0
23,2100	C: 21576 0	I: 77650 1	C: 46054 1	35010 0	04616 1	C: 20476 0	15472 1	12111 0
23,2110	12103 0	05504 0	C: 00124 0	04616 1	C: 54123 0	15472 1	04645 1	55143 1
23,2120	05504 0	C: 00024 1	02127 1	04645 1	55143 1	05516 0	C: 00024 1	34747 1
23,2130	70075 1	00006 1	12271 0	06037 0	I: 77775 1	C: 06514 1	C: 03765 0	I: 43234 0
23,2140	C: 21573 0	C: 15712 1	C: 34041 0	C: 51255 1	I: 77775 1	C: 01102 0	C: 02773 1	I: 45034 1
23,2150	C: 46277 1	C: 56032 0	C: 00322 1	I: 77776 1	05353 1	C: 04022 0	34747 1	70075 1
23,2160	00006 1	12271 0	04616 1	C: 54255 1	10000 0	02257 0	06037 0	I: 45175 0
23,2170	C: 01102 0	C: 47646 0	I: 45345 1	C: 00162 1	C: 06275 1	I: 77440 1	C: 46213 0	35015 0
23,2200	54003 0	00004 0	00006 1	30322 1	53636 1	30323 0	55637 0	00003 1
23,2210	35016 0	54003 0	02236 1	I: 77776 1	00004 0	04674 0	C: 40153 1	04674 0
23,2220	C: 40140 0	05516 0	C: 00124 0	05504 0	C: 00077 1	04616 1	C: 54123 0	00004 0
23,2230	04674 0	C: 40123 0	05353 1	C: 04022 0	05516 0	C: 00077 1	30075 0	74742 0
23,2240	10000 0	02262 0	11745 1	02245 0	02262 0	55745 1	32276 0	05173 1
23,2250	C: 02252 0	05155 0	37714 1	05105 0	C: 02127 1	C: 46067 1	05261 1	04616 1
23,2260	C: 54266 1	02236 1	31143 0	14640 0	32273 0	70074 0	00006 1	15155 1
23,2270	02236 1	04635 0	C: 50232 1	C: 00500 1	C: 17350 1	C: 34602 1	C: 01130 1	00004 0
23,2300	35015 0	56003 1	54070 1	31635 0	54154 0	00006 1	31637 1	52156 1
23,2310	30070 0	54003 0	00003 1	16477 1	C: 00302 0	C: 17755 0	I: 53754 1	C: 02777 1
23,2320	C: 57176 0	C: 26744 1	I: 52750 0	C: 02776 0	C: 57176 0	C: 02655 0	I: 45020 1	C: 03463 0
23,2330	C: 46344 0	C: 37671 0	C: 25674 0	I: 41401 1	C: 00003 1	I: 65225 1	C: 03671 1	C: 00001 0
23,2340	I: 45206 1	C: 03671 1	I: 52006 0	C: 03463 0	I: 41545 0	C: 06315 0	I: 62130 0	C: 00047 1
23,2350	C: 00002 0	I: 46135 1	C: 00050 1	C: 46357 1	I: 51575 1	C: 02023 1	I: 77725 1	I: 43545 1
23,2360	I: 77620 0	C: 03463 0	C: 37574 0	C: 27057 0	I: 77624 1	C: 46376 1	I: 77745 1	C: 03574 1
23,2370	C: 34041 0	C: 27043 0	I: 77624 1	C: 46406 1	I: 77650 1	C: 03463 0	I: 43175 0	C: 00001 0

OCTAL LISTING FOR PARAGRAPH # 125, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

23,2400	C: 01352 1	C: 46412 1	C: 27536 1	C: 00007 0	C: 03544 1	I: 77616 0	I: 43175 0	C: 00001 0
23,2410	C: 01352 1	C: 46402 0	C: 27552 0	C: 00007 0	C: 03560 1	I: 77616 0	I: 53754 1	C: 02777 1
23,2420	C: 57176 0	I: 63350 1	C: 02776 0	I: 63257 1	C: 57176 0	I: 77616 0	I: 53754 1	C: 02777 1
23,2430	C: 57576 1	I: 77616 0	I: 40220 0	C: 01164 0	C: 00001 0	I: 41575 0	C: 06514 1	I: 41434 1
23,2440	C: 21573 0	I: 77524 1	C: 55716 1	I: 74321 1	C: 01734 0	C: 16027 0	C: 26325 1	C: 02023 1
23,2450	I: 52446 0	C: 36333 1	C: 01164 0	C: 00046 0	C: 07374 0	C: 04145 0	C: 15527 0	C: 00007 0
23,2460	C: 23346 1	C: 06037 0	I: 43175 0	C: 03545 0	C: 03347 1	C: 66415 1	I: 64252 0	C: 01734 0
23,2470	C: 37521 0	C: 67130 1	I: 76575 1	C: 03553 1	I: 77721 0	C: 01734 0	C: 27527 1	C: 01726 0
23,2500	I: 53435 0	C: 01720 0	C: 03720 1	I: 77776 1	00006 1	34755 1	52755 1	04635 0
23,2510	C: 65420 1	C: 10000 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 20000 0
23,2520	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 37777 1
23,2530	C: 37777 1	I: 77620 0	C: 02772 1	I: 66570 0	C: 00066 1	C: 00051 0	C: 00022 1	I: 66374 1
23,2540	C: 00022 1	C: 00052 0	C: 00006 1	I: 63775 1	C: 03525 0	C: 02467 0	C: 12665 1	I: 77775 1
23,2550	C: 03533 1	I: 52717 1	C: 02555 0	C: 75112 1	C: 12665 1	I: 77775 1	C: 03541 1	I: 52717 1
23,2560	C: 02643 1	C: 75112 1	C: 12665 1	I: 77700 0	C: 46565 0	I: 43104 0	C: 46543 1	C: 02706 1
23,2570	C: 46574 0	I: 77775 1	C: 06522 1	C: 02657 1	I: 77201 1	C: 00001 0	C: 02643 1	I: 47036 1
23,2600	C: 21633 1	I: 47515 0	C: 02651 1	I: 76234 0	C: 21633 1	I: 47515 0	C: 02657 1	I: 76234 0
23,2610	C: 21633 1	I: 77171 0	C: 02707 0	C: 00000 1	C: 02665 0	I: 40151 0	C: 02707 0	C: 46620 1
23,2620	C: 02670 1	I: 77654 0	C: 46631 1	I: 40112 1	C: 46631 1	C: 02670 1	I: 52114 1	C: 00001 0
23,2630	C: 46623 1	I: 61551 1	C: 02665 0	I: 75405 1	C: 02670 1	I: 76257 0	C: 57576 1	C: 02665 0
23,2640	I: 63101 1	C: 00050 1	C: 77775 1	I: 77134 1	C: 02103 1	C: 00242 0	I: 40265 1	C: 06512 1
23,2650	C: 00001 0	C: 03500 1	I: 60351 0	C: 02665 0	C: 00047 1	I: 65345 0	C: 00155 0	C: 03547 1
23,2660	I: 77701 1	C: 00051 0	I: 70460 1	C: 00050 1	I: 41471 0	I: 77650 1	C: 45711 1	I: 77731 1
23,2670	C: 00052 0	C: 00066 1	I: 60775 1	C: 02643 1	C: 75134 0	I: 77206 0	C: 02651 1	I: 53303 1
23,2700	C: 75112 1	I: 77206 0	C: 02657 1	I: 53303 1	C: 75070 1	I: 61006 0	C: 46672 0	I: 45575 1
23,2710	C: 74260 0	I: 45575 1	C: 74266 0	I: 45575 1	C: 74274 0	I: 77214 0	C: 02706 1	C: 46722 1
23,2720	C: 05522 1	C: 03517 1	I: 66374 1	C: 00022 1	C: 00052 0	C: 00006 1	I: 77773 1	C: 74252 1
23,2730	I: 53761 1	C: 00001 0	C: 20201 0	C: 12707 1	I: 77304 0	C: 46726 0	C: 02673 1	I: 77732 1
23,2740	C: 02673 1	I: 77650 1	C: 02772 1	I: 45020 1	C: 02772 1	C: 27414 0	I: 74375 0	C: 03503 1
23,2750	C: 03500 1	C: 26713 0	C: 03511 1	I: 77761 1	C: 03500 1	C: 26721 1	C: 03517 1	I: 77761 1
23,2760	C: 03500 1	C: 02727 1	I: 77776 1	33244 0	55320 0	55321 1	34755 1	55322 1
23,2770	55323 0	05353 1	C: 04022 0	05504 0	C: 00236 0	31321 0	55320 0	31323 1

JCTAL LISTING FOR PARAGRAPH # 136, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

23,000	55322 1	06037 0	I: 73150 1	C: 01320 1	C: 01322 0	I: 70731 0	C: 00051 0	C: 00006 1
23,3010	C: 75134 0	I: 60276 1	C: 00052 0	I: 65161 1	C: 02713 0	C: 00051 0	I: 57144 1	C: 00047 1
23,3020	C: 02103 1	I: 65057 0	C: 57576 1	C: 00051 0	I: 77653 1	C: 02467 0	C: 02735 1	I: 57543 1
23,3030	C: 75134 0	I: 74301 0	C: 00052 0	C: 02721 1	I: 71124 0	C: 00051 0	C: 00047 1	I: 53674 1
23,3040	C: 02103 1	C: 57576 1	I: 52724 1	C: 00051 0	C: 02555 0	C: 02743 0	I: 77614 1	C: 02746 0
23,3050	C: 47070 0	I: 57543 1	C: 75134 0	I: 74301 0	C: 00052 0	C: 02727 1	I: 71124 0	C: 00051 0
23,3060	C: 00047 1	I: 53674 1	C: 02103 1	C: 57576 1	I: 52724 1	C: 00051 0	C: 02643 1	C: 02751 0
23,3070	I: 77624 1	C: 11244 0	I: 77776 1	31320 1	63245 1	55321 1	21322 0	67746 0
23,3100	55323 0	06037 0	I: 66350 1	C: 01320 1	C: 00051 0	C: 00006 1	I: 77775 1	C: 02735 1
23,3110	C: 06467 1	I: 77775 1	C: 02743 0	C: 06555 1	I: 77214 0	C: 02746 0	C: 47126 1	C: 02751 0
23,3120	C: 06643 0	I: 52100 1	C: 47124 0	C: 47134 1	I: 77634 0	C: 46771 1	I: 43335 0	C: 01324 0
23,3130	C: 07247 1	I: 52030 0	C: 47134 1	C: 47121 0	I: 77624 1	C: 11244 0	I: 53375 0	C: 01701 0
23,3140	C: 02701 0	C: 03472 0	I: 47014 1	C: 00707 1	C: 47234 1	C: 26770 0	I: 77004 0	C: 57753 1
23,3150	C: 00000 1	I: 77014 1	C: 04344 0	C: 47155 0	C: 00002 0	I: 53775 1	C: 02665 0	C: 57205 1
23,3160	I: 40055 0	C: 01521 0	C: 47174 0	C: 25521 0	C: 02673 1	I: 53257 1	C: 57202 0	C: 01527 0
23,3170	I: 77600 1	C: 47200 0	C: 35527 1	C: 47207 1	I: 53375 0	C: 01535 0	C: 02665 0	C: 01535 0
23,3200	I: 53375 0	C: 01543 1	C: 02573 1	C: 01543 1	I: 45134 0	C: 02030 0	C: 23441 1	I: 77624 1
23,3210	C: 11244 0	I: 47014 1	C: 00707 1	C: 47237 1	C: 26747 1	I: 77624 1	C: 26070 1	I: 77624 1
23,3220	C: 11244 0	I: 77214 0	C: 02746 0	C: 47226 1	C: 03472 0	C: 01701 0	I: 66150 0	C: 02772 1
23,3230	C: 00052 0	I: 77775 1	04635 0	C: 27425 1	I: 52034 1	C: 26723 0	C: 47146 1	I: 45034 1
23,3240	C: 25674 0	C: 26114 1	I: 77650 1	C: 47217 0	C: 00066 1	C: 77771 0	C: 00014 1	I: 71220 1
23,3250	C: 00051 0	C: 02665 0	I: 65325 0	C: 06522 1	C: 02671 0	I: 55476 1	I: 77656 1	C: 14027 1
23,3260	C: 00027 1	I: 77742 0	C: 14023 0	C: 00033 1	I: 77742 0	C: 34021 0	C: 47320 0	C: 16742 1
23,3270	C: 02667 1	I: 77742 0	C: 14023 0	C: 00027 1	I: 65205 0	C: 02671 0	C: 00033 1	I: 45205 1
23,3300	C: 02665 0	I: 77626 0	C: 43756 1	C: 47320 0	C: 26744 1	C: 00027 1	I: 77641 1	C: 02701 0
23,3310	C: 24021 1	C: 00027 1	I: 77641 1	C: 02673 1	C: 34023 1	C: 47320 0	C: 36740 1	C: 00051 0
23,3320	I: 51545 1	C: 00023 0	I: 50025 0	C: 07534 1	C: 47333 1	I: 72545 0	C: 00021 1	I: 75326 1
23,3330	C: 00023 0	C: 00025 0	I: 77616 0	I: 72545 0	C: 00023 0	I: 77736 0	C: 14025 0	C: 00021 1
23,3340	I: 77640 0	C: 47344 1	I: 43545 1	C: 00025 0	I: 75345 1	C: 06520 0	C: 00023 0	I: 77625 0
23,3350	C: 00025 0	C: 00025 0	I: 77616 0	I: 77601 0	C: 00001 0	I: 47375 0	C: 02665 0	C: 02651 1
23,3360	I: 41456 0	I: 44041 1	C: 02701 0	C: 00051 0	C: 24021 1	C: 00001 0	I: 77641 1	C: 02673 1
23,3370	C: 34023 1	C: 47320 0	C: 26740 0	C: 00001 0	I: 50235 0	C: 02665 0	C: 02651 1	I: 77752 1

DCTAL LISTING FOR PARAGRAPH # 137, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

23,3400	C: 24021 1	C: 02651 1	I: 77641 1	C: 02665 0	C: 34023 1	C: 47320 0	C: 02744 1	I: 45246 0
23,3410	C: 07536 0	I: 77644 1	C: 47431 1	I: 50375 0	C: 02657 1	C: 00001 0	C: 24021 1	C: 02643 1
23,3420	I: 45441 1	C: 43754 0	C: 47320 0	C: 26742 1	C: 02740 0	I: 77634 0	C: 21620 0	C: 34322 0
23,3430	C: 00051 0	I: 77776 1	05567 0	C: 00401 1	05504 0	C: 00056 1	06037 0	I: 77650 1
23,3440	C: 47413 1	I: 66370 0	C: 02714 1	C: 00051 0	C: 02700 1	I: 77601 0	C: 00001 0	I: 46773 0
23,3450	C: 02723 0	C: 02731 0	I: 77656 1	C: 06731 1	I: 77773 1	C: 02723 0	I: 76433 1	C: 02731 0
23,3460	C: 06737 1	I: 77700 0	C: 47447 0	I: 66160 0	C: 00006 1	C: 00036 1	I: 66370 0	C: 00022 1
23,3470	C: 00051 0	C: 00006 1	I: 66374 1	C: 00006 1	C: 00052 0	C: 00002 0	I: 76720 0	C: 00036 1
23,3500	C: 00001 0	I: 62757 0	C: 75062 1	C: 00007 0	I: 77757 1	C: 75054 1	C: 30031 0	C: 00015 0
23,3510	I: 53357 0	C: 75046 1	I: 76455 1	C: 00031 0	I: 53520 0	C: 00036 1	C: 06707 1	I: 77700 0
23,3520	C: 47521 1	I: 77704 1	C: 47476 1	I: 77775 1	C: 02665 0	C: 26707 0	C: 02673 1	C: 26715 0
23,3530	C: 02701 0	C: 02723 0	I: 77616 0	C: 05520 0	C: 26075 1	C: 05252 1	C: 25253 1	I: 77776 1
23,3540	03547 1	06037 0	I: 77616 0	I: 77776 1	03555 1	06037 0	I: 77616 0	30032 0
23,3550	54772 1	30033 1	54766 1	30034 0	54770 0	00006 1	22142 0	34751 0
23,3560	76242 1	54143 0	50143 1	30766 0	52155 1	52127 1	04713 0	C: 21576 0
23,3570	00006 1	30155 0	50143 1	52767 0	04713 0	C: 01517 0	52155 1	50143 1
23,3600	52745 0	00006 1	50143 1	30767 1	04713 0	C: 01531 1	52127 1	52155 1
23,3610	50143 1	52737 0	10143 0	13560 0	00142 0	00004 0	00006 1	22061 0
23,3620	34751 0	76242 1	54062 1	50062 0	30766 0	05033 1	00006 1	74736 0
23,3630	50062 0	52737 0	50062 0	30766 0	05032 0	00006 1	74736 0	50062 0
23,3640	52745 0	10062 1	13621 0	30061 0	00003 1	00000 1	I: 77776 1	03547 1
23,3650	13653 0	I: 77776 1	03555 1	07532 1	46245 0	03675 0	06037 0	I: 43575 1
23,3660	C: 00123 1	I: 77776 1	03547 1	13666 0	I: 77776 1	03555 1	07532 1	36245 1
23,3670	13655 0	I: 77776 1	13653 0	I: 77776 1	13666 0	54142 1	00006 1	22145 1
23,3700	10142 1	40142 1	66245 1	00006 1	50000 1	33764 1	52144 1	34753 1
23,3710	54130 1	00006 1	50143 1	40123 0	13716 0	52131 0	52155 1	33762 1
23,3720	60143 1	54116 0	07107 0	10142 1	52155 1	13730 1	00006 1	40155 1
23,3730	52160 1	36242 0	26116 0	00006 1	50130 0	50143 1	30123 1	52155 1
23,3740	07107 0	52155 1	20160 1	52160 1	20001 1	50130 0	50143 1	52123 0
23,3750	52131 0	10000 0	13715 0	00006 1	26142 1	10142 1	13700 1	00145 1
23,3760	13700 1	00145 1	C: 00736 0	C: 00004 0	C: 00002 0	C: 00000 1	C: 00004 0	C: 03767 1
23,3770	C: 03770 1	CKSM 57135 1	@	@	@	@	@	@

JCTAL LISTING FOR PARAGRAPH # 140, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

24,2000	05327 1	C: 00004 0	C: 05022 1	C: 26000 0	02667 1	02007 1	02036 0	05504 0
24,2010	C: 00026 0	34753 1	55145 1	32311 0	04616 1	C: 20633 0	06001 0	02021 0
24,2020	02013 1	42312 1	61145 0	00006 1	12040 0	32315 1	04616 1	C: 20476 0
24,2030	05001 0	02033 0	02025 1	06037 0	I: 77650 1	C: 64217 1	05516 0	C: 00026 0
24,2040	04616 1	C: 11254 1	05504 0	C: 00027 1	05504 0	C: 00031 0	05504 0	C: 00010 0
24,2050	05516 0	C: 00037 0	05516 0	C: 00040 0	05516 0	C: 00063 1	05516 0	C: 00126 1
24,2060	05516 0	C: 00041 1	05011 1	05353 1	C: 04022 0	34755 1	55462 1	06037 0
24,2070	I: 77634 0	C: 21573 0	C: 34041 0	C: 51255 1	I: 77624 1	C: 53565 1	I: 77776 1	50154 1
24,2100	02101 0	02111 1	32305 0	04616 1	C: 21562 0	06022 1	02102 0	02063 0
24,2110	05155 0	05353 1	C: 04022 0	02667 1	02117 1	04616 1	C: 46116 0	05353 1
24,2120	C: 05022 1	C: 10000 0	37714 1	05146 1	30075 0	74747 0	00006 1	12232 1
24,2130	34752 0	00005 1	02033 0	00006 1	12170 1	46007 1	61011 0	00006 1
24,2140	12153 0	67746 0	00006 1	12153 0	32307 1	04616 1	C: 21562 0	06022 1
24,2150	02117 1	02117 1	05155 0	32306 0	04616 1	C: 20623 1	05022 1	02117 1
24,2160	02667 1	02166 1	03135 0	05504 0	C: 00040 0	02117 1	04364 1	02117 1
24,2170	40110 0	74737 1	00006 1	12205 0	34355 0	70076 1	00006 1	12211 0
24,2200	05516 0	C: 00037 0	05516 0	C: 00040 0	02232 0	02304 1	04616 1	C: 01735 1
24,2210	02170 0	06037 0	I: 77634 0	C: 21573 0	C: 34041 0	C: 50316 0	I: 77776 1	05353 1
24,2220	C: 04022 0	30074 1	74745 1	00006 1	15155 1	30075 0	74747 0	00006 1
24,2230	12264 1	02674 0	32304 1	05173 1	C: 02244 1	30075 0	74747 0	00006 1
24,2240	15155 1	05353 1	C: 40072 0	05155 0	30074 1	74745 1	00006 1	15261 0
24,2250	30075 0	74747 0	00006 1	12261 1	37714 1	05105 0	C: 02627 0	C: 50067 0
24,2260	05261 1	05221 0	C: 02734 0	02244 1	32666 0	05173 1	C: 02270 0	05155 0
24,2270	30075 0	74747 0	10000 0	12277 0	05221 0	C: 02734 0	02270 0	37714 1
24,2300	05105 0	C: 02211 1	C: 50067 0	05261 1	C: 00372 1	C: 00526 0	C: 00201 1	C: 00514 1
24,2310	C: 00074 1	C: 00012 1	C: 00001 0	C: 10000 0	C: 00000 1	C: 01441 1	I: 45020 1	C: 01757 0
24,2320	C: 27414 0	I: 77624 1	C: 26644 0	I: 43014 0	C: 02756 1	C: 50336 1	C: 01476 0	I: 43014 0
24,2330	C: 04307 1	C: 50333 1	C: 01475 0	I: 77614 1	C: 00747 0	C: 50370 0	I: 77614 1	C: 01474 1
24,2340	I: 77624 1	C: 27134 1	I: 77624 1	C: 11244 0	I: 77624 1	C: 27414 0	I: 43145 0	C: 01571 0
24,2350	C: 01674 0	I: 77624 1	C: 26644 0	C: 34041 0	C: 27134 1	I: 77214 0	C: 04347 0	C: 50216 1
24,2360	C: 01651 1	I: 77742 0	C: 26352 1	C: 01667 1	I: 77742 0	C: 02360 0	I: 77650 1	C: 01757 0
24,2370	I: 45014 0	C: 01674 0	C: 27134 1	I: 77624 1	C: 11244 0	I: 77624 1	C: 27414 0	I: 71214 0

OCTAL LISTING FOR PARAGRAPH # 141. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

24,2400	C: 01474 1	C: 01643 1	I: 77650 1	C: 50351 0	05327 1	C: 00004 0	C: 05022 1	C: 26000 0
24,2410	04616 1	C: 11254 1	05504 0	C: 00031 0	05504 0	C: 00006 1	05353 1	C: 04022 0
24,2420	34743 0	70074 0	00006 1	15155 1	34747 1	70075 1	00006 1	12437 1
24,2430	34757 0	55745 1	04616 1	C: 46123 0	02416 0	05353 1	C: 00112 0	32450 1
24,2440	05173 1	C: 02443 0	05155 0	35024 1	05105 0	C: 02416 0	C: 50067 0	05261 1
24,2450	C: 13560 0	05353 1	C: 04022 0	34745 0	70074 0	00006 1	15155 1	34747 1
24,2460	70075 1	00006 1	12636 1	34736 1	00006 1	02012 0	00006 1	12111 0
24,2470	34752 0	00006 1	02033 0	00006 1	12476 1	02135 1	40110 0	74737 1
24,2500	00006 1	12627 1	05353 1	C: 00152 1	04616 1	C: 64366 0	50154 1	02510 1
24,2510	02521 1	02217 1	32663 0	04616 1	C: 21562 0	06022 1	02521 0	02512 0
24,2520	05155 0	05353 1	C: 04022 0	32664 1	04616 1	C: 20507 1	06022 1	02531 1
24,2530	02217 1	05353 1	C: 04022 0	02667 1	02551 1	30075 0	74747 0	00006 1
24,2540	12626 1	04616 1	C: 51233 0	50154 1	02545 1	02551 1	04616 1	C: 46116 0
24,2550	02636 0	40075 1	74746 1	00006 1	12627 1	30075 0	74745 1	00006 1
24,2560	12627 1	37734 1	55056 1	06037 0	I: 77650 1	C: 54412 1	I: 77776 1	05353 1
24,2570	C: 04022 0	12622 1	I: 77776 1	34755 1	55746 1	05353 1	C: 04022 0	37715 0
24,2600	05072 1	C: 02644 0	C: 50067 0	06037 0	I: 77735 0	C: 03747 0	I: 50054 0	C: 50604 0
24,2610	C: 50616 0	I: 77776 1	02667 1	02636 0	34755 1	02632 1	I: 77624 1	C: 11244 0
24,2620	I: 77650 1	C: 55431 1	25462 0	02667 1	02640 1	34756 1	02632 1	02667 1
24,2630	02640 1	34752 0	55745 1	04616 1	C: 46123 0	02451 0	32666 0	02233 1
24,2640	35000 1	04616 1	C: 01735 1	02451 0	32665 0	04616 1	C: 20507 1	06022 1
24,2650	44753 0	55746 1	05155 0	05353 1	C: 00152 1	04616 1	C: 53103 0	04616 1
24,2660	C: 17714 0	02217 1	02451 0	C: 00525 0	C: 01405 1	C: 01461 0	C: 02734 0	40104 0
24,2670	74744 0	10000 0	24002 0	00002 0	44736 0	00006 1	03012 1	02667 1
24,2700	02705 1	34755 1	55107 1	55110 1	02715 0	34740 0	70110 0	10000 0
24,2710	02725 0	34735 1	55107 1	44736 0	55110 1	05516 0	C: 03012 1	04616 1
24,2720	C: 52475 0	02722 1	04616 1	C: 17714 0	02760 1	05504 0	C: 00041 1	32310 1
24,2730	55114 0	36245 1	55456 0	06037 0	I: 43234 0	C: 21573 0	C: 11120 1	C: 34041 0
24,2740	C: 51255 1	I: 77776 1	05504 0	C: 00012 1	05516 0	C: 00126 1	06037 0	I: 77624 1
24,2750	C: 52373 1	I: 77776 1	02777 1	02111 1	04616 1	C: 17714 0	02760 1	02767 0
24,2760	32775 0	04616 1	C: 21562 0	06022 1	02772 1	02211 1	05155 0	05516 0
24,2770	C: 00041 1	03121 0	05353 1	C: 04022 0	03206 0	C: 00503 1	C: 00527 1	32310 1

DATA LISTING FOR PARAGRAPH # 142. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

24,3000	55423 1	05504 0	C: 00005 1	05516 0	C: 00041 1	06037 0	I: 77634 0	C: 21573 0
24,3010	I: 77615 0	C: 11116 1	C: 03425 1	C: 34041 0	C: 51255 1	I: 77624 1	C: 52373 1	I: 77776 1
24,3020	03033 1	05155 0	06027 1	C: 52573 1	06037 0	I: 77614 1	C: 00345 0	C: 51043 1
24,3030	I: 77614 1	C: 00225 1	C: 51037 1	11423 1	03036 1	03105 0	55423 1	06037 0
24,3040	I: 52145 0	C: 03425 1	C: 51010 1	I: 77745 1	C: 03425 1	C: 34041 0	C: 50316 0	I: 77776 1
24,3050	05504 0	C: 00264 1	05516 0	C: 00012 1	05504 0	C: 00126 1	04616 1	C: 52475 0
24,3060	03061 0	06037 0	I: 44234 1	C: 21573 0	C: 03425 1	C: 03427 0	I: 77776 1	00006 1
24,3070	31427 1	05277 0	C: 03075 0	C: 50067 0	05155 0	06027 1	C: 52602 1	06011 1
24,3100	37714 1	05105 0	C: 02725 0	C: 50067 0	05261 1	33114 0	04616 1	C: 21562 0
24,3110	06022 1	06022 1	06022 1	05155 0	C: 00530 1	C: 00000 1	C: 01750 1	C: 00000 1
24,3120	C: 00062 0	05353 1	C: 04022 0	33134 1	04616 1	C: 20710 0	06022 1	02232 0
24,3130	03123 1	34745 0	05464 1	05155 0	C: 01510 1	05504 0	C: 00126 1	00004 0
24,3140	04674 0	C: 40140 0	00003 1	34736 1	00006 1	05012 1	33205 0	04616 1
24,3150	C: 20623 1	03176 1	03154 1	03201 1	00004 0	04523 1	C: 00035 1	03166 0
24,3160	04674 0	C: 40123 0	00003 1	05516 0	C: 00126 1	02163 1	00003 1	33204 1
24,3170	04616 1	C: 21562 0	03176 1	03167 1	03201 1	05155 0	05516 0	C: 00126 1
24,3200	05022 1	04616 1	C: 46116 0	03143 1	C: 00501 0	C: 00205 0	05504 0	C: 00037 0
24,3210	05516 0	C: 00041 1	34755 1	55733 0	55734 1	55735 0	05353 1	C: 04022 0
24,3220	33254 1	04616 1	C: 20504 1	06022 1	03230 0	03234 1	04616 1	C: 55442 0
24,3230	05027 1	C: 55643 0	06011 1	12063 1	05353 1	C: 04022 0	06027 1	C: 55643 0
24,3240	06011 1	00003 1	34774 1	04616 1	C: 01735 1	02667 1	03251 1	04616 1
24,3250	C: 45116 0	34755 1	55306 1	03216 1	C: 04120 0	I: 43020 1	C: 01757 0	C: 01343 1
24,3260	C: 51264 0	I: 77614 1	C: 04307 1	C: 51274 1	I: 77624 1	C: 27100 0	I: 77775 1	C: 00001 0
24,3270	C: 26352 1	C: 00007 0	C: 16360 0	C: 00015 0	C: 34041 0	C: 27066 1	I: 52375 1	C: 00007 0
24,3300	C: 02360 0	I: 76521 0	C: 01734 0	I: 77776 1	06027 1	C: 52602 1	06037 0	C: 25761 0
24,3310	C: 00001 0	I: 43051 1	C: 02352 1	C: 00350 1	C: 51321 0	I: 77604 0	C: 57753 1	I: 77561 0
24,3320	C: 20212 1	I: 41056 1	C: 50102 1	I: 76521 0	C: 01734 0	C: 15102 0	C: 00045 0	C: 01767 0
24,3330	I: 77614 1	C: 00231 1	C: 01757 0	04645 1	55737 1	06037 0	I: 65545 0	C: 03745 1
24,3340	I: 50025 0	C: 11355 1	C: 51347 0	I: 77776 1	34753 1	54154 0	13352 1	I: 77776 1
24,3350	34755 1	54154 0	31737 0	04640 1	C: 02525 1	C: 12525 0	35031 0	05072 1
24,3360	C: 02547 0	C: 64063 0	34774 1	05224 0	40110 0	74742 0	10000 0	15261 0
24,3370	40076 1	74740 1	00006 1	13376 1	26076 1	13356 0	34753 1	13363 0

DETAILED LISTING FOR PARAGRAPH # 142. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

24,3400	37714 1	05072 1	C: 03413 1	C: 50067 0	35000 1	05224 0	30077 1	74743 1
24,3410	10000 0	13400 1	15261 0	30077 1	74741 0	10000 0	13475 0	30110 1
24,3420	74752 1	10000 0	13475 0	04616 1	C: 53103 0	04616 1	C: 17714 0	13475 0
24,3430	53106 0	52155 1	00004 0	00006 1	30036 1	52157 0	00006 1	30034 0
24,3440	52161 0	30032 0	54162 0	04616 1	C: 53105 0	04616 1	C: 17714 0	13466 1
24,3450	00004 0	53334 0	53757 1	52155 1	53755 0	52157 0	53753 0	52161 0
24,3460	53460 0	30162 1	55461 1	34753 1	55462 1	15155 1	40101 0	74742 0
24,3470	10000 0	13475 0	05516 0	C: 00120 1	13443 0	34755 1	55462 1	05516 0
24,3500	C: 00063 1	44736 0	00006 1	03012 1	15155 1	34753 1	55145 1	34752 0
24,3510	04616 1	C: 20633 0	06001 0	03515 0	03507 0	33665 1	04616 1	C: 20476 0
24,3520	05001 0	03523 0	03515 0	06037 0	I: 77745 1	C: 01046 1	C: 34041 0	C: 27414 0
24,3530	I: 43014 0	C: 00304 0	C: 51550 0	C: 01674 0	I: 70535 0	C: 01146 0	I: 43030 0	C: 51541 0
24,3540	C: 01474 1	I: 43014 0	C: 01676 1	C: 01673 1	I: 77624 1	C: 27134 1	I: 77650 1	C: 51571 0
24,3550	I: 77775 1	C: 03676 0	C: 25535 0	C: 03704 1	C: 15543 1	C: 03763 0	C: 01517 0	I: 43014 0
24,3560	C: 01676 1	C: 00263 0	I: 53135 0	C: 01164 0	C: 51567 1	I: 77614 1	C: 00063 1	I: 77624 1
24,3570	C: 27107 1	I: 77745 1	C: 00015 0	C: 27763 0	C: 00017 1	C: 27676 0	C: 00025 0	C: 03704 1
24,3600	I: 53646 0	C: 57576 1	C: 27712 0	C: 00001 0	I: 50256 0	C: 00007 0	I: 67471 1	C: 03712 0
24,3610	C: 03714 0	I: 67334 1	C: 01163 1	C: 01146 0	I: 46142 1	C: 51620 1	I: 77650 1	C: 51623 1
24,3620	I: 77614 1	C: 04307 1	C: 51625 1	I: 77614 1	C: 00064 0	I: 67214 1	C: 01663 0	C: 00050 1
24,3630	I: 43054 1	C: 51633 0	C: 01463 1	I: 77775 1	C: 00001 0	C: 16032 1	C: 00015 0	I: 45014 0
24,3640	C: 00662 0	C: 26351 1	I: 77605 1	C: 11667 0	C: 03716 1	I: 77776 1	33664 0	04616 1
24,3650	C: 20476 0	06001 0	06001 0	06037 0	I: 43345 1	C: 03763 0	C: 11663 1	C: 01046 1
24,3660	I: 77634 0	C: 51515 1	C: 00003 1	C: 25140 0	C: 01453 1	C: 01442 1	C: 00243 1	C: 32703 1
24,3670	I: 46020 1	C: 00050 1	C: 51712 1	I: 77624 1	C: 51720 0	I: 61375 1	C: 02013 1	C: 00025 0
24,3700	I: 77772 0	I: 51235 1	C: 00001 0	C: 00001 0	I: 77721 0	C: 00025 0	I: 40372 0	C: 00001 0
24,3710	I: 77650 1	C: 00050 1	I: 77624 1	C: 55743 1	I: 77624 1	C: 15753 1	I: 77650 1	C: 51701 0
24,3720	I: 40220 0	C: 00051 0	C: 00011 1	I: 77770 1	C: 00005 1	I: 65345 0	C: 14017 1	C: 14011 1
24,3730	I: 45006 0	C: 53743 1	I: 71406 0	C: 14041 1	I: 77756 0	C: 14043 0	C: 14015 0	I: 41525 0
24,3740	C: 14007 0	I: 45170 0	C: 00004 0	C: 53743 1	C: 14027 1	C: 14013 0	I: 41525 0	C: 14005 1
24,3750	I: 45170 0	C: 00005 1	C: 53743 1	I: 71406 0	I: 77606 1	C: 00025 0	I: 76405 1	C: 00041 1
24,3760	C: 14035 1	I: 76405 1	C: 00043 0	C: 14037 0	I: 41556 1	I: 77676 0	C: 14033 1	C: 00027 1
24,3770	C: 14007 0	I: 76405 1	C: 00041 1	I: 77650 1	C: 53671 1	C: 03775 1	C: 03776 1	CKSM 76466 1

DCTAL LISTING FOR PARAGRAPH # 144. WITH PARITY BIT IN DIVARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

25,2000	C: 47777 0	C: 00001 0	C: 01150 1	11755 0	12006 1	15261 0	05203 0	C: 02003 0
25,2010	C: 52064 1	37713 0	05072 1	C: 02023 1	C: 52064 1	34736 1	00006 1	71754 1
25,2020	61753 1	55751 1	15261 0	02047 0	04615 1	C: 17714 0	25756 1	00004 0
25,2030	30101 1	74741 0	10000 0	12037 0	53102 1	51754 0	53601 0	41754 1
25,2040	61752 0	00006 1	12045 0	31754 0	64752 0	55754 1	15155 1	34753 1
25,2050	54133 1	51751 0	32054 1	14622 1	C: 53105 0	C: 53103 0	C: 53101 1	C: 53077 1
25,2060	C: 53075 0	C: 53073 0	02071 0	05221 0	C: 00144 0	44753 0	70110 0	54110 0
25,2070	15261 0	00006 1	23315 1	34753 1	00006 1	05012 1	05221 0	C: 00002 0
25,2100	34755 1	54035 0	54036 0	44753 0	00006 1	03012 1	05221 0	C: 01750 1
25,2110	44737 1	70110 0	54110 0	30035 1	04512 0	C: 57777 1	12121 0	34755 1
25,2120	12122 0	34740 0	56110 1	77741 0	26110 0	04564 1	01315 1	02156 1
25,2130	05221 0	C: 00002 0	34740 0	70110 0	10000 0	34735 1	02241 1	34740 0
25,2140	70110 0	10000 0	44736 0	02244 1	44741 0	70110 0	54110 0	74742 0
25,2150	10000 0	12573 0	44752 1	00006 1	03012 1	15261 0	34752 0	00006 1
25,2160	02012 0	10000 0	00002 0	54112 1	54113 0	34752 0	00006 1	05012 1
25,2170	00002 0	34740 0	70110 0	10000 0	34735 1	02241 1	37740 0	02244 1
25,2200	40110 0	74740 1	10000 0	32232 0	62231 0	02241 1	40110 0	74740 1
25,2210	10000 0	34735 1	02241 1	40110 0	74740 1	10000 0	44736 0	02244 1
25,2220	02233 1	44736 0	70110 0	54110 0	34742 1	70110 0	00006 1	13555 0
25,2230	02602 1	C: 57070 1	C: 61515 1	22110 1	34740 0	00006 1	06001 0	54110 0
25,2240	00002 0	55316 0	34755 1	12246 1	55316 0	34753 1	55317 1	00006 1
25,2250	23315 1	12254 1	05221 0	C: 00062 0	40110 0	77710 1	00006 1	12144 0
25,2260	31316 1	00006 1	51317 0	20035 0	54061 1	00006 1	72305 1	54001 1
25,2270	30110 1	74752 1	56061 0	04512 0	C: 77644 1	10061 1	01315 1	11317 1
25,2300	12302 0	56001 0	53110 1	02306 0	12252 1	C: 22715 1	22002 0	34753 1
25,2310	54062 1	50000 1	31107 0	54061 1	04512 0	C: 77177 0	12335 1	30061 0
25,2320	50062 0	56112 0	40000 0	60061 0	64754 0	50062 0	54052 0	10062 1
25,2330	12310 0	35020 0	00006 1	05014 1	00001 0	10061 1	42315 0	12341 1
25,2340	32315 1	54061 1	12320 0	32372 0	70110 0	10000 0	13530 0	00004 0
25,2350	44737 1	70110 0	64737 0	54110 0	34753 1	05203 0	C: 02370 1	C: 52067 1
25,2360	40110 0	74752 1	10000 0	12366 1	05567 0	C: 00510 0	00003 1	14631 0
25,2370	02071 0	13546 1	C: 02001 1	I: 43020 1	C: 01113 0	C: 00271 0	I: 77624 1	C: 47537 0

OCTAL LISTING FOR PARAGRAPH # 145. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

25,2400	I: 45175 0	C: 01102 0	C: 47571 1	I: 77624 1	C: 26133 1	I: 77776 1	00004 0	04523 1
25,2410	C: 01107 0	02414 1	25113 0	02432 0	40104 0	74744 0	00006 1	12456 0
25,2420	02461 0	40104 0	74744 0	00006 1	12456 0	30074 1	74745 1	10000 0
25,2430	02471 1	15155 1	25113 0	40110 0	74742 0	26110 0	74741 0	10000 0
25,2440	12446 1	02156 1	34752 0	05203 0	C: 02573 1	C: 52067 1	31306 0	00006 1
25,2450	12452 1	05155 0	00303 1	25113 0	31113 0	14640 0	34755 1	55306 1
25,2460	12452 1	02233 1	04523 1	C: 01111 1	12471 0	02233 1	34736 1	26110 0
25,2470	12412 0	02233 1	25113 0	12456 0	C: 00074 1	04645 1	55113 1	05516 0
25,2500	C: 00041 1	32474 1	55114 0	00004 0	02540 1	C: 01107 0	12523 0	00003 1
25,2510	00006 1	31110 0	53753 0	06037 0	I: 77624 1	C: 46041 0	C: 01102 0	I: 77414 0
25,2520	C: 00071 1	00004 0	12433 0	02233 1	02540 1	C: 01107 0	12533 1	02233 1
25,2530	34736 1	26110 0	12507 0	02233 1	05567 0	C: 00502 0	06011 1	05155 0
25,2540	50002 0	30300 1	24002 0	00006 1	50000 1	30001 0	52062 1	22002 0
25,2550	34740 0	70110 0	10000 0	14550 1	30061 0	04512 0	C: 66161 1	00001 0
25,2560	30062 0	00006 1	62570 1	64562 1	04512 0	C: 64420 0	00001 0	04560 0
25,2570	62572 0	12564 0	C: 03512 1	40110 0	74736 0	10000 0	02602 1	02171 1
25,2600	05221 0	C: 00062 0	34741 1	70110 0	10000 0	12623 0	10110 0	12612 1
25,2610	12612 1	12630 1	40110 0	74742 0	10000 0	13546 1	11114 0	12627 1
25,2620	42635 1	00006 1	03012 1	44742 0	70110 0	54110 0	13562 1	55114 0
25,2630	37714 1	05105 0	C: 02636 0	C: 52067 1	12600 1	C: 20002 1	00006 1	30036 1
25,2640	53110 1	06037 0	I: 77201 1	C: 00001 0	C: 01102 0	I: 74214 0	C: 00311 1	C: 52661 1
25,2650	C: 01767 0	I: 62272 1	C: 01761 0	I: 53361 0	C: 13072 0	I: 45056 0	C: 47537 0	I: 77624 1
25,2660	C: 47671 1	C: 14041 1	C: 01111 1	I: 41434 1	C: 21576 0	I: 65356 1	I: 41546 0	I: 65205 0
25,2670	C: 00041 1	C: 00045 0	I: 44205 0	C: 00001 0	I: 77626 0	C: 76666 0	I: 47135 0	C: 01110 0
25,2700	C: 21576 0	I: 71406 0	I: 73525 1	I: 41206 0	C: 00003 1	I: 65352 0	C: 00005 1	I: 41325 0
25,2710	C: 00007 0	C: 00001 0	I: 55552 0	I: 77441 0	C: 00041 1	40154 0	00006 1	73066 0
25,2720	55107 1	40110 0	74740 1	00006 1	12727 0	31110 0	12730 0	41110 1
25,2730	00006 1	73066 0	55110 1	05037 0	I: 41345 0	C: 00003 1	C: 00005 1	I: 65352 0
25,2740	I: 65276 1	C: 00001 0	I: 72405 0	C: 00005 1	I: 43066 0	C: 00311 1	C: 52751 0	I: 77624 1
25,2750	C: 47673 0	I: 77441 0	C: 01102 0	00006 1	43070 1	20155 1	10154 0	34755 1
25,2760	12762 1	34753 1	54155 1	10110 0	12767 1	12767 1	13017 0	10155 1
25,2770	13000 0	40074 0	74747 0	10000 0	13005 0	34736 1	00006 1	05012 1

OCTAL LISTING FOR PARAGRAPH # 146. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

25,3000	34750 1	00006 1	02033 0	10000 0	13017 0	44742 0	70110 0	00004 0
25,3010	54110 0	05516 0	C: 00341 1	44752 1	00006 1	03012 1	15155 1	30076 0
25,3020	77712 0	00006 1	13041 0	06037 0	I: 74375 0	C: 01102 0	C: 01767 0	I: 41572 1
25,3030	I: 74375 0	C: 01761 0	C: 13072 0	I: 53362 0	I: 77656 1	C: 15102 0	C: 00045 0	C: 01767 0
25,3040	I: 77776 1	00004 0	40110 0	74741 0	10000 0	02306 0	30076 0	74740 1
25,3050	00006 1	15155 1	11456 0	03064 0	00004 0	06027 1	C: 52602 1	00003 1
25,3060	10067 1	05122 0	04616 1	C: 50731 1	55456 0	05155 0	C: 21122 0	C: 07777 1
25,3070	C: 33005 1	C: 00310 0	C: 00000 1	03113 1	C: 00017 1	03114 0	C: 00016 0	03114 0
25,3100	C: 00015 0	03114 0	C: 00014 1	03113 1	C: 00012 1	03113 1	C: 00011 1	55105 0
25,3110	34755 1	51105 1	13075 1	34753 1	00004 0	55105 0	00006 1	74751 1
25,3120	53106 0	10000 0	55111 0	64753 1	55100 0	33147 0	00006 1	02033 0
25,3130	55113 1	43074 0	00305 1	03013 0	50002 0	30000 1	00006 1	05013 0
25,3140	00006 1	30025 0	21106 0	34755 1	54001 1	53102 1	12366 1	C: 00230 0
25,3150	00006 1	04007 1	54016 1	00006 1	22012 1	34757 0	00006 1	02013 1
25,3160	55335 1	00006 1	13166 1	30046 0	51335 0	55332 0	11100 0	13211 1
25,3170	13174 1	05567 0	C: 00520 0	05270 1	30107 1	74735 0	00006 1	13206 1
25,3200	40077 0	74743 1	00006 1	13206 1	05567 0	C: 00521 1	44753 0	55100 0
25,3210	03560 1	55100 0	34751 0	00006 1	02013 1	00006 1	13276 0	03364 0
25,3220	30110 1	00006 1	06033 1	74746 1	00006 1	13231 0	05567 0	C: 00522 1
25,3230	03206 0	36245 1	00006 1	06013 0	76245 0	00006 1	13272 1	34733 1
25,3240	70046 1	62000 0	54001 1	30046 0	60000 1	74753 0	52064 1	34744 1
25,3250	03442 0	11111 0	03262 1	44753 0	55100 0	40061 1	70110 0	54110 0
25,3260	03616 0	03553 1	55111 0	11100 0	13266 1	13461 0	34750 1	00006 1
25,3270	05013 0	05270 1	34747 1	54061 1	34743 0	03320 0	34741 1	70110 0
25,3300	10000 0	13206 1	40110 0	74745 1	10000 0	13206 1	34750 1	54061 1
25,3310	34753 1	00006 1	02013 1	54002 1	10000 0	13317 0	13331 1	34751 0
25,3320	54001 1	00006 1	02033 0	56001 0	70110 0	00006 1	06001 0	10000 0
25,3330	03350 1	34733 1	70046 1	54064 1	30046 0	60000 1	74753 0	54063 0
25,3340	10002 1	13402 0	00006 1	42002 0	20064 1	30061 0	03443 1	03253 0
25,3350	22110 1	64753 1	00006 1	06001 0	54110 0	33147 0	00006 1	02033 0
25,3360	55113 1	05504 0	C: 00120 1	13206 1	40101 0	74741 0	10000 0	00002 0
25,3370	43401 0	70110 0	54001 1	33401 1	00006 1	02033 0	60001 0	54110 0

JCTAL LISTING FOR PARAGRAPH # 147. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

25,3400	03553 1	C: 00220 1	10001 1	13405 1	13345 1	31335 0	74751 1	10000 0
25,3410	13417 1	52064 1	20001 1	20001 1	20001 1	52064 1	13345 1	10063 0
25,3420	13431 0	40064 1	63441 0	00006 1	63431 1	40107 0	74751 1	26107 0
25,3430	13434 0	44751 1	70107 0	54107 0	00006 1	30064 0	20001 1	20001 1
25,3440	13344 0	C: 00714 0	54061 1	00006 1	02033 0	54001 1	40061 1	71113 1
25,3450	60001 0	57113 0	70061 1	60001 0	10000 0	03263 0	52064 1	21102 1
25,3460	00002 0	40061 1	70110 0	60061 0	54110 0	52064 1	53102 1	03616 0
25,3470	13174 1	00004 0	40110 0	74746 1	26110 0	34745 0	00006 1	02033 0
25,3500	00006 1	13530 0	34737 0	00006 1	05012 1	33545 0	05203 0	C: 03543 0
25,3510	C: 52067 1	02366 0	55100 0	05221 0	C: 00144 0	34745 0	00006 1	02033 0
25,3520	00006 1	13535 0	11100 0	13512 0	44737 1	00006 1	03012 1	13562 1
25,3530	34753 1	05203 0	C: 03555 1	C: 52067 1	02366 0	35000 1	05224 0	44737 1
25,3540	00006 1	03012 1	13555 0	34317 0	13512 0	C: 01130 1	34745 0	70110 0
25,3550	10000 0	13555 0	13562 1	44755 0	54734 0	34752 0	04635 0	C: 17665 1
25,3560	44755 0	54734 0	34752 0	04635 0	C: 17662 0	I: 45345 1	C: 01767 0	C: 13600 0
25,3570	I: 77644 1	C: 53574 1	I: 43535 0	C: 06522 1	I: 43535 0	C: 13577 0	C: 00001 0	C: 26467 0
25,3600	C: 00000 1	34735 1	02241 1	44741 0	70110 0	54110 0	15261 0	34753 1
25,3610	71303 1	10000 0	14707 1	03630 1	03625 0	14707 1	34753 1	71303 1
25,3620	10000 0	00002 0	44747 0	60061 0	10000 0	44753 0	13664 1	14570 0
25,3630	54065 0	34747 1	54001 1	30107 1	74751 1	10000 0	13656 0	34747 1
25,3640	70110 0	10000 0	13656 0	30107 1	50065 1	74753 0	10000 0	14570 0
25,3650	00006 1	22066 1	04602 1	00006 1	22066 1	14570 0	50065 1	44753 0
25,3660	70107 0	54107 0	30001 0	13650 0	54065 0	34751 0	54001 1	34744 1
25,3670	13640 1	C: 14037 1	C: 00011 1	I: 76405 1	C: 00043 0	C: 14031 0	C: 06522 1	I: 57525 1
25,3700	C: 00043 0	I: 63325 0	C: 00041 1	C: 00033 1	I: 63361 0	C: 14003 1	C: 00011 1	I: 53361 0
25,3710	C: 14001 0	I: 77772 0	C: 24041 1	I: 63361 0	C: 14003 1	C: 00033 1	I: 52361 1	C: 14001 0
25,3720	I: 65372 1	C: 00007 0	I: 74346 0	C: 00011 1	I: 73525 1	C: 00007 0	I: 52361 1	C: 00025 0
25,3730	I: 77772 0	C: 14033 1	C: 00007 0	I: 74356 1	I: 71525 0	C: 00007 0	I: 53361 0	C: 00025 0
25,3740	I: 57572 0	C: 34025 1	C: 00051 0	I: 54345 1	C: 00007 0	C: 20617 0	I: 72371 1	C: 01707 0
25,3750	C: 00155 0	C: 14017 1	C: 00020 0	I: 77605 1	I: 43257 0	C: 20206 1	I: 67206 1	C: 00017 1
25,3760	I: 41261 1	C: 20212 1	C: 00013 0	I: 43257 0	C: 20213 0	I: 77600 1	C: 53767 1	I: 77616 0
25,3770	C: 03770 1	C: 03771 0	CKSM 10540 1	a	a	a	a	a

JCTAL LISTING FOR PARAGRAPH # 150. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

26,2000	C: 17775 1	C: 02052 1	C: 00333 1	C: 10374 0	C: 77665 1	C: 42175 1	C: 22211 0	C: 00625 0
26,2010	C: 77777 0	C: 77767 1	C: 37436 1	C: 01613 1	C: 32417 1	C: 32160 1	C: 02052 1	C: 35552 0
26,2020	C: 37116 0	C: 32523 1	04616 1	C: 11254 1	36245 1	55051 0	34753 1	55052 0
26,2030	32117 1	04616 1	C: 20476 0	05472 0	02036 0	02030 0	06037 0	I: 43234 0
26,2040	C: 21573 0	C: 14122 0	C: 02205 1	C: 34041 0	C: 27066 1	I: 77775 1	C: 00001 0	C: 16207 0
26,2050	C: 02205 1	C: 34041 0	C: 27100 0	I: 52375 1	C: 02207 0	C: 00001 0	I: 47121 0	C: 01734 0
26,2060	C: 21726 1	C: 03773 1	I: 77776 1	41052 0	64753 1	00006 1	12113 1	06037 0
26,2070	I: 77775 1	C: 06520 0	C: 37765 1	C: 56040 0	C: 00322 1	I: 77776 1	04616 1	C: 54266 1
26,2100	32120 0	04616 1	C: 20476 0	05472 0	02106 1	02036 0	05516 0	C: 00124 0
26,2110	04616 1	C: 54123 0	15472 1	06037 0	I: 52175 0	C: 06514 1	C: 54072 0	C: 01014 0
26,2120	C: 01422 1	C: 00000 1	C: 13560 0	04645 1	55164 1	34746 0	70101 0	10000 0
26,2130	12136 0	06037 0	I: 77624 1	C: 56040 0	C: 00322 1	I: 77776 1	04616 1	C: 54266 1
26,2140	32254 0	04616 1	C: 20710 0	02242 1	02150 1	02175 0	02201 0	05155 0
26,2150	34746 0	70101 0	10000 0	12161 1	06037 0	I: 77624 1	C: 56040 0	C: 00322 1
26,2160	I: 77776 1	04616 1	C: 54266 1	02255 1	10000 0	12140 1	32254 0	04616 1
26,2170	C: 20451 0	02201 0	04616 1	C: 17750 0	12140 1	05516 0	C: 00124 0	31164 0
26,2200	04640 1	40100 1	74740 1	10000 0	00002 0	30002 0	54156 1	46245 0
26,2210	60133 0	55055 1	05353 1	C: 00132 1	34745 0	05464 1	00156 0	37714 1
26,2220	05146 1	34747 1	70075 1	10000 0	12237 1	34745 0	70074 0	10000 0
26,2230	02234 0	05353 1	C: 40112 1	05155 0	05353 1	C: 40072 0	05155 0	05504 0
26,2240	C: 00077 1	01055 0	31011 0	00006 1	12175 1	30100 0	74740 1	00006 1
26,2250	16001 1	06022 1	C: 20100 1	C: 00203 0	C: 01422 1	00006 1	00030 1	74742 0
26,2260	10000 0	00002 0	00006 1	00031 0	74736 0	00002 0	04645 1	55342 1
26,2270	30321 1	54772 1	30322 1	54766 1	30323 0	54770 0	06037 0	I: 45001 1
26,2300	C: 00001 0	C: 47543 0	I: 41345 0	C: 00743 1	C: 00747 0	I: 57552 1	I: 65336 1	C: 00741 0
26,2310	C: 14023 0	C: 00747 0	I: 72405 0	C: 00751 1	C: 34021 0	C: 26510 1	I: 41325 0	C: 00741 0
26,2320	C: 00743 1	I: 41512 1	I: 65205 0	C: 00745 1	I: 65205 0	C: 00737 1	C: 00751 1	I: 72405 0
26,2330	C: 00745 1	I: 45425 0	C: 63756 0	C: 00737 1	I: 72405 0	C: 00751 1	I: 45415 0	C: 43754 0
26,2340	C: 26510 1	I: 55525 0	I: 77634 0	C: 21620 0	C: 02345 1	I: 77776 1	31342 0	04640 1
26,2350	I: 47375 0	C: 03255 0	C: 06520 0	I: 47256 0	C: 03765 0	I: 40056 0	C: 54372 0	C: 17271 0
26,2360	C: 00045 0	I: 50025 0	C: 14411 0	C: 54372 0	I: 77775 1	C: 03271 0	C: 17271 0	C: 06520 0
26,2370	I: 77650 1	C: 56072 1	I: 52175 0	C: 06520 0	C: 54366 0	C: 15555 0	C: 35172 0	C: 14113 1

ICTAL LISTING FOR PARAGRAPH # 151, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

26,2400	C: 36326 0	C: 07701 0	C: 35703 0	C: 04343 1	C: 21616 0	C: 03070 0	C: 34344 0	C: 00000 1
26,2410	C: 00001 0	C: 00000 1	I: 77624 1	C: 11244 0	I: 43014 0	C: 04307 1	C: 55200 0	C: 02466 1
26,2420	I: 45014 0	C: 00747 0	C: 54454 0	C: 27414 0	I: 45014 0	C: 01674 0	C: 26644 0	I: 77624 1
26,2430	C: 55242 0	I: 77624 1	C: 11244 0	I: 77624 1	C: 27414 0	I: 43014 0	C: 01676 1	C: 02756 1
26,2440	C: 54444 1	I: 43014 0	C: 01476 0	C: 01475 0	I: 43014 0	C: 01474 1	C: 01673 1	I: 45014 0
26,2450	C: 01472 1	C: 55242 0	I: 77650 1	C: 54504 1	I: 77624 1	C: 27414 0	I: 45014 0	C: 01474 1
26,2460	C: 26644 0	I: 77624 1	C: 55242 0	I: 77624 1	C: 11244 0	I: 77624 1	C: 27414 0	I: 43014 0
26,2470	C: 01676 1	C: 02756 1	C: 54476 0	I: 43014 0	C: 01476 0	C: 01475 0	I: 43014 0	C: 01673 1
26,2500	C: 01674 0	I: 45014 0	C: 01472 1	C: 55242 0	I: 45014 0	C: 02716 0	C: 54510 1	C: 55251 1
26,2510	I: 77414 0	C: 04307 1	C: 54520 1	34755 1	55745 1	04616 1	C: 46123 0	06037 0
26,2520	I: 43174 1	C: 00000 1	C: 04304 1	C: 54526 1	I: 77714 0	C: 00002 0	I: 45134 0	C: 03720 1
26,2530	C: 11244 0	I: 66170 1	C: 00001 0	C: 03745 1	I: 54335 0	C: 01775 0	C: 20635 0	I: 77634 0
26,2540	C: 21633 1	C: 00025 0	I: 77624 1	C: 55333 1	I: 57414 1	C: 00707 1	C: 54547 0	C: 27525 0
26,2550	C: 06522 1	C: 03533 1	C: 17541 1	C: 00045 0	I: 44257 1	C: 56174 0	C: 03757 1	I: 77657 0
26,2560	C: 56574 1	C: 17547 1	C: 00045 0	I: 63501 0	C: 00047 1	I: 53605 1	C: 01771 1	C: 20577 0
26,2570	I: 53657 0	C: 20601 1	C: 57176 0	I: 47057 0	C: 57176 0	C: 21633 1	C: 02707 0	I: 76276 0
26,2600	C: 00025 0	I: 72240 1	C: 54605 0	C: 00025 0	C: 02707 0	I: 77624 1	C: 55401 1	I: 45131 0
26,2610	C: 03746 1	C: 00002 0	C: 11244 0	I: 77624 1	C: 55333 1	I: 53725 1	C: 00045 0	C: 57202 0
26,2620	C: 24045 0	I: 57414 1	C: 00707 1	C: 54624 0	I: 77761 1	C: 00045 0	C: 27533 1	C: 01653 0
26,2630	I: 53257 1	C: 57170 0	C: 01667 1	I: 53715 1	C: 01601 1	C: 57170 0	I: 52255 1	C: 01615 1
26,2640	I: 50315 0	C: 00001 0	C: 00007 0	I: 53606 1	C: 56174 0	I: 57316 1	C: 01773 0	C: 02707 0
26,2650	I: 54335 0	C: 01776 0	C: 20621 0	C: 00031 0	I: 50025 0	C: 02707 0	C: 54662 1	I: 77745 1
26,2660	C: 00031 0	C: 02707 0	I: 60545 0	I: 53725 1	C: 03751 1	C: 56577 1	I: 77625 0	I: 77675 0
26,2670	C: 00045 0	C: 27547 1	C: 00001 0	I: 47235 0	I: 57414 1	C: 00707 1	C: 54677 0	I: 77657 0
26,2700	C: 57200 1	C: 27525 0	C: 06522 1	C: 00025 0	C: 27541 1	C: 03525 0	I: 60246 1	C: 00025 0
26,2710	I: 51575 1	C: 03533 1	I: 71301 0	C: 00027 1	C: 00027 1	I: 50025 0	C: 00025 0	C: 54725 0
26,2720	I: 52150 1	C: 00026 0	C: 54725 0	I: 77750 0	C: 00024 1	I: 53775 1	C: 03525 0	C: 20201 0
26,2730	C: 27525 0	C: 03533 1	I: 77657 0	C: 20201 0	C: 17533 1	C: 03547 1	I: 77657 0	C: 20201 0
26,2740	C: 03547 1	I: 53745 1	C: 00045 0	C: 20200 1	I: 41316 0	C: 02707 0	I: 47012 1	C: 21633 1
26,2750	C: 36707 1	C: 55401 1	I: 77624 1	C: 11244 0	I: 77414 0	C: 04307 1	C: 55176 1	33332 0
26,2760	54006 0	31457 0	54766 1	31460 1	54770 0	31461 0	54772 1	06037 0
26,2770	I: 45175 0	C: 06520 0	C: 47664 0	I: 76505 0	C: 01734 0	C: 27677 1	C: 06516 0	I: 77624 1

OCTAL LISTING FOR PARAGRAPH # 152. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

26,3000	C: 47673 0	I: 76505 0	C: 01734 0	C: 27705 0	C: 06514 1	I: 77624 1	C: 47673 0	I: 76505 0
26,3010	C: 01734 0	C: 37713 0	C: 55361 0	I: 45131 0	C: 03746 1	C: 00003 1	C: 11244 0	I: 50375 0
26,3020	C: 03724 0	C: 03677 1	I: 77752 1	C: 24023 0	C: 03724 0	I: 72441 0	C: 03713 1	C: 34021 0
26,3030	C: 26510 1	I: 41221 0	C: 03736 0	C: 15441 1	I: 41472 0	I: 52545 1	C: 01701 0	I: 44257 1
26,3040	C: 56176 1	I: 53605 1	C: 03722 0	C: 21601 0	C: 27547 1	C: 03724 0	I: 76435 1	C: 03705 0
26,3050	I: 77656 1	I: 57414 1	C: 00747 0	C: 55054 0	C: 27525 0	C: 06522 1	C: 03533 1	C: 17541 1
26,3060	C: 03722 0	I: 53657 0	C: 20577 0	C: 56176 1	C: 03541 1	I: 77735 0	C: 02011 0	I: 41215 1
26,3070	C: 15436 1	C: 03722 0	I: 41257 1	C: 21601 0	C: 03722 0	I: 53657 0	C: 20577 0	C: 57176 0
26,3100	I: 47057 0	C: 57176 0	C: 21633 1	C: 36707 1	C: 55401 1	I: 77624 1	C: 11244 0	I: 77624 1
26,3110	C: 55361 0	I: 45131 0	C: 03746 1	C: 00004 0	C: 11244 0	I: 47375 0	C: 03724 0	C: 03705 0
26,3120	I: 47372 1	C: 03724 0	I: 77772 0	I: 57414 1	C: 00747 0	C: 55126 1	C: 27525 0	C: 06522 1
26,3130	C: 03533 1	C: 17541 1	C: 03722 0	I: 53657 0	C: 20577 0	C: 56176 1	C: 03543 0	I: 77735 0
26,3140	C: 02012 0	I: 41215 1	C: 15436 1	C: 03722 0	I: 41257 1	C: 21601 0	C: 03722 0	I: 53657 0
26,3150	C: 20577 0	C: 57176 0	I: 47057 0	C: 57176 0	C: 21633 1	C: 15707 0	C: 03732 1	I: 44336 1
26,3160	C: 03734 1	I: 56405 0	C: 15441 1	I: 52525 1	C: 01703 1	I: 44257 1	C: 56176 1	I: 53605 1
26,3170	C: 03722 0	C: 21601 0	C: 37547 0	C: 55401 1	I: 77624 1	C: 11244 0	I: 77650 1	C: 50566 1
26,3200	I: 77624 1	C: 27414 0	I: 43014 0	C: 01472 1	C: 01674 0	I: 77624 1	C: 55242 0	I: 77624 1
26,3210	C: 11244 0	I: 45014 0	C: 02666 0	C: 27414 0	I: 46145 0	C: 03463 0	C: 55231 1	I: 43014 0
26,3220	C: 01675 1	C: 01476 0	I: 43014 0	C: 01474 1	C: 01673 1	I: 77624 1	C: 55242 0	I: 77650 1
26,3230	C: 54510 1	I: 77624 1	C: 55251 1	I: 45014 0	C: 01474 1	C: 26644 0	I: 77624 1	C: 55242 0
26,3240	I: 77650 1	C: 54510 1	I: 71220 1	C: 03675 0	C: 03755 0	C: 34041 0	C: 27134 1	I: 77650 1
26,3250	C: 03675 0	I: 77776 1	33331 0	54006 0	33437 1	55257 1	34755 1	51257 0
26,3260	55400 0	11257 1	03255 0	33332 0	54006 0	06037 0	I: 67214 1	C: 04307 1
26,3270	C: 55274 0	C: 02001 1	I: 77650 1	C: 55276 1	I: 77735 0	C: 02007 1	I: 77661 0	C: 20606 0
26,3300	C: 02401 0	C: 02411 1	C: 02421 1	I: 67214 1	C: 04307 1	C: 55311 1	C: 02002 1	I: 77650 1
26,3310	C: 55313 0	I: 77735 0	C: 02010 1	C: 02511 0	C: 02521 0	C: 02531 1	I: 77735 0	C: 02003 0
26,3320	C: 02621 0	I: 77735 0	C: 02004 1	C: 02631 1	I: 66214 0	C: 02476 0	C: 03463 0	C: 00000 1
26,3330	I: 77616 0	C: 54065 0	C: 54067 1	I: 77201 1	C: 00001 0	C: 01645 1	I: 77754 1	C: 03720 1
26,3340	I: 53257 1	C: 57165 1	C: 01561 1	I: 53715 1	C: 01573 1	C: 57165 1	I: 52255 1	C: 01607 1
26,3350	I: 41434 1	C: 21724 0	C: 17724 0	C: 00045 0	I: 77657 0	C: 20201 0	C: 24045 0	C: 03724 0
26,3360	I: 77616 0	I: 45020 1	C: 03575 0	C: 55333 1	I: 50276 1	C: 03705 0	I: 41572 1	C: 03732 1
26,3370	I: 44316 0	C: 06512 1	I: 41366 1	C: 00045 0	I: 60352 0	C: 00047 1	C: 03722 0	I: 77650 1

JCTAL LISTING FOR PARAGRAPH # 153, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

26,3400	C: 03675 0	I: 45020 1	C: 03675 0	C: 46531 1	I: 51575 1	C: 02673 1	I: 53754 1	C: 03720 1
26,3410	C: 56174 0	C: 24317 1	C: 02665 0	I: 53646 0	C: 56174 0	C: 00315 0	I: 54335 0	C: 02005 0
26,3420	C: 20613 1	I: 50025 0	C: 00315 0	C: 50572 1	I: 45335 0	C: 02006 0	C: 00317 1	I: 77640 0
26,3430	C: 50572 1	I: 77624 1	C: 46743 0	I: 77650 1	C: 03675 0	C: 00103 0	C: 03370 0	C: 00241 0
26,3440	C: 31103 1	C: 36652 0	34755 1	55736 0	34736 1	00006 1	05012 1	34736 1
26,3450	70076 1	00006 1	15155 1	33713 1	00004 0	05203 0	C: 03643 0	C: 54067 1
26,3460	00003 1	40110 0	74736 0	00006 1	15155 1	06037 0	I: 43234 0	C: 21573 0
26,3470	C: 15715 0	C: 34041 0	C: 27100 0	I: 77775 1	C: 00001 0	C: 27676 0	C: 00007 0	C: 17740 1
26,3500	C: 00015 0	C: 34041 0	C: 27066 1	I: 52375 1	C: 00001 0	C: 03676 0	I: 77656 1	C: 27712 0
26,3510	C: 00007 0	I: 47256 0	C: 00001 0	I: 77656 1	C: 03704 1	I: 52375 1	C: 00007 0	C: 03740 1
26,3520	I: 75521 0	C: 01734 0	C: 03740 1	I: 53135 0	C: 03737 1	C: 55636 1	I: 53025 0	C: 15711 1
26,3530	C: 55623 0	I: 77775 1	C: 03720 1	C: 24015 0	C: 03726 1	C: 00023 0	I: 77761 1	C: 15705 1
26,3540	C: 27720 1	C: 00015 0	I: 53361 0	C: 06520 0	C: 03720 1	I: 77656 1	C: 27720 1	C: 00015 0
26,3550	I: 77761 1	C: 15705 1	C: 27726 1	C: 00023 0	I: 52361 1	C: 06520 0	C: 03726 1	I: 77656 1
26,3560	C: 03726 1	I: 53361 0	C: 15707 0	C: 03712 0	I: 64256 1	C: 01734 0	I: 77772 0	C: 25102 0
26,3570	C: 03740 1	C: 01761 0	I: 77776 1	00004 0	06027 1	C: 52602 1	44735 0	70110 0
26,3600	64735 1	54110 0	06037 0	I: 77624 1	C: 52373 1	I: 77776 1	03675 0	03675 0
26,3610	00006 1	30036 1	53753 0	06037 0	I: 77624 1	C: 46041 0	I: 65545 0	C: 00045 0
26,3620	C: 03735 0	I: 77776 1	05155 0	I: 47375 0	C: 03704 1	C: 03712 0	I: 77656 1	C: 27720 1
26,3630	C: 03712 0	I: 53435 0	C: 03720 1	C: 03726 1	I: 77650 1	C: 55561 0	I: 64375 1	C: 03712 0
26,3640	C: 01734 0	I: 52172 1	C: 55567 0	30074 1	74745 1	00006 1	15261 0	37713 0
26,3650	05105 0	C: 03654 0	C: 54067 1	05261 1	34750 1	00006 1	02033 0	00006 1
26,3660	13667 1	46242 1	61736 1	00006 1	13442 1	25736 1	13444 1	33703 0
26,3670	55733 0	00004 0	06027 1	C: 52602 1	05155 0	05567 0	C: 00527 1	00004 0
26,3700	06027 1	C: 55643 0	05155 0	C: 25547 0	C: 33555 1	C: 01106 1	C: 01642 0	C: 11045 0
26,3710	C: 00001 0	C: 00000 1	C: 00454 1	C: 01130 1	C: 00000 1	C: 00226 1	I: 46020 1	C: 00050 1
26,3720	C: 55733 0	I: 77624 1	C: 51720 0	I: 77775 1	C: 02013 1	I: 53235 0	C: 00001 0	C: 00001 0
26,3730	I: 52105 1	C: 00025 0	C: 51706 1	I: 77624 1	C: 55743 1	I: 77624 1	C: 15753 1	I: 76521 0
26,3740	C: 00025 0	I: 77650 1	C: 55725 1	I: 40220 0	C: 00051 0	C: 00011 1	I: 77770 1	C: 00000 1
26,3750	I: 65345 0	C: 01712 1	C: 14021 1	I: 45006 0	C: 53743 1	I: 41401 1	C: 00023 0	I: 65346 0
26,3760	C: 00023 0	I: 65358 1	C: 06522 1	I: 73525 1	C: 00023 0	I: 65276 1	C: 00023 0	I: 63346 0
26,3770	C: 06522 1	I: 41525 0	C: 06520 0	I: 77650 1	C: 00051 0	C: 03775 1	C: 03776 1	CKSM 73435 1

DATA LISTING FOR PARAGRAPH # 154, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

27,2000	C: 00000 1	C: 07622 0	C: 00000 1	C: 00762 1	C: 00030 1	C: 35104 1	C: 00016 0	C: 36237 1
27,2010	C: 35711 0	C: 35563 1	C: 03631 0	C: 23146 0	C: 33226 1	C: 14632 0	C: 05306 1	C: 15503 0
27,2020	C: 25337 1	C: 30000 1	C: 55340 0	C: 61710 0	C: 00072 1	C: 16206 1	C: 00344 1	C: 24331 0
27,2030	C: 24775 1	C: 30424 0	I: 40020 1	C: 03325 0	C: 56035 1	I: 52164 0	C: 03246 1	C: 56046 0
27,2040	I: 40020 1	C: 03325 0	C: 56043 0	I: 47164 1	C: 03246 1	C: 44403 0	C: 34032 1	C: 44410 1
27,2050	I: 61375 1	C: 03773 1	C: 03247 0	I: 77656 1	C: 00035 1	I: 53435 0	C: 03765 0	I: 57400 1
27,2060	C: 55170 1	C: 17271 0	C: 00045 0	I: 50025 0	C: 14411 0	C: 56170 1	I: 50375 0	C: 03765 0
27,2070	C: 00035 1	I: 65552 0	I: 77624 1	C: 44527 1	I: 75160 1	C: 03246 1	C: 02230 1	I: 77624 1
27,2100	C: 44312 1	I: 51545 1	C: 00007 0	I: 50025 0	C: 14376 0	C: 56160 0	I: 51545 1	C: 03765 0
27,2110	I: 51025 1	C: 14400 0	C: 56160 0	I: 77775 1	I: 77626 0	C: 50514 1	I: 77626 0	C: 50522 1
27,2120	I: 77626 0	C: 50530 1	C: 03255 0	I: 57444 1	C: 56125 1	I: 50035 1	C: 03765 0	C: 56134 1
27,2130	I: 57575 1	C: 03765 0	C: 37271 1	C: 56137 1	I: 77775 1	C: 03765 0	C: 03271 0	I: 51545 1
27,2140	C: 03765 0	I: 51025 1	C: 14402 1	C: 56147 0	I: 52145 0	C: 14406 0	C: 56151 1	I: 77745 1
27,2150	C: 14404 1	I: 77624 1	C: 44527 1	I: 75160 1	C: 03246 1	C: 02230 1	I: 77624 1	C: 44312 1
27,2160	I: 45160 1	C: 00000 1	C: 44654 0	I: 40234 0	C: 21620 0	C: 00001 0	I: 77650 1	C: 03325 0
27,2170	I: 50375 0	C: 00035 1	C: 03765 0	I: 72240 1	C: 54350 0	C: 00032 0	I: 77650 1	C: 03325 0
27,2200	22062 0	24002 0	00006 1	22061 0	54063 0	75012 0	64741 1	54064 1
27,2210	45012 0	70063 0	54063 0	22007 0	50001 0	41410 1	60064 0	00006 1
27,2220	12232 1	44747 0	60001 0	00006 1	12230 0	24001 0	24001 0	12214 0
27,2230	52062 1	52006 0	45012 0	50001 0	71411 0	00006 1	60063 1	00006 1
27,2240	12242 0	12221 0	34353 0	50001 0	55410 1	12230 0	I: 71220 1	C: 03632 0
27,2250	C: 03442 0	C: 03763 0	I: 77614 1	C: 01347 0	C: 56336 1	I: 77201 1	C: 00001 0	C: 03650 1
27,2260	C: 02331 1	I: 53435 0	C: 03642 1	C: 27673 0	C: 03642 1	C: 02323 1	I: 65236 0	C: 00045 0
27,2270	I: 55205 0	C: 16412 1	I: 41205 0	C: 03664 0	C: 01245 0	I: 77671 1	C: 03735 0	C: 24017 1
27,2300	C: 03656 1	I: 74241 0	C: 03673 0	C: 03673 0	I: 41552 0	I: 65245 1	C: 03656 1	C: 00017 1
27,2310	I: 63356 1	C: 00007 0	I: 53435 0	C: 03673 0	I: 45561 1	C: 50076 0	I: 65256 0	C: 00017 1
27,2320	I: 74346 0	I: 74255 0	C: 03701 1	C: 00045 0	I: 53352 0	I: 77626 0	C: 74076 0	I: 77656 1
27,2330	C: 27673 0	C: 03701 1	I: 45006 0	C: 15733 1	I: 77650 1	C: 03632 0	I: 77745 1	C: 03442 0
27,2340	C: 00041 1	I: 77621 1	C: 03531 0	C: 37452 0	C: 27057 0	I: 40375 1	C: 00001 0	C: 00001 0
27,2350	C: 03642 1	C: 02323 1	I: 77656 1	C: 27537 0	C: 00007 0	C: 03650 1	C: 02331 1	I: 65345 0
27,2360	C: 05522 1	C: 16406 1	I: 43214 1	C: 03745 1	C: 56366 1	C: 16410 0	I: 65006 1	C: 02776 0
27,2370	I: 45134 0	C: 02777 1	C: 22000 1	I: 41575 0	C: 02366 0	C: 03701 1	I: 77656 1	C: 17673 0

JCTAL LISTING FOR PARAGRAPH # 155, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "2" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

27,2400	C: 00045 0	C: 37664 1	C: 15733 1	I: 77650 1	C: 03632 0	C: 00707 1	C: 03434 1	C: 03070 0
27,2410	C: 34344 0	C: 00024 1	C: 13714 1	I: 77775 1	C: 03673 0	I: 76521 0	C: 01734 0	C: 27773 1
27,2420	C: 06520 0	C: 27765 0	C: 03673 0	C: 03607 0	I: 53435 0	C: 03642 1	I: 46125 0	C: 00045 0
27,2430	C: 56441 0	I: 45575 1	C: 74162 1	I: 76435 1	C: 03607 0	I: 77676 0	C: 03623 0	I: 43414 1
27,2440	C: 01073 1	I: 47375 0	C: 03607 0	C: 03650 1	I: 41456 0	I: 77650 1	C: 56431 1	I: 77614 1
27,2450	C: 01347 0	C: 56731 1	I: 52375 1	C: 03701 1	C: 03527 1	C: 03707 1	I: 76521 0	C: 01734 0
27,2460	C: 03254 1	I: 51575 1	C: 03707 1	C: 03664 0	I: 77201 1	C: 00001 0	C: 03707 1	C: 27701 1
27,2470	C: 03527 1	I: 57414 1	C: 01344 0	C: 00052 0	I: 77656 1	I: 41441 0	C: 03707 1	I: 56244 0
27,2500	C: 56526 0	C: 03743 1	I: 41215 1	C: 06520 0	I: 56261 1	C: 20613 1	C: 00045 0	I: 43205 1
27,2510	C: 16535 0	C: 03741 0	C: 03517 1	I: 77615 0	C: 01235 1	C: 17442 0	C: 03517 1	I: 51025 1
27,2520	C: 16537 1	C: 61111 1	I: 43014 0	C: 01066 0	C: 01224 1	C: 00052 0	I: 77776 1	05567 0
27,2530	C: 01407 0	06037 0	I: 77650 1	C: 61111 1	C: 77715 1	C: 77777 0	C: 00000 1	C: 00620 0
27,2540	06037 0	I: 43001 1	C: 00001 0	C: 01266 1	I: 51575 1	C: 03701 1	I: 41325 0	C: 21021 1
27,2550	C: 34017 0	I: 72471 0	C: 01245 0	I: 41421 0	I: 43014 0	C: 05342 1	C: 56626 0	C: 02463 1
27,2560	I: 56345 0	C: 16001 1	C: 01245 0	I: 50021 1	C: 00001 0	C: 56610 0	I: 41325 0	C: 03737 1
27,2570	C: 15700 1	I: 65221 0	C: 01245 0	C: 03735 0	I: 60405 0	C: 16702 0	I: 41471 0	I: 51021 0
27,2600	C: 00003 1	C: 56626 0	I: 55345 0	I: 43205 1	C: 16702 0	C: 16676 1	I: 77650 1	C: 56616 0
27,2610	I: 41345 0	C: 01245 0	I: 41542 1	I: 56215 1	C: 16003 0	C: 16005 0	I: 77414 0	C: 01066 0
27,2620	07257 0	30154 1	56001 0	34755 1	53517 1	12650 1	I: 41345 0	C: 00001 0
27,2630	C: 01245 0	I: 43006 0	C: 05302 0	C: 56671 1	I: 43071 0	C: 16007 1	C: 02663 0	I: 41400 0
27,2640	C: 56653 1	I: 51075 1	C: 16704 0	C: 56661 0	I: 52015 1	C: 16704 0	C: 56616 0	I: 77776 1
27,2650	05353 1	C: 00003 1	05155 0	I: 40545 1	I: 77671 1	C: 16011 0	C: 03517 1	I: 77776 1
27,2660	12650 1	I: 51025 1	C: 16706 1	C: 56666 1	I: 77614 1	C: 02463 1	I: 77745 1	I: 77776 1
27,2670	12620 0	I: 62471 1	C: 34007 1	I: 77650 1	C: 56667 0	C: 00144 0	C: 00000 1	C: 01274 1
27,2700	C: 00000 1	C: 00764 1	C: 00300 1	C: 01130 1	C: 00000 1	C: 21304 0	C: 00000 1	06037 0
27,2710	I: 77601 0	C: 00001 0	I: 71214 0	C: 01072 0	C: 06522 1	I: 77725 1	C: 16406 1	I: 43214 1
27,2720	C: 03745 1	C: 56723 1	C: 16410 0	I: 45006 0	C: 22002 0	I: 77776 1	05353 1	C: 00002 0
27,2730	15155 1	I: 51575 1	C: 01221 1	I: 53744 0	C: 02777 1	C: 57576 1	C: 27715 1	C: 03444 0
27,2740	I: 47051 0	C: 01221 1	C: 21724 0	C: 17656 1	C: 00045 0	I: 53674 1	C: 00046 0	C: 57576 1
27,2750	C: 00037 0	I: 41301 0	C: 00050 1	C: 03715 1	I: 57101 0	C: 00047 1	C: 00046 0	I: 77734 1
27,2760	C: 03766 0	C: 17725 1	C: 00037 0	I: 65342 1	C: 03715 1	I: 65342 1	C: 03723 1	I: 43342 0
27,2770	I: 45415 0	C: 74044 1	I: 41225 1	C: 00037 0	C: 03721 0	I: 77621 1	C: 03717 0	I: 45325 1

JOCTAL LISTING FOR PARAGRAPH # 156, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

27,3000	C: 03733 0	C: 03715 1	I: 70501 1	C: 00047 1	I: 41271 0	C: 03725 1	I: 53664 0	C: 00046 0
27,3010	C: 57575 1	I: 77754 1	C: 03766 0	I: 75366 0	C: 02673 1	C: 00041 1	I: 41345 0	C: 03733 0
27,3020	C: 03721 0	I: 77621 1	C: 03717 0	I: 45325 1	C: 03733 0	C: 03723 1	I: 70501 1	C: 00047 1
27,3030	I: 41271 0	C: 03725 1	I: 53664 0	C: 00046 0	C: 57575 1	I: 65366 1	C: 03733 0	I: 56225 1
27,3040	C: 00037 0	C: 03733 0	I: 41566 1	I: 67542 0	I: 65205 0	C: 17216 1	I: 56325 0	C: 00037 0
27,3050	C: 03733 0	I: 77600 1	C: 57053 0	I: 41366 1	I: 44242 0	I: 65365 1	C: 02673 1	C: 17216 1
27,3060	I: 45302 1	I: 65205 0	C: 03733 0	C: 03733 0	I: 75442 1	I: 77605 1	I: 52525 1	C: 03717 0
27,3070	I: 55366 1	I: 43225 0	C: 03631 0	C: 01235 1	C: 14037 0	I: 77765 0	C: 00037 0	C: 00037 0
27,3100	I: 77214 0	C: 03705 0	C: 57123 0	C: 03656 1	I: 53451 1	C: 03537 0	I: 63361 0	C: 00037 0
27,3110	C: 03656 1	I: 53455 0	C: 03537 0	I: 53361 0	C: 00041 1	I: 53744 0	C: 02777 1	C: 57177 1
27,3120	C: 02337 1	I: 77650 1	C: 57166 1	I: 50375 0	C: 03656 1	C: 03537 0	I: 77240 1	C: 57146 0
27,3130	C: 03656 1	I: 63362 0	C: 03537 0	I: 53362 0	I: 77656 1	I: 57406 1	I: 75235 1	C: 02674 0
27,3140	C: 02673 1	I: 74256 0	C: 00037 0	I: 77715 1	I: 77650 1	C: 57113 0	I: 74575 0	C: 03537 0
27,3150	I: 74515 0	C: 03656 1	I: 53451 1	I: 77606 1	I: 75235 1	C: 02674 0	C: 02673 1	I: 74256 0
27,3160	C: 00041 1	I: 77715 1	I: 53361 0	C: 00037 0	I: 77650 1	C: 57115 0	I: 77651 0	C: 03553 1
27,3170	C: 02366 0	I: 53135 0	C: 03000 1	C: 57177 1	I: 52175 0	C: 02366 0	C: 57212 1	I: 53575 0
27,3200	C: 01221 1	I: 45345 1	C: 01235 1	C: 03512 1	I: 56205 0	C: 16023 1	C: 00043 0	I: 53361 0
27,3210	C: 03521 1	C: 02366 0	C: 02366 0	I: 77650 1	C: 56455 0	C: 31103 1	C: 36652 0	05516 0
27,3220	C: 00137 1	45017 0	00006 1	03012 1	35014 1	00006 1	05012 1	05221 0
27,3230	C: 13560 0	45014 0	00006 1	03012 1	35017 1	00006 1	05012 1	31402 0
27,3240	05173 1	C: 03260 0	31401 0	05224 0	44740 1	00006 1	03012 1	30102 1
27,3250	74742 0	00006 1	13264 0	34737 0	05072 1	C: 02323 1	C: 02067 1	05261 1
27,3260	44742 0	00006 1	03012 1	13247 1	05504 0	C: 00137 1	05261 1	I: 76521 0
27,3270	C: 01734 0	I: 77650 1	C: 47646 0	I: 50375 0	C: 03254 1	C: 02146 0	I: 51025 1	C: 02577 0
27,3300	C: 57307 1	I: 50375 0	C: 02146 0	C: 03537 0	I: 50025 0	C: 02601 1	C: 30351 0	I: 77614 1
27,3310	C: 04631 1	C: 60715 1	I: 50375 0	C: 03537 0	C: 03720 1	I: 41312 1	C: 03631 0	C: 02335 0
27,3320	I: 77616 0	00006 1	33357 0	53253 0	40103 1	74745 1	26103 1	34735 1
27,3330	54107 0	00006 1	34755 1	52753 1	30102 1	74744 0	10000 0	13343 1
27,3340	00006 1	34755 1	52755 1	00006 1	34755 1	52757 0	00006 1	34755 1
27,3350	52765 1	34764 0	54001 1	40000 0	52761 0	15644 0	C: 03770 1	C: 64067 1
27,3360	C: 00037 0	I: 53575 0	C: 02207 0	I: 77725 1	C: 00045 0	C: 00015 0	I: 77701 1	C: 00047 1
27,3370	C: 24041 1	C: 02215 0	I: 77761 1	C: 00037 0	C: 02170 0	I: 47361 0	C: 00041 1	I: 47572 1

JCTAL LISTING FOR PARAGRAPH # 157, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

27,3400	C: 14035 1	C: 06512 1	I: 63271 0	C: 00041 1	C: 02170 0	I: 57436 1	C: 00025 0	I: 43257 0
27,3410	C: 20573 1	I: 77626 0	C: 77744 0	I: 41457 1	C: 20173 0	I: 75446 0	I: 77701 1	C: 00050 1
27,3420	C: 00031 0	I: 75316 1	I: 55254 1	C: 57425 0	C: 06512 1	C: 00027 1	I: 77616 0	I: 41345 0
27,3430	C: 00033 1	C: 00035 1	I: 57457 0	C: 20571 0	I: 51415 0	C: 17765 0	I: 43366 0	C: 06512 1
27,3440	I: 55206 0	C: 00035 1	I: 53657 0	C: 20601 1	C: 20572 0	C: 14017 1	I: 41005 1	C: 00027 1
27,3450	C: 57753 1	I: 53654 0	C: 57461 0	C: 57603 0	I: 40057 1	C: 57576 1	C: 57461 0	I: 77644 1
27,3460	C: 57463 1	I: 77745 1	C: 17771 0	C: 00021 1	I: 77616 0	I: 77614 1	C: 03436 0	C: 57472 1
27,3470	I: 77614 1	C: 03676 0	C: 00023 0	I: 77657 0	C: 20201 0	C: 00021 1	I: 44205 0	C: 00033 1
27,3500	C: 05512 1	I: 41206 0	C: 00021 1	I: 53725 1	C: 00035 1	C: 20573 1	I: 43276 0	I: 77657 0
27,3510	C: 20601 1	I: 71214 0	C: 03756 0	C: 57515 1	C: 06522 1	I: 75440 0	C: 57650 0	I: 41076 0
27,3520	C: 57753 1	C: 24045 0	C: 02170 0	I: 52441 1	C: 02207 0	C: 00017 1	I: 44240 1	C: 57550 0
27,3530	C: 00045 0	C: 14043 0	C: 00033 1	I: 44205 0	C: 00041 1	I: 51406 1	I: 40015 1	C: 17757 1
27,3540	C: 57561 1	I: 65245 0	C: 06522 1	I: 57545 1	C: 00033 1	I: 71240 1	C: 57655 0	I: 77616 0
27,3550	I: 77745 1	I: 45245 1	C: 00023 0	C: 00015 0	C: 14043 0	C: 00045 0	I: 52015 1	C: 00017 1
27,3560	C: 57535 0	I: 65215 1	C: 17761 1	C: 00043 0	I: 53605 1	C: 00031 0	C: 57201 0	I: 77671 1
27,3570	I: 40145 0	C: 00043 0	C: 57653 0	I: 45471 1	C: 77732 1	I: 63406 0	I: 41206 0	C: 00035 1
27,3600	I: 75261 0	C: 20206 1	C: 00045 0	C: 14045 0	I: 41206 0	C: 00033 1	I: 77657 0	C: 20201 0
27,3610	C: 00043 0	I: 41234 1	C: 57735 1	I: 44302 0	C: 00023 0	I: 41215 1	C: 00015 0	I: 51042 0
27,3620	C: 57641 0	I: 75206 1	C: 00017 1	I: 71244 0	C: 57645 1	C: 00027 1	I: 51076 1	C: 57645 1
27,3630	I: 77676 0	I: 56205 0	C: 17755 0	C: 00031 0	I: 53657 0	C: 57602 1	C: 57602 1	I: 43257 0
27,3640	C: 57576 1	I: 40005 0	C: 00037 0	C: 57651 1	I: 77616 0	I: 77745 1	I: 77650 1	C: 57641 0
27,3650	I: 77745 1	I: 43545 1	C: 17771 0	I: 77712 0	I: 41465 0	I: 45345 1	C: 00045 0	C: 00017 1
27,3660	C: 14013 0	I: 77626 0	C: 77732 1	I: 53605 1	C: 00027 1	C: 57576 1	I: 41206 0	C: 00045 0
27,3670	I: 41057 0	C: 57576 1	C: 21712 0	C: 00043 0	I: 41234 1	C: 57735 1	C: 00043 0	I: 45242 1
27,3700	C: 17763 0	I: 41405 0	I: 41345 0	C: 00045 0	C: 00015 0	I: 43312 0	C: 00017 1	C: 14045 0
27,3710	C: 00035 1	I: 53605 1	C: 00027 1	C: 57575 1	I: 53765 0	C: 00045 0	C: 57576 1	C: 14045 0
27,3720	C: 00027 1	I: 41366 1	C: 17755 0	I: 77615 0	I: 45257 0	C: 57577 0	C: 00013 0	I: 53605 1
27,3730	C: 00027 1	C: 57601 1	I: 52057 1	C: 57602 1	C: 57641 0	07222 1	C: 00004 0	C: 12525 0
27,3740	C: 12525 0	C: 71463 0	C: 57703 1	C: 04423 0	C: 17645 0	C: 74604 0	C: 42667 1	C: 01626 1
27,3750	C: 37256 1	C: 77404 1	C: 52071 0	06061 0	C: 06220 1	C: 37553 0	C: 37777 1	C: 37700 1
27,3760	C: 00000 1	C: 00100 0	C: 04000 0	C: 00000 1	C: 02000 0	C: 00000 1	C: 00305 1	C: 11205 0
27,3770	C: 37777 1	C: 27777 1	C: 03772 0	C: 03773 1	CKSM 45310 1	a	a	a

OCTAL LISTING FOR PARAGRAPH # 150, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

30,2000	C: 02445 0	C: 00274 0	I: 77615 0	C: 02201 0	C: 02201 0	I: 47573 0	C: 02555 0	I: 77615 0
30,2010	C: 02203 1	C: 02203 1	I: 47573 0	C: 02643 1	I: 77615 0	C: 02205 1	C: 02205 1	I: 75500 0
30,2020	C: 62137 0	I: 77661 0	C: 20613 1	C: 16205 1	C: 02203 1	I: 77766 0	C: 16203 1	C: 02201 0
30,2030	I: 77766 0	C: 02201 0	I: 52000 0	C: 60035 1	C: 60042 1	I: 77745 1	C: 06530 1	C: 02201 0
30,2040	C: 02203 1	C: 02205 1	I: 45345 1	C: 02201 0	C: 20060 0	I: 71240 1	C: 60051 0	C: 20060 0
30,2050	C: 02201 0	I: 66150 0	C: 00051 0	C: 00052 0	I: 77776 1	04635 0	C: 27425 1	C: 01670 1
30,2060	C: 17000 1	05353 1	C: 04024 0	04616 1	C: 11254 1	05504 0	C: 00141 0	05504 0
30,2070	C: 00307 0	05504 0	C: 00015 0	06011 1	05516 0	C: 00010 0	36000 1	55251 1
30,2100	34751 0	55515 0	34755 1	55462 1	33035 1	04616 1	C: 20476 0	16001 1
30,2110	12112 0	12104 1	05353 1	C: 04024 0	06037 0	I: 77624 1	C: 46432 0	I: 45014 0
30,2120	C: 04464 0	C: 60254 1	I: 77745 1	C: 25761 0	C: 17517 1	C: 03442 0	C: 34041 0	C: 27057 0
30,2130	I: 64375 1	C: 00007 0	C: 01734 0	I: 77772 0	C: 27601 0	C: 00001 0	I: 52521 0	C: 01734 0
30,2140	C: 37521 0	C: 67130 1	I: 53575 0	C: 03521 1	C: 37537 1	C: 57312 0	I: 57461 0	C: 20606 0
30,2150	C: 17643 0	C: 06456 0	C: 16277 1	C: 06460 0	C: 02273 0	I: 77776 1	05355 1	C: 04024 0
30,2160	33034 0	04616 1	C: 20476 0	16001 1	12166 0	12160 0	32320 1	55455 0
30,2170	05353 1	C: 04024 0	06037 0	I: 54345 1	C: 03643 0	C: 20206 1	I: 77615 0	C: 02335 0
30,2200	C: 27633 1	C: 03537 0	I: 53361 0	C: 06454 1	C: 03601 0	C: 03527 1	I: 72441 0	C: 03537 0
30,2210	C: 27474 0	C: 03537 0	I: 53435 0	C: 03720 1	C: 03726 1	I: 77614 1	C: 04421 1	C: 60321 1
30,2220	I: 77745 1	C: 02361 1	I: 65316 0	C: 02355 0	I: 43316 1	I: 75454 0	C: 60232 1	I: 55352 0
30,2230	C: 02355 0	I: 77736 0	C: 26363 0	C: 03254 1	I: 50256 0	C: 03537 0	I: 65552 0	I: 77676 0
30,2240	C: 02365 0	I: 77776 1	05353 1	C: 04024 0	05516 0	C: 00213 1	00004 0	04674 0
30,2250	C: 40142 1	00003 1	04635 0	C: 74126 1	I: 77745 1	C: 16013 1	C: 03641 1	C: 03637 0
30,2260	C: 17635 1	C: 16017 0	C: 16263 1	C: 16021 0	C: 16271 1	C: 34013 1	I: 54276 0	C: 20214 1
30,2270	C: 02267 0	I: 57535 0	C: 26301 1	I: 77702 1	C: 02265 1	I: 43414 1	C: 04747 1	C: 60300 1
30,2300	I: 43345 1	C: 25757 0	C: 02333 0	C: 17631 0	C: 06522 1	C: 03654 0	C: 03633 1	C: 02273 0
30,2310	C: 25275 0	C: 01563 0	I: 64235 1	C: 01555 0	C: 01734 0	I: 77656 1	C: 03720 1	I: 77616 0
30,2320	C: 02022 0	I: 51575 1	C: 03521 1	C: 26301 1	C: 03726 1	I: 72441 0	C: 03527 1	C: 26313 1
30,2330	C: 03726 1	I: 76455 1	C: 03537 0	C: 02303 0	I: 72441 0	C: 03527 1	C: 36311 1	C: 57312 0
30,2340	I: 77775 1	C: 03563 1	I: 50341 1	C: 27147 0	C: 03537 0	I: 47315 0	C: 03537 0	C: 03527 1
30,2350	I: 56236 0	C: 02301 1	I: 43352 1	I: 77625 0	C: 61462 0	C: 02277 1	I: 77625 0	C: 02313 1
30,2360	C: 02343 1	I: 65361 0	C: 03726 1	C: 02275 0	I: 77625 0	C: 02311 0	C: 02341 0	I: 65361 0
30,2370	C: 02303 0	C: 02273 0	I: 77625 0	C: 03474 0	C: 02337 1	I: 53361 0	C: 03537 0	I: 76455 1

OCTAL LISTING FOR PARAGRAPH # 151, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

30,2400	I: 77626 0	C: 74131 1	I: 41345 0	C: 03517 1	C: 02315 1	I: 76561 1	C: 03537 0	I: 77645 0
30,2410	C: 03646 0	C: 03646 0	I: 76521 0	C: 02146 0	C: 27502 0	C: 03646 0	I: 43046 1	C: 04745 0
30,2420	C: 60425 1	I: 77671 1	C: 20001 1	C: 37517 0	C: 60746 1	I: 41471 0	C: 02265 1	I: 44205 0
30,2430	C: 26201 0	C: 17771 0	I: 41205 0	C: 02271 1	I: 77625 0	C: 02267 0	C: 03517 1	I: 57461 0
30,2440	C: 20614 0	C: 17454 1	C: 03517 1	I: 45214 1	C: 03710 1	C: 60451 1	C: 21021 1	I: 77640 0
30,2450	C: 30355 1	I: 77745 1	C: 03517 1	I: 50025 0	C: 21023 0	C: 60612 1	I: 45345 1	C: 02271 1
30,2460	C: 03517 1	I: 45071 0	C: 02271 1	C: 61036 0	I: 41461 1	C: 20206 1	I: 44265 0	C: 03517 1
30,2470	C: 02271 1	I: 43006 0	C: 04703 1	C: 60502 0	I: 45345 1	C: 03517 1	C: 21025 0	I: 43044 0
30,2500	C: 60510 0	C: 04463 1	I: 77745 1	C: 06522 1	C: 02351 1	C: 02353 0	I: 77650 1	C: 60572 1
30,2510	I: 45345 1	C: 03517 1	C: 00003 1	I: 72406 0	I: 52421 1	C: 03517 1	I: 41325 0	C: 03517 1
30,2520	C: 03474 0	I: 45215 0	C: 02301 1	C: 03631 0	I: 41325 0	C: 02337 1	C: 00005 1	I: 62415 0
30,2530	I: 56271 0	C: 00007 0	C: 03517 1	C: 02351 1	I: 71240 1	C: 60541 1	C: 06522 1	C: 36351 0
30,2540	C: 60553 1	I: 56202 1	C: 02271 1	I: 51025 1	C: 26203 1	C: 60553 1	I: 41345 0	C: 26203 1
30,2550	C: 02271 1	I: 77612 1	C: 02351 1	I: 77745 1	C: 03517 1	I: 43205 1	C: 02311 0	C: 02335 0
30,2560	I: 65225 1	C: 03633 1	C: 02341 0	I: 43205 1	C: 00005 1	I: 56312 1	I: 40271 1	C: 03517 1
30,2570	C: 00005 1	C: 02353 0	I: 41345 0	C: 02351 1	C: 00003 1	I: 56325 0	C: 02337 1	C: 00001 0
30,2600	I: 45302 1	I: 77626 0	C: 61432 0	C: 02353 0	I: 65205 0	I: 60465 0	C: 02341 0	I: 77625 0
30,2610	C: 00001 0	C: 02347 0	I: 71201 1	C: 00001 0	C: 27147 0	I: 77605 1	C: 02351 1	I: 56215 1
30,2620	C: 02345 1	C: 02271 1	I: 45352 1	C: 02315 1	C: 16357 1	C: 27147 0	I: 43205 1	C: 02353 0
30,2630	C: 02347 0	I: 72471 0	C: 02271 1	C: 02355 0	I: 65361 0	C: 02303 0	C: 02357 1	I: 53361 0
30,2640	C: 03537 0	I: 41572 1	I: 65246 1	C: 02263 1	I: 45316 1	C: 00043 0	I: 41525 0	C: 02263 1
30,2650	I: 45316 1	C: 00043 0	I: 71240 1	C: 60657 0	C: 00011 1	I: 52166 1	C: 60665 1	I: 55345 0
30,2660	C: 00007 0	I: 77761 1	C: 00001 0	C: 14001 0	C: 06522 1	I: 77765 0	C: 02343 1	C: 02361 1
30,2670	I: 77761 1	C: 03726 1	I: 53372 1	C: 00001 0	C: 03254 1	I: 43001 1	C: 00001 0	C: 04704 0
30,2700	C: 60220 1	I: 77614 1	C: 04701 0	C: 60755 0	I: 57575 1	C: 03537 0	C: 17262 1	C: 03654 0
30,2710	I: 51025 1	C: 01235 1	C: 60721 0	I: 77614 1	C: 04711 1	C: 57273 0	I: 43014 0	C: 01664 1
30,2720	C: 06666 1	I: 77776 1	30105 0	74742 0	10000 0	12747 0	06037 0	I: 77624 1
30,2730	C: 61111 1	I: 77776 1	30105 0	74742 0	10000 0	12747 0	30104 1	74742 0
30,2740	10000 0	12747 0	33033 1	04616 1	C: 20451 0	12747 0	I: 77776 1	15155 1
30,2750	I: 77776 1	00004 0	04674 0	C: 40153 1	12732 1	I: 45345 1	C: 02301 1	C: 02333 0
30,2760	I: 50025 0	C: 26700 1	C: 16567 1	I: 43014 0	C: 04661 1	C: 04711 1	C: 60704 1	I: 43345 1
30,2770	C: 01235 1	C: 25755 1	C: 37654 1	C: 60704 1	I: 77614 1	C: 04631 1	C: 60763 0	05353 1

JCTAL LISTING FOR PARAGRAPH # 162, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

30,3000	C: 04024 0	33017 1	04616 1	C: 20476 0	13007 1	13007 1	12777 0	05353 1
30,3010	C: 04024 0	00004 0	04674 0	C: 40123 0	05516 0	C: 00215 1	16001 1	C: 04125 0
30,3020	C: 00062 0	C: 00000 1	C: 00031 0	C: 00000 1	C: 00175 1	C: 00000 1	C: 00045 0	C: 20000 0
30,3030	C: 00010 0	C: 14400 0	C: 00000 1	C: 01477 1	C: 01514 0	C: 01441 1	I: 44301 0	C: 00163 0
30,3040	C: 17771 0	I: 77776 1	07222 1	C: 00006 1	C: 00000 1	C: 00002 0	C: 76777 1	C: 77175 1
30,3050	C: 77400 0	C: 75416 0	C: 77507 0	C: 65515 0	C: 77741 0	C: 63547 1	C: 77052 0	C: 55373 0
30,3060	C: 01167 0	C: 30361 0	C: 76520 1	C: 75267 0	34755 1	54156 1	00006 1	33103 0
30,3070	52155 1	52132 0	30162 1	07307 1	52156 1	52155 1	52132 0	20155 1
30,3100	06037 0	I: 43476 0	C: 00542 1	C: 34414 1	I: 77775 1	C: 06520 0	C: 03270 1	C: 03262 1
30,3110	I: 77616 0	I: 77775 1	C: 03254 1	I: 40200 1	C: 61113 0	C: 00023 0	I: 77420 1	C: 03247 0
30,3120	33761 1	56003 1	55646 0	30111 0	74737 1	10000 0	34753 1	55650 1
30,3130	34743 0	55652 0	70111 1	55651 0	00004 0	30032 0	54772 1	30033 1
30,3140	54766 1	30034 0	54770 0	34742 1	00006 1	02030 0	10000 0	13164 0
30,3150	34736 1	00006 1	02031 1	10000 0	13164 0	55652 0	31635 0	54772 1
30,3160	31636 0	54766 1	31637 1	54770 0	06037 0	I: 77634 0	C: 21726 1	C: 24001 0
30,3170	C: 03262 1	I: 47034 0	C: 21726 1	C: 47615 0	C: 24015 0	C: 00325 0	I: 53404 1	C: 61750 1
30,3200	I: 45000 0	C: 61215 0	C: 47671 1	I: 77776 1	31671 0	22157 1	03503 1	55671 1
30,3210	31673 1	22161 1	03503 1	55673 0	06037 0	I: 46135 1	C: 03252 1	C: 61223 0
30,3220	I: 45175 0	C: 00015 0	C: 61523 1	I: 77775 1	C: 02162 0	C: 34015 1	C: 61523 1	I: 57575 1
30,3230	C: 02146 0	C: 00015 0	I: 47375 0	C: 00015 0	C: 00001 0	I: 41456 0	I: 76435 1	C: 00001 0
30,3240	C: 00015 0	I: 63361 0	C: 03274 0	I: 51361 1	C: 03272 0	I: 53372 1	C: 00001 0	I: 77656 1
30,3250	C: 00001 0	I: 76435 1	C: 00015 0	C: 00007 0	I: 47276 1	C: 00001 0	I: 77772 0	C: 00015 0
30,3260	I: 77624 1	C: 61533 0	I: 77776 1	30156 0	54001 1	33773 1	03727 0	56156 0
30,3270	00006 1	20156 1	00006 1	13275 0	13756 1	00004 0	22007 0	34752 0
30,3300	54142 1	30001 0	00006 1	70000 0	64350 0	00006 1	63311 1	34755 1
30,3310	55651 0	50142 0	30154 1	50142 0	54321 0	00006 1	50142 0	21635 1
30,3320	40000 0	50142 0	55675 0	54001 1	10142 1	13300 0	11652 0	13752 0
30,3330	30101 1	74745 1	00006 1	13752 0	23677 0	51650 0	33767 1	03727 0
30,3340	55677 1	31676 1	00006 1	70746 0	54001 1	51650 0	33771 0	03727 0
30,3350	00006 1	10746 0	57676 1	00006 1	70740 0	20001 1	40000 0	00006 1
30,3360	21675 0	54001 1	51650 0	33767 1	03727 0	55675 0	11651 0	41675 0
30,3370	55675 0	41676 0	00006 1	70740 0	20001 1	27675 0	41675 0	55643 0

OCTAL LISTING FOR PARAGRAPH # 163, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

30,3400	41676 0	00006 1	70740 0	20001 1	27643 0	27643 0	41676 0	00006 1
30,3410	70750 1	20001 1	00006 1	70746 0	55644 1	41677 1	00006 1	70742 1
30,3420	27644 1	27644 1	27644 1	31676 1	00006 1	70742 1	20001 1	00006 1
30,3430	70746 0	55645 0	41677 1	00006 1	70750 1	27645 0	27645 0	27645 0
30,3440	34752 0	54142 1	50142 0	31675 1	00006 1	73774 1	03743 1	50142 0
30,3450	55640 0	50142 0	11643 0	64753 1	13456 1	64753 1	00006 1	50142 0
30,3460	71643 0	00006 1	74741 0	00006 1	50142 0	11530 1	54001 1	33771 0
30,3470	03727 0	50142 0	55277 0	10142 1	13441 1	31646 1	54003 0	06037 0
30,3500	I: 52001 1	C: 00001 0	C: 03247 0	00006 1	22142 0	54143 0	40000 0	60001 0
30,3510	00006 1	51650 0	73762 0	54001 1	33764 1	03727 0	60143 1	54001 1
30,3520	33765 0	03727 0	00142 0	I: 63441 0	C: 00001 0	I: 50025 0	C: 21767 1	C: 61232 0
30,3530	I: 43531 1	C: 03252 1	C: 00000 1	I: 63545 0	C: 00003 1	I: 51021 0	C: 06512 1	C: 61542 0
30,3540	I: 77745 1	C: 06522 1	I: 77566 1	00006 1	30155 0	20001 1	54145 0	13552 1
30,3550	34733 1	54145 0	50120 1	30002 0	22154 1	03522 1	54156 1	34755 1
30,3560	03600 1	34751 0	03500 1	40141 1	03622 1	54155 1	34750 1	03600 1
30,3570	33577 1	03600 1	40141 1	03622 1	54154 0	06037 0	I: 77616 0	C: 00016 0
30,3600	60120 1	54115 0	50116 1	30000 1	00006 1	63607 0	40000 0	60145 1
30,3610	00006 1	63617 1	00006 1	50116 1	30001 0	00006 1	10145 0	54001 1
30,3620	22141 0	00002 0	00006 1	13665 0	00006 1	22144 0	54142 1	30001 0
30,3630	54143 0	34755 1	00006 1	10142 1	00006 1	13654 1	10143 0	34755 1
30,3640	13644 0	40142 1	54142 1	34735 1	54143 0	30142 0	03672 1	03743 1
30,3650	00006 1	20143 0	03743 1	00144 0	40143 0	03672 1	64736 1	54143 0
30,3660	10142 1	30143 1	13652 1	40143 0	13652 1	10001 1	34755 1	00002 0
30,3670	34735 1	00002 0	60000 1	54021 0	13700 1	50000 1	44734 1	54021 0
30,3700	00006 1	70000 0	54141 1	00006 1	73726 0	63725 1	00006 1	70141 1
30,3710	63724 0	00006 1	70141 1	63723 1	00006 1	70141 1	63722 0	00006 1
30,3720	70021 0	00002 0	C: 24406 0	C: 00650 1	C: 16204 0	C: 50744 0	C: 20315 1	54141 1
30,3730	34755 1	00006 1	10141 1	10000 0	22141 0	13737 0	13741 1	30001 0
30,3740	00002 0	40141 1	00002 0	10000 0	64753 1	00002 0	40000 0	00002 0
30,3750	05567 0	C: 00402 1	00004 0	04674 0	C: 40165 1	13475 0	05567 0	C: 00401 1
30,3760	13275 0	C: 03246 1	C: 06315 0	C: 03146 1	C: 00071 1	C: 02041 0	C: 01673 1	C: 03434 1
30,3770	C: 00266 0	C: 01616 1	C: 00133 0	C: 14344 1	C: 01463 1	C: 03775 1	C: 03776 1	CKSM 71361 0

DATA LISTING FOR PARAGRAPH # 164, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

31,2000	C: 00222 0	C: 33316 0	C: 07401 0	C: 06613 0	C: 00024 1	C: 00307 0	C: 17534 0	06037 0
31,2010	I: 77524 1	C: 52120 0	I: 77776 1	00006 1	31601 1	53607 0	00006 1	31603 0
31,2020	53611 1	00006 1	31605 0	53613 0	32143 0	04616 1	C: 20334 1	15472 1
31,2030	12032 0	12024 1	22007 0	34756 1	54002 1	50002 0	41600 1	50002 0
31,2040	61606 0	26001 1	10002 1	12034 0	22000 1	00006 1	12051 0	05504 0
31,2050	C: 00160 0	06037 0	I: 77414 0	C: 03707 1	C: 62056 0	15472 1	I: 77745 1	C: 02201 0
31,2060	I: 72412 0	C: 14001 0	C: 02203 1	C: 14003 1	C: 02205 1	I: 77661 0	C: 20213 0	C: 00005 1
31,2070	I: 72014 1	C: 04307 1	C: 52102 0	C: 00000 1	I: 72130 0	C: 02000 0	C: 00002 0	I: 52130 1
31,2100	C: 02001 1	C: 62110 0	I: 66150 0	C: 00000 1	C: 02006 0	I: 66150 0	C: 00002 0	C: 02007 1
31,2110	I: 66150 0	C: 00004 0	C: 02003 0	I: 77730 0	C: 02002 1	I: 77414 0	C: 02676 1	15472 1
31,2120	I: 40020 1	C: 00051 0	C: 62123 0	I: 45014 0	C: 03667 0	C: 27414 0	I: 71331 0	C: 00051 0
31,2130	C: 00006 1	C: 06522 1	C: 02201 0	C: 02203 1	C: 02205 1	I: 77770 1	C: 00066 1	I: 47573 0
31,2140	C: 02467 0	I: 77650 1	C: 60002 0	C: 01543 1	05353 1	C: 04024 0	00004 0	04616 1
31,2150	C: 40153 1	04616 1	C: 40127 1	06037 0	I: 43014 0	C: 04067 1	C: 04666 0	I: 77214 0
31,2160	C: 05062 0	C: 01221 1	C: 16032 1	C: 01235 1	I: 45014 0	C: 01463 1	C: 26351 1	I: 77201 1
31,2170	C: 00001 0	C: 01221 1	I: 65352 0	C: 01235 1	I: 45006 0	C: 51670 1	C: 02023 1	I: 77776 1
31,2200	32215 0	04616 1	C: 20476 0	16001 1	12206 0	12200 0	06037 0	I: 77775 1
31,2210	C: 05520 0	C: 36231 1	C: 33506 1	I: 77776 1	16001 1	C: 01453 1	31246 0	00006 1
31,2220	72417 0	00005 1	23607 1	02400 1	53470 1	00006 1	31464 0	02400 1
31,2230	55615 0	53466 0	41517 1	60025 0	74733 0	40000 0	65002 0	00006 1
31,2240	62244 1	00006 1	31611 0	21470 1	35014 1	54003 0	00006 1	31507 1
31,2250	52131 0	35016 0	54003 0	44755 0	55606 1	40131 0	61620 1	00006 1
31,2260	62272 1	40130 1	61465 1	00006 1	62267 0	31467 0	12277 0	42002 0
31,2270	61467 0	12301 0	40131 0	61465 1	00006 1	62302 1	32003 0	53466 0
31,2300	34737 0	55606 1	03740 1	00006 1	31466 1	55620 0	53613 0	00006 1
31,2310	41470 1	21613 0	31612 0	61606 0	55614 1	54055 0	34750 1	00006 1
31,2320	05014 1	30025 0	55617 1	31762 0	54130 1	41011 1	62501 1	00006 1
31,2330	12335 1	31235 1	54130 1	35003 1	12336 1	35000 1	54002 1	00006 1
31,2340	74746 1	22131 1	40130 1	60025 0	62004 1	74357 0	22007 0	00006 1
31,2350	10002 1	00006 1	71612 1	60000 1	53611 1	11612 1	64753 1	12361 0
31,2360	64753 1	00006 1	71612 1	00006 1	10131 0	22007 0	21611 1	01607 1
31,2370	34737 0	55606 1	44755 0	55620 0	55612 1	00006 1	23607 1	12312 1

JCTAL LISTING FOR PARAGRAPH # 165, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "2" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

31,2400	00005 1	22130 0	52155 1	07103 1	C: 01244 1	07103 1	C: 02005 0	07257 0
31,2410	39154 1	00006 1	12415 1	34733 1	00130 0	52156 1	00130 0	C: 04143 0
31,2420	12641 1	12641 1	12630 1	12621 1	13003 0	13013 1	12704 1	13013 1
31,2430	13061 1	13061 1	13061 1	13531 1	13245 0	13245 0	13245 0	13432 0
31,2440	13331 1	13352 1	13360 0	13473 0	13477 1	13527 0	13733 1	13735 1
31,2450	13735 1	C: 00000 1	C: 00000 1	C: 00034 0	I: 77776 1	34752 0	55647 1	12603 1
31,2460	55647 1	13003 0	05353 1	C: 00035 1	05353 1	C: 05023 0	C: 21000 1	00006 1
31,2470	00030 1	74747 0	10000 0	12551 0	05321 1	C: 00103 0	12557 0	03740 1
31,2500	05311 1	C: 00102 1	00006 1	31474 1	53645 0	06037 0	I: 41535 1	C: 01457 0
31,2510	I: 41535 1	C: 01455 1	I: 55535 1	C: 01453 1	I: 43161 0	C: 25537 1	C: 00463 0	C: 26631 1
31,2520	C: 01255 1	I: 77676 0	C: 27764 1	C: 06522 1	C: 17767 1	C: 02540 1	C: 17757 1	C: 01235 1
31,2530	C: 03760 0	I: 77776 1	34755 1	55620 0	55610 0	55611 1	55647 1	34752 0
31,2540	55621 1	55351 0	04616 1	C: 40155 1	05516 0	C: 00311 1	05516 0	C: 00143 1
31,2550	13531 1	05311 1	C: 00103 0	34755 1	55746 1	34363 0	12536 1	34737 0
31,2560	00006 1	02031 1	10000 0	12601 0	41011 1	62501 1	00006 1	12574 1
31,2570	31746 0	00006 1	12601 0	12477 0	30075 0	74740 1	00006 1	12505 1
31,2600	13531 1	34755 1	55746 1	00006 1	31625 1	53574 1	03740 1	00006 1
31,2610	31561 1	53625 0	00006 1	31643 1	53553 1	11623 0	12641 1	51351 1
31,2620	12421 0	05311 1	C: 00101 1	44752 1	55647 1	05516 0	C: 00311 1	12641 1
31,2630	05311 1	C: 00100 0	31425 0	27552 0	34740 0	00006 1	05013 0	05516 0
31,2640	C: 00143 1	06037 0	I: 45345 1	C: 03625 0	C: 03574 1	I: 41461 1	C: 21214 0	I: 47361 0
31,2650	C: 03635 1	C: 02325 1	I: 47045 0	C: 03635 1	C: 21726 1	I: 76561 1	C: 02333 0	C: 17545 0
31,2660	I: 77776 1	52155 1	21553 1	03740 1	00006 1	31553 0	53643 0	00006 1
31,2670	31545 1	53635 1	00006 1	31547 0	53637 0	00006 1	31551 1	53641 1
31,2700	03704 1	03740 1	51351 1	12425 1	30102 1	74746 1	00006 1	13013 1
31,2710	31666 0	00006 1	13013 1	00004 0	31267 0	55554 0	31266 1	55556 1
31,2720	03740 1	34755 1	55267 1	55266 0	55555 1	55557 0	30120 1	54166 1
31,2730	05037 0	I: 52375 1	C: 03635 1	C: 03521 1	I: 41434 1	C: 21726 1	I: 76435 1	C: 02154 0
31,2740	I: 65361 0	C: 03555 1	C: 03557 0	I: 52361 1	C: 02154 0	I: 41455 0	I: 45345 1	C: 00001 0
31,2750	C: 05660 1	I: 71240 1	C: 62755 1	C: 05660 1	C: 00001 0	I: 45345 1	C: 03635 1	C: 03521 1
31,2760	I: 74271 0	C: 00001 0	I: 53455 0	C: 03521 1	I: 76561 1	C: 02333 0	C: 03545 0	I: 77776 1
31,2770	03740 1	00006 1	31545 1	53635 1	00005 1	31547 0	53637 0	00006 1

OBJECT LISTING FOR PARAGRAPH # 166, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

31,3000	31551 1	53641 1	13013 1	06037 0	I: 64375 1	C: 00025 0	C: 01734 0	I: 53362 0
31,3010	C: 03254 1	C: 03527 1	I: 77776 1	06037 0	I: 47375 0	C: 03521 1	C: 02325 1	I: 70455 1
31,3020	C: 03527 1	C: 02265 1	I: 77721 0	C: 02603 0	C: 03627 1	I: 55525 0	C: 06522 1	I: 52446 0
31,3030	C: 26263 1	C: 03521 1	I: 41451 1	C: 03635 1	I: 76521 0	C: 02603 0	C: 02637 1	I: 77646 0
31,3040	C: 26625 1	I: 50234 1	C: 21726 1	C: 02146 0	I: 77776 1	30120 1	54166 1	30154 1
31,3050	60000 1	04616 1	C: 61672 0	63753 0	00006 1	73752 0	55667 0	51351 1
31,3060	12431 1	03677 1	I: 77743 1	C: 02431 0	C: 23571 0	C: 02427 1	C: 17567 0	C: 03633 1
31,3070	I: 42605 1	C: 05656 1	C: 02425 0	C: 23565 0	C: 02407 0	I: 41225 1	C: 02643 1	C: 05654 0
31,3100	C: 03563 1	I: 77776 1	34744 1	55572 1	00006 1	31643 1	52155 1	34752 0
31,3110	54001 1	33745 1	03553 1	51351 1	12447 0	00006 1	30155 0	53643 0
31,3120	03704 1	41642 1	61426 0	64733 1	54001 1	40001 1	60001 0	22007 0
31,3130	00006 1	11642 1	54130 1	00006 1	70000 0	54131 0	60130 0	56131 1
31,3140	60131 1	54154 0	60131 1	50120 1	54032 1	60131 1	50120 1	54034 1
31,3150	60130 0	64733 1	60131 1	60131 1	50120 1	54036 0	34755 1	54163 1
31,3160	03677 1	I: 65361 0	C: 03627 1	C: 00035 1	I: 62757 0	C: 02411 1	C: 02403 1	I: 70251 0
31,3170	C: 02637 1	C: 03643 0	I: 74342 1	C: 00033 1	I: 53255 0	I: 74341 1	C: 03643 0	C: 05656 1
31,3200	I: 73725 0	C: 00037 0	C: 02417 1	I: 77655 1	I: 76505 0	C: 02603 0	I: 70315 1	C: 01237 0
31,3210	C: 05652 0	I: 45445 0	C: 74523 0	I: 77646 0	C: 17464 1	C: 03254 1	I: 65316 0	C: 03256 0
31,3220	I: 65316 0	C: 05650 1	I: 63471 0	C: 01245 0	I: 45225 0	I: 71244 0	C: 63230 0	C: 06522 1
31,3230	I: 43366 0	C: 03260 0	I: 44244 0	C: 63236 0	C: 03260 0	C: 03260 0	I: 77776 1	03740 1
31,3240	31351 1	55621 1	25623 1	51351 1	12435 0	35014 1	54003 0	00006 1
31,3250	51351 1	52452 0	31435 1	24006 1	24006 1	61642 0	56001 0	61642 0
31,3260	10000 0	10001 1	13313 1	13313 1	13265 1	03677 1	I: 53575 0	C: 03635 1
31,3270	C: 15603 0	C: 03643 0	I: 74203 0	C: 02433 1	C: 02265 1	I: 77655 1	C: 03635 1	I: 47051 0
31,3300	C: 03521 1	C: 21726 1	I: 47035 1	C: 03635 1	C: 21726 1	C: 26611 0	C: 02603 0	I: 76435 1
31,3310	C: 02611 0	C: 02617 0	I: 77776 1	51351 1	31423 0	61642 0	00006 1	51351 1
31,3320	62441 1	03740 1	31621 0	64753 1	55351 0	34755 1	55623 0	51621 0
31,3330	12441 0	06037 0	I: 47175 1	C: 03254 1	C: 21725 1	I: 74361 0	C: 03423 1	C: 22001 0
31,3340	C: 03254 1	I: 77776 1	11647 1	12460 0	11646 0	13350 0	05567 0	C: 01412 1
31,3350	04635 0	C: 65102 1	06037 0	I: 77775 1	C: 03537 0	C: 03262 1	I: 77776 1	13432 0
31,3360	06037 0	I: 52375 1	C: 03635 1	C: 03521 1	I: 77534 0	C: 21726 1	C: 03262 1	I: 50235 0
31,3370	C: 02146 0	C: 02611 0	I: 77776 1	40154 0	63754 1	64733 1	54130 1	40130 1

OCTAL LISTING FOR PARAGRAPH # 170. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

32,2000	C: 00044 1	C: 70123 0	C: 40702 0	C: 13337 1	C: 10776 0	34737 0	70077 0	10000 0
32,2010	02017 0	05567 0	C: 00220 1	05472 0	00006 1	30014 1	53421 0	00006 1
32,2020	31421 1	53052 0	32172 1	04616 1	C: 20334 1	05472 0	02036 0	44746 1
32,2030	60154 1	00006 1	12014 1	00006 1	31052 1	02016 1	06037 0	I: 77614 1
32,2040	C: 01076 1	I: 77414 0	C: 02076 1	32172 1	04616 1	C: 20620 1	05037 0	I: 77634 0
32,2050	C: 21573 0	C: 34041 0	C: 27057 0	I: 77624 1	C: 64132 0	C: 16201 0	C: 00015 0	C: 34041 0
32,2060	C: 27043 0	I: 77624 1	C: 64132 0	C: 16207 0	C: 00015 0	I: 56225 1	C: 02021 0	C: 24175 1
32,2070	C: 02215 0	I: 77776 1	34753 1	54332 1	32176 0	04616 1	C: 01735 1	31324 0
32,2100	54332 1	34744 1	70074 0	10000 0	02122 1	11304 0	12111 0	12115 1
32,2110	12111 0	34363 0	04616 1	C: 01735 1	12105 0	04616 1	C: 16714 1	04616 1
32,2120	C: 17716 1	02122 1	05516 0	C: 00054 0	32173 0	04616 1	C: 20342 0	15472 1
32,2130	15472 1	05472 0	I: 64375 1	C: 00025 0	C: 01734 0	I: 72561 0	C: 24202 1	I: 53255 0
32,2140	C: 24204 1	C: 24212 0	I: 77634 0	C: 21772 0	C: 24025 0	C: 00017 1	I: 74321 1	C: 01734 0
32,2150	C: 24200 0	I: 53212 0	C: 24204 1	I: 47055 1	C: 24212 0	C: 21772 0	I: 77750 0	C: 00024 1
32,2160	I: 72130 0	C: 00155 0	C: 00026 0	I: 72130 0	C: 00160 0	C: 00030 1	I: 43530 0	C: 00162 1
32,2170	C: 00216 1	C: 14400 0	C: 01420 0	C: 14420 1	C: 03100 0	C: 00000 1	C: 03720 1	C: 15077 0
32,2200	C: 05041 1	C: 24402 1	C: 25724 1	C: 00000 1	C: 60000 1	C: 00000 1	C: 60000 1	C: 00000 1
32,2210	C: 60000 1	C: 00000 1	C: 37777 1	C: 00000 1	C: 37777 1	C: 00000 1	C: 37777 1	I: 77624 1
32,2220	C: 27414 0	I: 77745 1	C: 03442 0	C: 03661 0	C: 00041 1	I: 43014 0	C: 01674 0	C: 01673 1
32,2230	I: 43014 0	C: 01676 1	C: 01675 1	I: 77624 1	C: 27134 1	I: 77624 1	C: 11244 0	I: 77775 1
32,2240	C: 00017 1	C: 17631 0	C: 00015 0	C: 34041 0	C: 27414 0	I: 43014 0	C: 01474 1	C: 01673 1
32,2250	I: 43014 0	C: 01676 1	C: 02756 1	C: 64257 0	I: 43014 0	C: 01476 0	C: 01475 0	I: 77624 1
32,2260	C: 27134 1	I: 77624 1	C: 11244 0	I: 77775 1	C: 00025 0	C: 25761 0	C: 00017 1	C: 01102 0
32,2270	I: 53435 0	C: 01761 0	C: 24025 0	C: 03631 0	I: 53435 0	C: 00025 0	C: 27637 0	C: 01102 0
32,2300	I: 50256 0	C: 03637 0	I: 77752 1	C: 02732 0	I: 44316 0	C: 10314 0	I: 77766 0	C: 26730 1
32,2310	C: 01102 0	C: 26655 0	C: 01761 0	I: 77676 0	C: 02744 1	I: 45014 0	C: 03666 1	C: 24732 1
32,2320	I: 77676 0	C: 03645 0	I: 77745 1	C: 00037 0	C: 27663 1	C: 03645 0	I: 77646 0	C: 24025 0
32,2330	C: 00001 0	C: 03653 1	I: 53435 0	C: 03631 0	I: 53435 0	C: 03653 1	I: 76561 1	C: 00025 0
32,2340	C: 37665 0	C: 11244 0	I: 77624 1	C: 27414 0	I: 44345 0	C: 03663 1	C: 03661 0	C: 25517 0
32,2350	C: 03653 1	C: 01535 0	C: 25503 0	C: 03665 1	C: 35511 1	C: 23455 1	I: 45174 1	C: 00002 0
32,2360	C: 26661 1	I: 77624 1	C: 27423 1	I: 77776 1	04616 1	C: 50040 0	04645 1	55737 1
32,2370	05516 0	C: 00120 1	00004 0	34751 0	00006 1	02033 0	54001 1	44751 1

DATA LISTING FOR PARAGRAPH # 171. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

32,2400	70110 0	50001 0	54110 0	00003 1	04616 1	C: 53103 0	04616 1	C: 17714 0
32,2410	12542 1	00004 0	53106 0	52162 0	53102 1	53747 0	00006 1	30034 0
32,2420	52160 1	30032 0	54156 1	00006 1	30025 0	52155 1	00006 1	30036 1
32,2430	53110 1	00003 1	04616 1	C: 53105 0	04616 1	C: 17714 0	02536 0	00004 0
32,2440	53334 0	53761 1	52162 0	53755 0	52160 1	53460 0	00006 1	31110 0
32,2450	53753 0	30156 0	55461 1	06037 0	C: 14025 0	C: 03747 0	I: 57261 0	C: 20217 1
32,2460	C: 24002 0	C: 03751 1	I: 47135 0	C: 01110 0	C: 21576 0	C: 03734 1	I: 47135 0	C: 01111 1
32,2470	C: 21576 0	C: 17736 0	C: 01102 0	I: 66405 0	C: 24004 0	C: 37757 0	C: 46041 0	C: 17741 0
32,2500	C: 00025 0	C: 34041 0	C: 51255 1	I: 77776 1	31457 0	54766 1	31460 1	54770 0
32,2510	31461 0	54772 1	06037 0	I: 45175 0	C: 01102 0	C: 47651 0	I: 77641 1	C: 03741 0
32,2520	I: 65552 0	C: 01046 1	I: 50025 0	C: 24546 0	C: 64531 1	I: 77776 1	34752 0	54154 0
32,2530	12534 0	I: 77776 1	34755 1	54154 0	31737 0	04640 1	30101 1	74742 0
32,2540	10000 0	12404 1	34753 1	54154 0	02534 1	C: 00210 1	C: 21042 1	34753 1
32,2550	55107 1	34756 1	10000 0	54002 1	11107 1	12563 1	00006 1	50002 0
32,2560	31761 0	50002 0	21102 1	00006 1	50002 0	31102 0	50002 0	52156 1
32,2570	11107 1	12577 1	00006 1	50002 0	31761 0	50002 0	20156 1	10002 1
32,2600	12552 0	52156 1	52155 1	32774 1	54120 0	04713 0	C: 01023 1	07532 1
32,2610	11107 1	12613 0	12527 1	00004 0	00006 1	30036 1	53767 1	30033 1
32,2620	54766 1	30034 0	54770 0	30032 0	54772 1	04616 1	C: 47615 0	46245 0
32,2630	04616 1	C: 47675 0	11107 1	12635 1	12702 1	00004 0	55107 1	31766 1
32,2640	05032 0	54166 1	41766 0	05033 1	54163 1	00006 1	70124 1	52155 1
32,2650	31767 0	05033 1	55766 0	00006 1	70166 1	00006 1	70122 1	20155 1
32,2660	31767 0	05032 0	55767 1	00006 1	70166 1	00006 1	70126 0	20155 1
32,2670	00006 1	30155 0	20155 1	10000 0	34736 1	12676 0	00006 1	05012 1
32,2700	00003 1	12551 0	31767 0	00006 1	70122 1	53110 1	41766 0	00006 1
32,2710	70126 0	21110 1	40163 1	00006 1	71766 0	00006 1	70122 1	52155 1
32,2720	30166 0	00006 1	70124 1	20155 1	40163 1	00006 1	71767 1	00006 1
32,2730	70126 0	20155 1	30154 1	00006 1	72775 1	57107 0	00006 1	72775 1
32,2740	55110 1	34750 1	00006 1	02033 0	00004 0	00006 1	12752 1	04616 1
32,2750	C: 52306 0	12770 1	44742 0	70110 0	54110 0	44752 1	00006 1	03012 1
32,2760	34743 0	26077 0	11056 1	44776 1	64777 1	05203 0	C: 03400 0	C: 50067 0
32,2770	44740 1	70076 1	54076 1	15155 1	C: 00052 0	C: 56655 1	05353 1	C: 04024 0

DATA LISTING FOR PARAGRAPH # 172. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

32,3000	04616 1	C: 11254 1	33253 0	55455 0	32000 0	55251 1	34751 0	55515 0
32,3010	44753 0	55351 0	34755 1	55623 0	44736 0	00006 1	03012 1	06037 0
32,3020	I: 43014 0	C: 02663 0	C: 03271 0	I: 43014 0	C: 05660 1	C: 03067 0	I: 43014 0	C: 00266 0
32,3030	C: 00270 1	I: 77201 1	C: 00001 0	C: 02023 1	I: 41525 0	C: 02401 0	C: 37625 1	C: 55716 1
32,3040	I: 64312 0	C: 01734 0	C: 37635 0	C: 46432 0	I: 45345 1	C: 02401 0	C: 25260 1	C: 34041 0
32,3050	C: 27057 0	I: 77331 0	C: 03647 1	C: 00050 1	C: 06520 0	C: 26603 0	C: 06516 0	C: 26611 0
32,3060	C: 06514 1	C: 16617 0	C: 25256 1	C: 27665 1	C: 06522 1	C: 17254 1	C: 06522 1	C: 03643 0
32,3070	I: 77745 1	C: 00015 0	C: 27561 0	C: 00017 1	I: 64312 0	C: 01734 0	C: 37521 0	C: 67130 1
32,3100	C: 35237 1	C: 62454 0	55646 0	06037 0	I: 57345 1	C: 03627 1	C: 02501 1	I: 44232 1
32,3110	C: 03633 1	I: 45325 1	C: 02477 1	C: 02643 1	I: 65222 0	C: 02641 0	I: 57316 1	C: 02503 0
32,3120	I: 65232 1	C: 02637 1	I: 57225 0	C: 02475 0	C: 02501 1	I: 51515 1	C: 03627 1	I: 57225 0
32,3130	C: 02473 0	C: 02505 0	I: 43215 0	I: 56215 1	I: 77661 0	C: 21613 0	I: 43206 1	C: 03561 0
32,3140	C: 14041 1	I: 45246 0	C: 25262 0	I: 45040 1	C: 65163 0	C: 27414 0	I: 43014 0	C: 01473 0
32,3150	C: 00063 1	I: 77745 1	C: 03561 0	C: 25517 0	C: 00017 1	C: 25535 0	C: 00025 0	C: 35543 0
32,3160	C: 27107 1	I: 77650 1	C: 65070 0	I: 54335 0	C: 03423 1	C: 20617 0	I: 77621 1	C: 00041 1
32,3170	C: 27442 0	C: 03527 1	I: 53435 0	C: 03521 1	I: 72441 0	C: 03635 1	C: 26627 0	C: 03254 1
32,3200	C: 02631 1	I: 77776 1	05353 1	C: 04024 0	44362 0	04616 1	C: 74664 0	15155 1
32,3210	06037 0	I: 47151 1	C: 02747 1	C: 65215 1	C: 31135 1	I: 53575 0	C: 02631 1	C: 27773 1
32,3220	C: 06520 0	C: 03765 0	I: 77776 1	35016 0	54003 0	00004 0	04674 0	C: 40142 1
32,3230	00003 1	04616 1	C: 54123 0	05353 1	C: 04024 0	34746 0	00006 1	02033 0
32,3240	00006 1	13247 1	33254 1	04616 1	C: 20623 1	16001 1	13235 1	04616 1
32,3250	C: 67721 1	04635 0	C: 74126 1	C: 02076 1	C: 00500 1	C: 00035 1	C: 30373 0	C: 00004 0
32,3260	C: 01610 1	C: 00000 1	C: 00010 0	37710 0	05105 0	C: 03275 1	C: 64067 1	15261 0
32,3270	05353 1	C: 00003 1	34777 1	05173 1	C: 03263 0	00004 0	34755 1	57746 0
32,3300	00006 1	71756 0	21645 0	00006 1	30040 0	53764 1	52071 0	30041 1
32,3310	57765 1	56072 1	00006 1	30025 0	53762 1	31763 1	61160 1	54154 0
32,3320	31764 0	61161 0	54157 0	31765 1	61162 0	54161 0	41763 0	61254 0
32,3330	60070 0	55766 0	41764 1	61255 1	60071 1	55770 1	41765 0	61256 1
32,3340	60072 1	55772 0	34755 1	54155 1	54160 1	54162 0	55254 1	55255 0
32,3350	55256 0	44753 0	54163 1	06037 0	I: 65361 0	C: 26022 0	C: 03762 1	I: 77625 0
32,3360	C: 01235 1	C: 00037 0	I: 63271 0	C: 27153 0	C: 01237 0	I: 74251 1	C: 02631 1	I: 53352 0
32,3370	C: 03527 1	I: 45455 1	C: 53746 1	C: 03521 1	I: 77656 1	C: 00017 1	I: 72441 0	C: 00031 0

OCTAL LISTING FOR PARAGRAPH # 173. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

32,3400	C: 17474 0	C: 00027 0	I: 41261 1	C: 20214 1	C: 03474 0	I: 45215 0	C: 00045 0	C: 02333 0
32,3410	C: 17775 1	C: 03474 0	I: 56221 0	C: 03645 0	C: 02541 0	I: 51515 1	C: 01237 0	I: 60471 0
32,3420	C: 05652 0	C: 00025 0	I: 77615 0	I: 45115 0	C: 06520 0	C: 47661 0	I: 77641 1	C: 00017 1
32,3430	C: 00027 1	I: 45465 1	C: 50313 0	C: 03767 1	I: 53361 0	C: 26022 0	C: 02631 1	I: 65246 1
32,3440	C: 03762 1	I: 65225 1	C: 03760 0	C: 03762 1	C: 17760 0	I: 55271 0	C: 25535 0	I: 41325 0
32,3450	C: 03611 1	C: 25514 1	I: 56271 0	C: 01245 0	C: 22006 1	I: 65215 1	C: 00001 0	C: 00025 0
32,3460	I: 45271 1	C: 00027 1	I: 43205 1	C: 02543 1	C: 03464 1	I: 56325 0	C: 02547 0	C: 01245 0
32,3470	I: 56325 0	C: 02545 1	C: 01245 0	I: 44206 0	C: 00003 1	I: 71240 1	C: 65504 0	I: 41545 0
32,3500	I: 51021 0	C: 00003 1	C: 65504 0	I: 77745 1	I: 77745 1	I: 77601 0	C: 00003 1	C: 17464 1
32,3510	I: 77775 1	52155 1	04516 1	C: 62221 1	06037 0	I: 77775 1	C: 00031 0	I: 53352 0
32,3520	C: 03734 1	I: 63342 1	C: 03521 1	I: 74256 0	C: 03474 0	I: 51372 0	I: 77646 0	C: 02263 1
32,3530	I: 77776 1	04515 1	C: 63463 0	C: 00001 0	C: 00000 1	C: 04000 0	C: 00000 1	C: 01217 1
32,3540	06037 0	I: 77624 1	C: 61104 0	I: 77776 1	34751 0	55515 0	33764 1	55455 0
32,3550	05516 0	C: 00214 0	05516 0	C: 00175 1	05516 0	C: 00161 1	05504 0	C: 00307 0
32,3560	05321 1	C: 00105 0	13707 0	06037 0	I: 77624 1	C: 65737 1	I: 54345 1	C: 34003 0
32,3570	C: 20205 1	I: 77665 1	C: 01245 0	C: 16271 1	C: 01245 0	I: 70471 1	C: 16015 1	C: 03635 1
32,3600	C: 03637 0	C: 03641 1	I: 77665 1	C: 25763 1	C: 16263 1	C: 34005 0	I: 54276 0	C: 20214 1
32,3610	C: 02267 0	I: 57535 0	C: 26302 1	I: 77702 1	C: 02265 1	I: 45014 0	C: 04467 0	C: 60300 1
32,3620	I: 52160 1	C: 00000 1	C: 65625 0	I: 77760 0	C: 00010 0	I: 41343 0	C: 02551 1	C: 03517 1
32,3630	I: 41213 1	C: 02553 0	C: 03517 1	I: 41213 1	C: 02555 0	C: 03517 1	I: 77613 0	C: 02557 1
32,3640	C: 02277 1	I: 51025 1	C: 02571 0	C: 65647 1	I: 77745 1	C: 02571 0	C: 02277 1	I: 77745 1
32,3650	C: 02575 1	C: 36273 1	C: 57312 0	I: 45246 0	C: 02573 1	I: 75240 0	C: 65661 0	C: 02335 0
32,3660	C: 03633 1	I: 45345 1	C: 03633 1	C: 02335 0	I: 77661 0	C: 20606 0	C: 03643 0	I: 77414 0
32,3670	C: 04461 0	05504 0	C: 00220 1	03746 1	05353 1	C: 04024 0	04616 1	C: 73747 1
32,3700	03746 1	00006 1	33766 0	55253 0	05353 1	C: 00004 0	15155 1	05516 0
32,3710	C: 00215 1	36000 1	55251 1	06037 0	I: 45014 0	C: 04707 0	C: 65724 0	C: 65737 1
32,3720	I: 52131 0	C: 00053 1	C: 65623 0	C: 60254 1	I: 72545 0	C: 03517 1	C: 37502 1	C: 60254 1
32,3730	I: 77776 1	05353 1	C: 04024 0	00006 1	31502 1	53517 1	13676 1	I: 45234 0
32,3740	C: 21573 0	C: 03442 0	I: 77661 0	C: 20214 1	C: 03517 1	I: 77616 0	34737 0	54055 0
32,3750	34750 1	00006 1	05014 1	00002 0	C: 00000 1	C: 01750 1	C: 00021 1	C: 33400 0
32,3760	C: 11021 1	C: 00000 1	C: 00507 0	C: 25605 0	C: 02112 1	C: 03642 1	C: 70067 1	C: 00003 1
32,3770	05353 1	C: 00035 1	15155 1	C: 03773 1	C: 03774 0	CKSM 71663 1	@	@

JOTAL LISTING FOR PARAGRAPH # 174. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

33,2000	C: 41545 0	C: 42341 1	C: 61000 0	C: 71210 1	C: 00000 1	C: 00000 1	C: 72333 1	C: 45546 1
33,2010	C: 65363 1	C: 64451 0	C: 21241 0	C: 03216 1	C: 30153 0	C: 23101 0	C: 63105 0	C: 61733 1
33,2020	C: 01507 1	C: 00321 1	C: 26706 1	C: 00150 0	C: 33343 0	C: 02630 0	C: 25010 1	C: 24402 1
33,2030	C: 26003 0	C: 61377 0	C: 55754 1	C: 77644 1	C: 65556 1	C: 64453 1	C: 55670 0	C: 00002 0
33,2040	C: 11777 0	C: 01023 1	C: 37155 1	C: 00065 1	C: 06244 0	40110 0	74742 0	00006 1
33,2050	12123 1	00004 0	26110 0	44736 0	00006 1	03012 1	44740 1	70076 1
33,2060	54076 1	44753 0	70074 0	54074 0	04616 1	C: 52156 1	34740 0	70110 0
33,2070	10000 0	12104 1	35031 0	05072 1	C: 02113 0	C: 66067 0	44742 0	70110 0
33,2100	54110 0	34736 1	26110 0	12570 0	34753 1	05203 0	C: 03601 0	C: 52067 1
33,2110	34741 1	26110 0	12570 0	34752 1	05203 0	C: 02171 1	C: 52067 1	04616 1
33,2120	C: 17714 0	15155 1	15155 1	00006 1	41235 0	52155 1	00006 1	30025 0
33,2130	20155 1	54163 1	30155 0	00006 1	74740 1	52155 1	06037 0	I: 52315 1
33,2140	C: 01726 0	C: 03527 1	I: 74325 0	I: 52255 1	C: 01720 0	C: 03521 1	I: 77414 0	C: 01043 1
33,2150	C: 66152 1	12570 0	C: 25102 0	C: 00001 0	I: 77761 1	C: 26177 1	C: 01761 0	I: 77414 0
33,2160	C: 01263 1	40074 0	74753 0	00006 1	12570 0	00004 0	26074 0	11056 1
33,2170	44776 1	64777 1	05203 0	C: 03356 1	C: 50067 0	12570 0	C: 00006 1	C: 10000 0
33,2200	C: 20000 0	C: 00000 1	C: 75751 0	C: 41775 1	C: 00022 1	C: 07212 1	05353 1	C: 16035 0
33,2210	C: 20000 0	C: 02217 1	C: 66067 0	37716 0	55075 0	04616 1	C: 15263 1	06037 0
33,2220	I: 51575 1	C: 00325 0	I: 77776 1	30154 1	55246 1	00006 1	72020 0	53514 1
33,2230	00006 1	31245 0	53571 1	40104 0	74744 0	00006 1	12254 1	30106 0
33,2240	74737 1	10000 0	00006 1	32001 1	54002 1	00006 1	31514 0	00006 1
33,2250	10002 1	00006 1	71244 0	21571 1	32021 0	07307 1	52155 1	21510 0
33,2260	02440 0	04616 1	C: 47615 0	32414 1	04616 1	C: 20037 1	06037 0	I: 45014 0
33,2270	C: 03307 0	C: 67032 1	C: 66776 1	I: 77776 1	03552 0	02423 0	55160 0	55161 1
33,2300	55162 1	44741 0	70076 1	54076 1	34745 0	70103 1	10000 0	12342 1
33,2310	40102 0	74752 1	10000 0	12346 0	41251 1	61246 0	00006 1	62352 1
33,2320	40076 1	74741 0	26076 1	34753 1	55515 0	30106 0	74737 1	10000 0
33,2330	12375 0	34743 0	00006 1	02032 1	00006 1	12375 0	44736 0	70111 1
33,2340	54111 1	12400 0	44752 1	70102 0	54102 0	12375 0	40102 0	74752 1
33,2350	26102 0	12375 0	03552 0	11515 0	12366 1	10761 0	12400 0	05353 1
33,2360	C: 00374 1	37713 0	05072 1	C: 02571 0	C: 74067 0	12400 0	55570 0	03552 0
33,2370	31570 1	55515 0	00004 0	04674 0	C: 40165 1	40111 1	74736 0	26111 1

OCTAL LISTING FOR PARAGRAPH # 175. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

33,2400	00003 1	04616 1	C: 40457 0	30167 1	75004 1	54166 1	22007 0	52121 1
33,2410	03552 0	00003 1	31253 1	52006 0	C: 02145 0	I: 77624 1	C: 66730 0	I: 77776 1
33,2420	32437 0	02424 1	05155 0	36007 0	00004 0	77747 0	54061 1	00006 1
33,2430	50061 0	31545 1	50061 0	53221 0	10061 1	12425 1	00002 0	C: 00022 1
33,2440	31156 1	54766 1	31157 0	54770 0	31155 1	54772 1	00002 0	00004 0
33,2450	45015 1	70107 0	65015 0	54107 0	37720 0	05105 0	C: 03670 0	C: 66067 0
33,2460	12540 0	I: 77773 1	40107 0	74735 0	00006 1	12546 0	34746 0	70107 0
33,2470	00006 1	12721 0	34743 0	70107 0	00006 1	12710 1	34741 1	70107 0
33,2500	00006 1	12515 0	34745 0	00006 1	02033 0	00006 1	13155 1	34737 0
33,2510	00006 1	02012 0	00006 1	12536 1	12540 0	31642 0	61427 1	00006 1
33,2520	62531 1	34741 1	56003 1	54001 1	41545 0	22003 1	61430 1	00006 1
33,2530	62447 1	34746 0	00006 1	02033 0	00006 1	13155 1	05567 0	C: 00511 1
33,2540	00004 0	43154 0	70107 0	54107 0	04674 0	C: 53607 0	03552 0	30077 1
33,2550	75014 0	10000 0	12564 0	30110 1	72250 0	10000 0	12564 0	30110 1
33,2560	77710 1	10000 0	12570 0	12045 0	00004 0	44742 0	70110 0	54110 0
33,2570	06037 0	I: 51575 1	C: 03573 0	I: 45206 1	C: 02333 0	C: 03535 1	C: 03775 1	I: 47075 0
33,2600	C: 26026 1	C: 21612 1	C: 27742 0	C: 03537 0	I: 53435 0	C: 03720 1	C: 27726 1	C: 03573 0
33,2610	I: 60505 1	C: 01734 0	C: 27545 0	C: 03601 0	I: 76505 0	C: 01734 0	C: 27553 1	C: 03537 0
33,2620	I: 51435 1	C: 03601 0	I: 63552 0	I: 77671 1	I: 47075 0	C: 26030 0	C: 21612 1	I: 77776 1
33,2630	00004 0	31546 0	55743 1	31540 1	55744 0	31542 0	55745 1	30154 1
33,2640	55716 1	00006 1	31573 1	53521 1	00006 1	31575 1	53523 0	00006 1
33,2650	31577 0	53525 0	00006 1	31601 1	53527 1	00006 1	31603 0	53531 0
33,2660	00005 1	31605 0	53533 1	12275 1	00006 1	50000 1	32700 1	52156 1
33,2670	00006 1	41535 1	20156 1	06727 0	34755 1	24133 0	14631 0	C: 00007 0
33,2700	C: 15100 1	C: 00016 0	C: 34200 1	C: 00000 1	C: 00364 0	C: 00010 0	C: 35600 1	C: 01414 1
33,2710	36242 0	04616 1	C: 66664 0	12476 1	05504 0	C: 00311 1	05504 0	C: 00253 0
33,2720	12476 1	34752 0	04616 1	C: 66664 0	12540 0	05504 0	C: 00256 0	12540 0
33,2730	I: 41456 0	C: 03537 0	I: 67340 1	C: 02777 1	C: 03000 1	I: 50076 0	C: 66765 0	I: 50375 0
33,2740	C: 05514 1	C: 03537 0	I: 41552 0	I: 44316 0	C: 27027 1	I: 56325 0	C: 26040 1	C: 00043 0
33,2750	C: 00041 1	I: 41205 0	C: 26042 0	I: 65361 0	C: 03537 0	I: 41205 0	C: 26044 0	C: 00041 1
33,2760	I: 75551 1	C: 06514 1	I: 45455 1	C: 74256 0	I: 41455 0	I: 60345 0	C: 00043 0	C: 00050 1
33,2770	I: 53663 1	C: 26032 1	C: 56623 0	I: 45561 1	C: 74214 0	I: 77616 0	I: 61375 1	C: 00325 0

OBJECTAL LISTING FOR PARAGRAPH # 176. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

33,3000	C: 01734 0	I: 76561 1	C: 26022 0	C: 03527 1	I: 41562 0	I: 41455 0	C: 01237 0	I: 65255 0
33,3010	C: 01227 1	C: 01250 1	I: 74261 1	C: 20207 0	I: 44055 1	C: 01221 1	C: 00037 0	C: 37545 1
33,3020	C: 66730 0	I: 53255 0	I: 77655 1	C: 01227 1	C: 37553 0	C: 00037 0	C: 01463 1	C: 06315 0
33,3030	C: 00010 0	C: 00060 1	I: 41575 0	C: 02317 0	I: 65255 0	C: 01726 0	C: 01250 1	I: 74271 0
33,3040	C: 27031 0	I: 77655 1	C: 01720 0	C: 37573 1	C: 67130 1	I: 53255 0	C: 01726 0	I: 77626 0
33,3050	C: 74176 1	I: 77776 1	03552 0	06037 0	I: 77775 1	C: 03563 1	C: 26317 0	C: 03573 0
33,3060	C: 25720 0	C: 03601 0	C: 01726 0	I: 77776 1	03552 0	06037 0	I: 74375 0	C: 00325 0
33,3070	C: 25024 0	I: 53206 0	C: 01237 0	I: 53206 0	C: 03527 1	I: 56325 0	C: 01250 1	C: 27031 0
33,3100	I: 77761 1	I: 77655 1	C: 03521 1	C: 37573 1	C: 67130 1	I: 53255 0	I: 77655 1	C: 03527 1
33,3110	C: 03601 0	I: 77646 0	C: 27472 0	C: 03537 0	I: 72441 0	C: 03601 0	C: 27474 0	C: 03573 0
33,3120	I: 72435 0	C: 02325 1	C: 17734 1	C: 00045 0	I: 77625 0	C: 02333 0	C: 37535 0	C: 66461 1
33,3130	I: 77656 1	C: 17537 0	C: 00043 0	I: 55261 1	C: 20207 0	C: 26036 0	I: 74205 0	C: 27031 0
33,3140	C: 03537 0	C: 03563 1	I: 77616 0	C: 00303 1	C: 00005 1	C: 33212 0	C: 00014 1	C: 20000 0
33,3150	C: 00000 1	C: 00210 0	C: 00000 1	C: 00620 0	C: 00110 1	34742 1	70107 0	10000 0
33,3160	12540 0	34750 1	70107 0	00006 1	13310 1	30120 1	54166 1	06037 0
33,3170	I: 61375 1	C: 02273 0	C: 02146 0	I: 72515 0	C: 03601 0	I: 50255 0	C: 03734 1	C: 00001 0
33,3200	I: 77405 0	C: 01355 0	40110 0	74743 1	00006 1	13210 0	31356 0	07307 1
33,3210	06037 0	I: 54215 0	C: 03655 1	C: 20210 0	I: 74205 0	C: 26011 0	I: 45241 1	C: 03537 0
33,3220	C: 03535 1	C: 03665 1	I: 77776 1	30107 1	74741 0	00006 1	13243 0	06037 0
33,3230	I: 45246 0	C: 02521 0	I: 45252 0	C: 03535 1	I: 77776 1	25670 1	06723 1	13560 0
33,3240	13560 0	05516 0	C: 00263 0	40107 0	74744 0	10000 0	13310 1	06037 0
33,3250	I: 40545 1	C: 03535 1	I: 77776 1	00006 1	31665 0	52155 1	07544 0	00006 1
33,3260	13262 0	13310 1	54156 1	40001 1	61420 0	00006 1	63310 0	00006 1
33,3270	71421 0	00006 1	11420 1	54135 1	07313 1	06037 0	I: 77752 1	I: 53361 0
33,3300	C: 03537 0	C: 03573 0	C: 37657 1	C: 67130 1	I: 77776 1	03552 0	34755 1	03534 0
33,3310	03552 0	40107 0	74745 1	10000 0	13514 0	41651 0	54001 1	26001 1
33,3320	60001 0	60001 0	50120 1	52047 0	34741 1	54003 0	31655 0	54766 1
33,3330	31656 0	54770 0	31654 1	54772 1	04616 1	C: 47615 0	30120 1	54166 1
33,3340	06037 0	I: 45173 0	C: 02231 0	C: 47673 0	I: 54325 1	C: 03653 1	C: 20215 0	I: 41403 0
33,3350	C: 51764 0	I: 77776 1	44753 0	54163 1	31657 1	22007 0	52155 1	31660 0
33,3360	22007 0	52160 1	31661 1	22007 0	52162 0	35016 0	54003 0	06037 0
33,3370	I: 65361 0	C: 26022 0	C: 02253 1	I: 56225 1	C: 01235 1	C: 27151 1	I: 76561 1	C: 01237 0

DATA LISTING FOR PARAGRAPH # 177. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

33,3400	I: 53255 0	C: 03527 1	I: 53352 0	C: 03734 1	I: 51406 1	I: 43202 0	C: 27145 1	C: 24025 0
33,3410	I: 44241 0	C: 00001 0	I: 51406 1	I: 77425 1	C: 00025 0	25672 0	06723 1	13575 1
33,3420	13575 1	05516 0	C: 00262 1	30107 1	74740 1	00006 1	13435 1	05516 0
33,3430	C: 00250 0	31651 1	67746 0	00006 1	13514 0	40107 0	74744 0	10000 0
33,3440	13514 0	54155 1	31471 1	54130 1	31651 1	54131 0	35014 1	54003 0
33,3450	41527 1	60130 0	00006 1	63466 0	40130 1	61526 1	00006 1	63471 0
33,3460	00006 1	50131 1	71530 1	00006 1	11526 0	13472 1	50131 1	31533 0
33,3470	13472 1	34755 1	54154 0	44745 1	61011 0	00006 1	63501 0	31536 0
33,3500	54154 0	35016 0	54003 0	06037 0	I: 74205 0	I: 77655 1	C: 03601 0	C: 03657 0
33,3510	I: 77776 1	03552 0	36242 0	03534 0	03552 0	34747 1	70107 0	10000 0
33,3520	13527 0	41471 0	62707 0	00006 1	62540 1	05504 0	C: 00257 1	37720 0
33,3530	05072 1	C: 03616 0	C: 66067 0	12540 0	54130 1	00006 1	31657 1	50130 0
33,3540	53573 0	00006 1	31661 1	50130 0	53575 0	00006 1	31663 0	50130 0
33,3550	53577 1	00002 0	35007 0	56003 1	52002 1	55446 1	22003 1	00000 1
33,3560	41671 1	00006 1	13572 0	61670 1	77745 1	00006 1	13570 1	13572 0
33,3570	05504 0	C: 00263 0	31670 1	55671 1	13310 1	41673 0	00006 1	13607 1
33,3600	61672 0	77745 1	00006 1	13605 0	13607 1	05504 0	C: 00262 1	31672 0
33,3610	55673 0	11651 0	13514 0	05504 0	C: 00250 0	13514 0	34361 1	05203 0
33,3620	C: 03757 1	C: 70064 1	11651 0	13625 1	34752 0	60000 1	04616 1	C: 53107 1
33,3630	04616 1	C: 17714 0	13665 0	11675 0	13666 0	00004 0	00006 1	31102 0
33,3640	53653 1	34741 1	54003 0	00006 1	31653 0	53740 1	00006 1	31655 0
33,3650	53735 0	31656 0	55736 0	35016 0	54003 0	40107 0	74745 1	26107 0
33,3660	11651 0	13663 0	34752 0	55651 0	15155 1	34752 0	55675 0	13660 0
33,3670	04616 1	C: 53471 0	04616 1	C: 17714 0	13703 1	37711 1	05146 1	03737 1
33,3700	05516 0	C: 00252 1	05155 0	33720 1	04616 1	C: 21562 0	16001 1	13712 1
33,3710	15155 1	05155 0	34745 0	00006 1	02033 0	00006 1	13675 1	13703 1
33,3720	C: 00523 0	04645 1	55656 1	34752 0	55674 1	55675 0	34755 1	55670 0
33,3730	55672 1	55671 1	55673 0	55651 0	03740 1	31656 0	04640 1	34752 0
33,3740	55002 0	55650 1	35014 1	54003 0	00006 1	50002 0	31523 1	54772 1
33,3750	22766 0	34755 1	54770 0	35016 0	54003 0	06037 0	I: 45175 0	C: 06516 0
33,3760	C: 47651 0	C: 26237 0	C: 06520 0	I: 77624 1	C: 47671 1	C: 02245 0	I: 76435 1	C: 02237 0
33,3770	C: 26231 0	C: 26003 0	I: 77624 1	C: 47671 1	C: 02273 0	I: 77776 1	01650 0	CKSM 07450 1

OCTAL LISTING FOR PARAGRAPH # 200, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

34,2000	I: 71220 1	C: 03632 0	C: 03442 0	C: 34041 0	C: 27057 0	I: 67175 0	C: 00001 0	C: 02777 1
34,2010	C: 03642 1	I: 57456 1	C: 27656 1	C: 00007 0	C: 03650 1	I: 53435 0	C: 03642 1	I: 66001 0
34,2020	C: 00001 0	C: 02776 0	I: 47206 0	C: 03656 1	I: 63372 1	I: 63315 0	C: 03656 1	C: 03434 1
34,2030	I: 76505 0	C: 00001 0	C: 03656 1	I: 77646 0	C: 27664 0	C: 03642 1	I: 53315 0	C: 03650 1
34,2040	C: 03656 1	I: 77624 1	C: 46316 1	I: 77624 1	C: 46426 0	I: 77624 1	C: 45636 0	C: 16321 0
34,2050	C: 00005 1	I: 77624 1	C: 46426 0	I: 77624 1	C: 45636 0	C: 36317 1	C: 03632 0	C: 00000 1
34,2060	C: 00020 0	C: 00003 1	C: 34661 1	C: 00606 1	C: 04467 0	C: 00601 0	C: 33216 1	C: 10000 0
34,2070	C: 00000 1	C: 00000 1	C: 00001 0	C: 00004 0	C: 31566 0	C: 00000 1	C: 01177 1	C: 00002 0
34,2100	C: 27311 1	C: 77754 1	C: 57611 0	C: 00000 1	C: 12326 0	C: 00116 1	C: 00730 0	C: 00000 1
34,2110	C: 06433 0	C: 00003 1	C: 25140 0	I: 43014 0	C: 03260 0	C: 03061 0	I: 43014 0	C: 03262 1
34,2120	C: 03063 1	I: 77745 1	C: 32420 0	C: 03606 1	C: 03614 1	I: 77201 1	C: 00001 0	C: 02303 0
34,2130	I: 41446 1	I: 70501 1	C: 00050 1	I: 51515 1	C: 03552 0	I: 55301 0	C: 00047 1	I: 53664 0
34,2140	C: 00046 0	C: 57175 0	I: 41215 1	C: 30070 0	I: 65301 0	C: 00047 1	C: 02321 0	I: 56342 1
34,2150	I: 75457 0	C: 20172 1	I: 53515 0	C: 02303 0	I: 47315 0	C: 02261 0	I: 77656 1	I: 72441 0
34,2160	C: 03472 0	I: 45421 1	C: 60203 0	C: 30062 0	C: 03612 1	I: 43345 1	C: 03606 1	C: 30072 1
34,2170	C: 03606 1	I: 77025 0	C: 30060 1	C: 00006 1	I: 77644 1	C: 70776 0	I: 77601 0	C: 00001 0
34,2200	I: 51545 1	C: 03574 1	I: 50025 0	C: 30064 0	C: 70224 1	I: 43174 1	C: 00007 0	C: 03300 1
34,2210	C: 70776 0	I: 43014 0	C: 03342 1	C: 70216 0	C: 03303 1	C: 70776 0	I: 71214 0	C: 03060 1
34,2220	C: 30066 1	I: 77765 0	C: 03574 1	C: 03574 1	I: 41575 0	C: 02303 0	I: 63256 0	C: 02261 0
34,2230	I: 53435 0	I: 76561 1	C: 03574 1	C: 02267 0	I: 40055 0	C: 03472 0	C: 70237 0	C: 37566 0
34,2240	C: 46416 0	C: 26744 1	I: 77614 1	C: 03466 0	C: 26655 0	C: 32414 1	C: 36730 0	C: 24732 1
34,2250	I: 72142 0	C: 02776 0	C: 37604 1	C: 46326 1	I: 77624 1	C: 46426 0	C: 17602 0	C: 03621 1
34,2260	I: 52054 1	C: 70263 1	C: 70372 0	I: 77745 1	C: 02752 0	I: 50025 0	C: 30110 1	C: 70372 0
34,2270	I: 45145 0	C: 00041 1	C: 46426 0	I: 60201 1	C: 00003 1	C: 00047 1	I: 50315 0	C: 02303 0
34,2300	C: 03556 1	I: 56246 1	C: 00003 1	I: 45257 0	C: 20201 0	C: 30100 0	I: 71240 1	C: 70372 0
34,2310	C: 02740 0	I: 45312 0	C: 30070 0	C: 14017 1	C: 02317 0	I: 56342 1	I: 41325 0	C: 02740 0
34,2320	C: 00041 1	I: 77624 1	C: 46426 0	I: 72412 0	I: 41366 1	I: 52414 1	C: 04343 1	C: 70330 0
34,2330	I: 50315 0	C: 02303 0	C: 03566 1	C: 03617 1	I: 77646 0	I: 41301 0	C: 00050 1	I: 53660 1
34,2340	C: 00047 1	C: 20204 0	C: 14015 0	C: 32420 0	C: 00021 1	I: 53575 0	C: 00015 0	C: 26730 1
34,2350	C: 02303 0	I: 75315 1	C: 03566 1	C: 03617 1	I: 45076 1	C: 46416 0	C: 26744 1	I: 77614 1
34,2360	C: 03466 0	C: 36655 1	C: 24732 1	I: 51125 0	C: 03617 1	C: 70376 1	I: 45345 1	C: 03604 0
34,2370	I: 52006 0	C: 70376 1	I: 71201 1	C: 00001 0	C: 32420 0	I: 77606 1	I: 41345 0	C: 03467 1

DATA LISTING FOR PARAGRAPH # 201, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

34,2400	C: 03604 0	I: 45261 0	C: 20217 1	I: 77615 0	C: 03634 0	C: 01777 1	I: 77021 1	C: 03636 1
34,2410	C: 00005 1	I: 40240 0	C: 70776 0	C: 00001 0	I: 63375 0	C: 03566 1	C: 02303 0	I: 77624 1
34,2420	C: 71062 0	C: 26311 0	C: 00007 0	C: 27514 1	C: 93506 1	I: 63201 1	C: 00001 0	C: 03500 1
34,2430	I: 77624 1	C: 71062 0	C: 27522 1	C: 00007 0	C: 37530 0	C: 71133 0	I: 40375 1	C: 02311 0
34,2440	C: 00001 0	I: 45115 0	C: 03544 1	C: 46316 1	I: 77624 1	C: 46426 0	C: 27604 0	C: 03544 1
34,2450	I: 63201 1	C: 00001 0	C: 02311 0	I: 65325 0	C: 01777 1	C: 03636 1	I: 41525 0	C: 33732 1
34,2460	I: 77624 1	C: 73466 1	I: 77624 1	C: 46402 0	I: 77745 1	C: 02257 0	I: 73401 0	C: 00007 0
34,2470	I: 53515 0	C: 03536 1	C: 00001 0	I: 47315 0	C: 02261 0	I: 77656 1	I: 71525 0	C: 02257 0
34,2500	I: 45561 1	C: 77754 1	I: 74345 0	I: 76455 1	C: 00023 0	I: 50206 0	C: 03536 1	I: 41552 0
34,2510	I: 72316 0	C: 00155 0	I: 50315 0	C: 03536 1	C: 03536 1	I: 57551 1	C: 00155 0	I: 50315 0
34,2520	C: 03552 0	C: 03552 0	I: 76371 0	I: 71244 0	C: 70542 0	C: 03606 1	I: 77025 0	C: 30072 1
34,2530	C: 00001 0	I: 77654 0	C: 72036 1	I: 70545 1	C: 03612 1	C: 03612 1	I: 77621 1	C: 03576 0
34,2540	C: 37574 0	C: 70165 1	I: 41566 1	I: 45276 0	C: 00007 0	C: 14013 0	I: 45425 0	C: 77762 1
34,2550	I: 77646 0	C: 14017 1	C: 00013 0	I: 45246 0	C: 00017 1	I: 71240 1	C: 70561 1	C: 00015 0
34,2560	C: 00013 0	I: 77745 1	C: 00013 0	I: 76561 1	I: 53455 0	C: 03536 1	I: 53515 0	C: 03552 0
34,2570	I: 53515 0	C: 03560 1	I: 63235 0	C: 00007 0	C: 00007 0	I: 50235 0	C: 00001 0	I: 77626 0
34,2600	C: 53762 1	I: 72441 0	I: 75326 1	C: 00015 0	I: 41542 1	I: 71214 0	C: 03301 0	C: 70644 0
34,2610	C: 00001 0	I: 65225 1	C: 03610 0	C: 03574 1	I: 60225 1	C: 03576 0	C: 00047 1	I: 65265 0
34,2620	C: 00003 1	C: 03574 1	C: 03576 0	I: 43014 0	C: 03342 1	C: 70656 0	C: 03343 0	C: 70656 0
34,2630	I: 41345 0	C: 00003 1	C: 03610 0	I: 71244 0	C: 70663 0	C: 30062 0	I: 77765 0	C: 03612 1
34,2640	C: 03612 1	I: 43014 0	C: 03062 0	C: 03263 0	I: 77745 1	C: 00001 0	C: 17610 0	C: 03574 1
34,2650	C: 03576 0	I: 43025 1	C: 03612 1	C: 03261 1	C: 37574 0	C: 70165 1	I: 43014 0	C: 03302 0
34,2660	C: 70702 0	C: 03303 1	C: 70702 0	I: 75345 1	C: 30102 1	C: 00005 1	I: 77765 0	C: 03610 0
34,2670	C: 03612 1	I: 43276 0	C: 03574 1	C: 17574 1	C: 00001 0	I: 43014 0	C: 03063 1	C: 03062 0
34,2700	C: 37610 1	C: 70176 0	I: 60345 0	C: 00005 1	C: 00050 1	I: 54065 0	C: 00001 0	C: 00047 1
34,2710	I: 77657 0	C: 20601 1	C: 17612 1	C: 00001 0	C: 03610 0	I: 51545 1	C: 03612 1	I: 45206 1
34,2720	C: 30076 0	I: 71240 1	C: 70737 0	I: 50025 0	C: 30106 0	C: 70732 0	I: 75345 1	C: 30106 0
34,2730	C: 03612 1	C: 03612 1	I: 45345 1	C: 03574 1	C: 03612 1	C: 37574 0	C: 70165 1	I: 77145 1
34,2740	C: 03602 0	C: 00002 0	I: 77750 0	C: 02776 0	I: 50023 0	C: 30072 1	C: 70776 0	I: 71374 1
34,2750	C: 00003 1	C: 03604 0	I: 50023 0	C: 30072 1	C: 70776 0	I: 45345 1	C: 01777 1	C: 03634 0
34,2760	C: 02253 1	I: 45274 0	C: 00004 0	C: 30112 0	I: 77040 0	C: 70776 0	C: 00005 1	I: 45345 1
34,2770	C: 03636 1	C: 01777 1	C: 02255 1	I: 51025 1	C: 30112 0	C: 72152 1	I: 43014 0	C: 03302 0

OCTAL LISTING FOR PARAGRAPH # 202, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

34,3000	C: 72040 0	C: 03343 0	C: 72040 0	I: 71334 0	C: 03613 0	C: 32420 0	I: 43014 0	C: 03260 0
34,3010	C: 03061 0	I: 43014 0	C: 03262 1	C: 03263 0	C: 37606 0	C: 70125 0	I: 71220 1	C: 03470 1
34,3020	C: 03442 0	C: 34041 0	C: 46360 0	I: 77214 0	C: 01067 1	C: 03560 1	C: 03530 1	C: 27506 1
34,3030	C: 03552 0	C: 03522 1	C: 03500 1	I: 47256 0	C: 03506 1	I: 77656 1	C: 26261 0	C: 03536 1
34,3040	C: 37642 0	C: 71052 0	C: 02311 0	C: 26303 0	C: 03544 1	C: 37650 0	C: 71052 0	C: 03514 1
34,3050	C: 37472 1	C: 03470 1	I: 41406 0	I: 74241 0	C: 02261 0	C: 02261 0	I: 51352 1	I: 63256 0
34,3060	I: 74246 1	I: 43572 0	I: 65325 0	C: 03634 0	C: 01777 1	I: 41525 0	C: 33732 1	I: 77650 1
34,3070	C: 73466 1	I: 65325 0	C: 01777 1	C: 03636 1	I: 41525 0	C: 32420 0	I: 77650 1	C: 73466 1
34,3100	I: 76020 1	C: 03470 1	C: 01521 0	I: 77624 1	C: 72370 0	I: 77624 1	C: 71120 1	I: 61375 1
34,3110	C: 03434 1	C: 00001 0	I: 77772 0	C: 03656 1	I: 51406 1	C: 27664 0	I: 77650 1	C: 03470 1
34,3120	I: 77201 1	C: 00007 0	C: 02261 0	I: 63276 1	C: 02303 0	I: 57456 1	I: 47206 0	C: 02261 0
34,3130	I: 77772 0	C: 00001 0	I: 77616 0	I: 77220 1	C: 03470 1	C: 02311 0	I: 53406 0	C: 27544 1
34,3140	C: 03522 1	I: 50256 0	C: 03544 1	I: 72406 0	C: 16732 0	I: 65316 0	C: 06512 1	I: 45302 1
34,3150	I: 72566 1	I: 57515 1	I: 77635 1	C: 03522 1	I: 65241 0	C: 02261 0	I: 45565 0	C: 51047 0
34,3160	C: 03522 1	I: 45115 0	C: 03530 1	C: 46416 0	C: 26744 1	I: 77614 1	C: 03666 1	C: 36655 1
34,3170	C: 24732 1	I: 53754 1	C: 02777 1	C: 57576 1	C: 00023 0	I: 76441 1	C: 03544 1	I: 51515 1
34,3200	I: 63257 1	C: 57576 1	C: 02311 0	I: 65246 1	I: 77625 0	C: 00003 1	C: 17600 1	C: 02742 1
34,3210	I: 65301 0	C: 00047 1	C: 00041 1	I: 77624 1	C: 46426 0	I: 56362 0	I: 41457 1	C: 20174 1
34,3220	I: 65225 1	C: 03600 1	I: 56302 0	C: 00005 1	I: 75406 1	I: 41275 1	C: 00007 0	C: 00001 0
34,3230	I: 65272 0	C: 00003 1	I: 65301 0	C: 00047 1	C: 02321 0	I: 56342 1	I: 65257 1	C: 20174 1
34,3240	C: 00005 1	I: 65301 0	C: 00050 1	C: 02321 0	I: 56342 1	I: 44257 1	C: 57604 1	I: 63525 0
34,3250	C: 00011 1	I: 75421 1	I: 47315 0	C: 02261 0	C: 03544 1	I: 74256 0	C: 00013 0	I: 74315 0
34,3260	C: 03544 1	C: 00011 1	I: 76455 1	I: 77626 0	C: 74233 0	I: 77651 0	C: 03514 1	C: 36275 1
34,3270	C: 03470 1	04616 1	C: 72347 1	03276 1	04616 1	C: 72354 0	04616 1	C: 72361 0
34,3300	33641 1	55466 0	33632 0	03621 1	33633 1	04616 1	C: 20635 0	16001 1
34,3310	13315 1	13304 1	36245 1	05464 1	15155 1	34756 1	55144 0	34753 1
34,3320	55145 1	33634 0	04616 1	C: 20535 0	16001 1	13332 1	13321 0	34751 0
34,3330	05464 1	15155 1	06037 0	I: 70535 0	C: 01146 0	I: 71230 0	C: 71344 1	C: 03631 0
34,3340	C: 02303 0	I: 77614 1	C: 01230 1	C: 71375 0	I: 43014 0	C: 01070 1	C: 00670 0	I: 77624 1
34,3350	C: 71554 0	I: 43015 1	C: 03442 0	C: 00470 1	C: 03631 0	I: 77776 1	33635 1	04616 1
34,3360	C: 20635 0	16001 1	13367 1	13356 0	36242 0	05464 1	15155 1	00006 1
34,3370	31631 1	53046 0	33636 1	03621 1	06037 0	I: 45014 0	C: 04266 1	C: 20000 0

DETAILED LISTING FOR PARAGRAPH # 203, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

34,3400	I: 77624 1	C: 71554 0	I: 71214 0	C: 01350 0	C: 71424 0	C: 03631 0	C: 34041 0	C: 71605 1
34,3410	I: 53575 0	C: 00001 0	I: 47315 0	C: 00007 0	I: 60246 1	C: 00047 1	I: 56325 0	C: 02303 0
34,3420	I: 77657 0	C: 20172 1	C: 36305 1	C: 71430 0	I: 43345 1	C: 02303 0	C: 00037 0	C: 03631 0
34,3430	I: 45345 1	C: 03631 0	C: 02305 0	C: 02307 1	C: 34041 0	C: 71605 1	I: 77745 1	C: 03442 0
34,3440	C: 03610 0	I: 77331 0	C: 03471 0	C: 71447 0	C: 00001 0	I: 77624 1	C: 73327 0	I: 43014 0
34,3450	C: 04346 1	C: 71460 0	C: 01311 0	C: 71456 0	I: 77614 1	C: 00470 1	I: 77776 1	03505 1
34,3460	I: 51575 1	C: 02366 0	C: 27576 0	C: 03506 1	I: 51451 0	C: 03566 1	C: 26350 0	C: 03536 1
34,3470	I: 45115 0	C: 02337 1	C: 46316 1	I: 77624 1	C: 46426 0	C: 03606 1	I: 43014 0	C: 01311 0
34,3500	C: 71502 0	C: 00470 1	I: 77776 1	33637 0	03621 1	33640 0	03621 1	06037 0
34,3510	I: 77214 0	C: 01267 0	C: 02366 0	C: 37556 0	C: 73606 0	I: 52014 0	C: 04306 0	C: 71541 1
34,3520	C: 71400 0	04616 1	C: 72347 1	00006 1	31401 0	03532 0	04616 1	C: 72354 0
34,3530	00076 1	31403 1	53576 0	04616 1	C: 72361 0	06037 0	I: 45014 0	C: 04066 0
34,3540	C: 20000 0	I: 43234 0	C: 21573 0	C: 03576 0	C: 03442 0	C: 34041 0	C: 46360 0	I: 77624 1
34,3550	C: 73274 1	I: 52145 0	C: 02307 1	C: 71434 1	I: 71220 1	C: 03465 0	C: 03442 0	C: 34041 0
34,3560	C: 46360 0	I: 52775 1	C: 03552 0	C: 57176 0	C: 16655 0	C: 03621 1	I: 71406 0	C: 16732 0
34,3570	I: 43156 1	C: 03466 0	C: 26730 1	C: 03560 1	I: 77657 0	C: 57176 0	C: 36744 0	C: 24732 1
34,3600	I: 77624 1	C: 73274 1	I: 52145 0	C: 00037 0	C: 03465 0	I: 43020 1	C: 03465 0	C: 01352 1
34,3610	C: 71615 0	I: 77624 1	C: 27043 0	I: 77650 1	C: 03465 0	I: 77624 1	C: 27057 0	I: 77650 1
34,3620	C: 03465 0	00006 1	23465 1	55615 0	31615 1	04616 1	C: 20476 0	16001 1
34,3630	01465 1	13624 0	C: 01441 1	C: 01467 0	C: 01006 0	C: 01471 1	C: 01442 1	C: 01472 1
34,3640	C: 01521 0	C: 00002 0	05353 1	C: 00035 1	06037 0	I: 77614 1	C: 04705 1	C: 60321 1
34,3650	I: 45345 1	C: 03514 1	C: 26205 1	I: 43040 1	C: 60750 0	C: 04267 0	I: 67214 1	C: 02676 1
34,3660	C: 31716 0	I: 77471 0	C: 03514 1	52155 1	53641 1	53637 0	53635 1	53571 1
34,3670	05037 0	I: 43345 1	C: 03571 1	C: 03635 1	I: 43215 0	C: 03637 0	C: 03641 1	I: 41205 0
34,3700	C: 02265 1	C: 21032 0	I: 65252 1	C: 02271 1	I: 43342 0	I: 77625 0	C: 21027 1	C: 16271 1
34,3710	C: 02265 1	I: 56342 1	C: 02271 1	C: 36263 0	C: 60321 1	C: 00004 0	04616 1	C: 53073 0
34,3720	04616 1	C: 17714 0	13745 0	11674 1	13755 1	00004 0	00006 1	31102 0
34,3730	53655 1	00006 1	31561 1	53755 0	00006 1	31157 0	53460 0	31155 1
34,3740	55461 1	40107 0	74750 0	26107 0	05155 0	30101 1	74742 0	00006 1
34,3750	13754 0	05516 0	C: 00120 1	05155 0	34752 0	55674 1	05155 0	00006 1
34,3760	30025 0	53653 1	00006 1	30033 1	53655 1	30034 0	55656 1	30037 0
34,3770	55657 0	00006 1	30041 1	53661 0	05261 1	C: 03775 1	C: 03776 1	CKSM 60264 1

OCTAL LISTING FOR PARAGRAPH # 204, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

35,2000	05504 0	C: 00027 1	05504 0	C: 00031 0	32025 1	03712 0	33727 0	03712 0
35,2010	05516 0	C: 00027 1	06037 0	I: 77624 1	C: 70000 0	I: 77414 0	C: 00470 1	32026 1
35,2020	03712 0	06037 0	I: 77614 1	C: 01027 0	C: 72540 0	C: 01441 1	C: 01452 0	02347 0
35,2030	02032 1	02354 1	00006 1	32420 0	53621 1	02053 0	I: 77734 1	C: 03613 0
35,2040	I: 77740 1	C: 03613 0	I: 77533 1	C: 32423 0	30154 1	05744 0	35006 1	04616 1
35,2050	C: 20476 0	06001 0	02046 1	02361 1	32417 1	55467 1	55633 1	55634 0
35,2060	32410 0	03712 0	06037 0	I: 57545 1	C: 03634 0	I: 71240 1	C: 72113 1	C: 01643 1
35,2070	C: 34041 0	C: 46360 0	I: 53775 1	C: 03536 1	C: 57176 0	C: 26655 0	C: 03544 1	I: 43057 1
35,2100	C: 57176 0	C: 03466 0	C: 16744 1	C: 06530 1	C: 36756 0	C: 25547 0	I: 77615 0	C: 03574 1
35,2110	C: 03634 0	I: 77776 1	02060 0	I: 77776 1	33724 0	04616 1	C: 20476 0	06001 0
35,2120	02122 1	02114 1	33723 1	03712 0	06037 0	I: 77745 1	C: 03634 0	C: 37442 1
35,2130	C: 20000 0	I: 77624 1	C: 71016 0	I: 77201 1	C: 00001 0	C: 03506 1	I: 65315 0	C: 03500 1
35,2140	C: 03634 0	I: 65325 0	C: 03636 1	C: 33732 1	I: 45005 0	C: 73466 1	I: 77624 1	C: 46412 1
35,2150	I: 77624 1	C: 70113 0	I: 43014 0	C: 01311 0	C: 72156 0	C: 00470 1	I: 77745 1	C: 02253 1
35,2160	C: 02253 1	I: 51025 1	C: 32422 1	C: 72160 0	I: 77745 1	C: 02255 1	C: 02255 1	I: 51025 1
35,2170	C: 32422 1	C: 72166 0	I: 77776 1	32412 1	03712 0	06037 0	I: 45175 0	C: 02267 0
35,2200	C: 71100 0	C: 26267 0	C: 02311 0	C: 26303 0	C: 02275 0	I: 45170 0	C: 01522 0	C: 72370 0
35,2210	I: 77745 1	C: 03636 1	C: 37640 1	C: 73606 0	I: 77650 1	C: 72131 1	02347 0	02221 1
35,2220	02354 1	02361 1	32411 1	03712 0	06037 0	I: 77745 1	C: 03640 0	C: 17636 1
35,2230	C: 01777 1	C: 37442 1	C: 20000 0	I: 77624 1	C: 71016 0	I: 77624 1	C: 71133 0	I: 77201 1
35,2240	C: 00001 0	C: 03544 1	I: 45115 0	C: 02311 0	C: 71071 1	I: 77624 1	C: 46402 0	I: 77201 1
35,2250	C: 00001 0	C: 03530 1	I: 45115 0	C: 03522 1	C: 71071 1	I: 77624 1	C: 46412 1	I: 43145 0
35,2260	C: 32420 0	C: 03460 0	C: 36317 1	C: 72764 1	I: 77454 1	C: 72302 0	05567 0	C: 00611 1
35,2270	35006 1	04616 1	C: 20476 0	06001 0	02276 0	02221 1	06037 0	I: 77745 1
35,2300	C: 32420 0	C: 02317 0	I: 43014 0	C: 01311 0	C: 72306 1	C: 00470 1	I: 43345 1	C: 02317 0
35,2310	C: 03636 1	C: 03636 1	I: 77625 0	C: 01777 1	I: 51025 1	C: 32422 1	C: 72314 1	I: 77615 0
35,2320	C: 32422 1	C: 16253 1	C: 03636 1	I: 41425 1	C: 03640 0	I: 45246 0	C: 32422 1	I: 43244 1
35,2330	C: 72325 0	C: 32422 1	I: 45565 0	C: 75522 0	I: 77776 1	32412 1	03712 0	06037 0
35,2340	I: 45175 0	C: 02275 0	C: 71100 0	C: 36275 1	C: 73606 0	I: 77650 1	C: 72233 0	00006 1
35,2350	23470 0	05504 0	C: 00050 1	01470 0	00006 1	23470 0	05516 0	C: 00050 1
35,2360	01470 0	00006 1	23470 0	05504 0	C: 00027 1	05504 0	C: 00031 0	01470 0
35,2370	C: 03434 1	I: 45020 1	C: 03463 0	C: 71120 1	I: 64375 1	C: 03434 1	C: 00001 0	I: 66172 0

TOTAL LISTING FOR PARAGRAPH # 205, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

35,2400	C: 03615 0	C: 03434 1	I: 77776 1	31615 1	03712 0	06037 0	I: 77650 1	C: 03463 0
35,2410	C: 01413 0	C: 01415 0	C: 01513 1	C: 77776 1	C: 62460 1	C: 17777 0	C: 37776 0	C: 00000 1
35,2420	C: 00000 1	C: 00025 0	C: 37100 1	C: 00600 1	C: 00601 0	C: 00602 0	C: 00603 1	C: 00604 0
35,2430	C: 00605 1	C: 00606 1	00006 1	23465 1	34755 1	55163 0	34752 0	00004 0
35,2440	05203 0	C: 02717 1	C: 74067 0	05327 1	C: 40036 0	C: 05024 1	C: 13000 0	01465 1
35,2450	02361 1	32025 1	03712 0	06037 0	I: 71214 0	C: 00670 0	C: 03442 0	C: 34041 0
35,2460	C: 27057 0	I: 40375 1	C: 00001 0	C: 00001 0	C: 03642 1	C: 26323 1	C: 00007 0	C: 03650 1
35,2470	C: 16331 1	C: 32420 0	I: 65206 0	C: 03452 1	I: 66015 0	C: 03442 0	C: 02776 0	C: 03631 0
35,2500	I: 45134 0	C: 02777 1	C: 22000 1	I: 41575 0	C: 02366 0	C: 03656 1	I: 43046 1	C: 01267 0
35,2510	C: 37664 1	C: 15733 1	I: 63375 0	C: 03642 1	C: 02337 1	I: 77624 1	C: 46316 1	I: 77624 1
35,2520	C: 46426 0	I: 77624 1	C: 45636 0	C: 16321 0	C: 00005 1	I: 77624 1	C: 46426 0	I: 77624 1
35,2530	C: 45636 0	C: 02317 0	I: 77776 1	33727 0	03712 0	32026 1	03712 0	06037 0
35,2540	I: 45014 0	C: 01071 0	C: 73606 0	I: 77650 1	C: 72540 0	02347 0	02550 0	02354 1
35,2550	02361 1	33723 1	03712 0	00006 1	33746 1	53621 1	32417 1	55466 0
35,2560	03674 1	06037 0	I: 71214 0	C: 01270 0	C: 03636 1	C: 17442 0	C: 02257 0	I: 43054 1
35,2570	C: 72572 1	C: 01070 1	I: 77624 1	C: 20000 0	I: 43145 0	C: 06522 1	C: 03460 0	I: 43014 0
35,2600	C: 01310 1	C: 72603 1	C: 03560 1	C: 02317 0	I: 43345 1	C: 03636 1	C: 02317 0	C: 34041 0
35,2610	C: 45360 0	I: 77624 1	C: 72764 1	I: 77454 1	C: 72625 0	05567 0	C: 00611 1	35006 1
35,2620	04616 1	C: 20476 0	06001 0	02550 0	02615 1	I: 43014 0	C: 03600 1	C: 72604 0
35,2630	C: 01310 1	C: 72635 1	I: 77776 1	03674 1	02640 1	I: 77776 1	33723 1	03712 0
35,2640	06037 0	I: 71201 1	C: 00001 0	C: 02777 1	C: 14047 1	C: 03621 1	I: 71406 0	C: 16732 0
35,2650	I: 77756 0	C: 26730 1	C: 03552 0	I: 77657 0	C: 57176 0	C: 26655 0	C: 03560 1	I: 43057 1
35,2660	C: 57176 0	C: 03466 0	C: 36744 0	C: 24732 1	I: 77745 1	C: 03636 1	C: 03610 0	I: 77615 0
35,2670	C: 00037 0	C: 37631 1	C: 73306 0	I: 51575 1	C: 02366 0	C: 27576 0	C: 03506 1	I: 51451 0
35,2700	C: 03566 1	C: 26350 0	C: 03536 1	I: 45115 0	C: 02337 1	C: 46316 1	I: 77624 1	C: 46426 0
35,2710	C: 17606 1	C: 03636 1	C: 03442 0	I: 77776 1	33725 1	03712 0	06037 0	I: 77624 1
35,2720	C: 73522 0	I: 77624 1	C: 73606 0	I: 77650 1	C: 72574 1	02347 0	00006 1	31401 0
35,2730	02734 0	02354 1	00006 1	31403 1	53576 0	02361 1	06037 0	I: 77624 1
35,2740	C: 20000 0	I: 77624 0	C: 21573 0	C: 03612 1	I: 77615 0	C: 03576 0	C: 03442 0	C: 03610 0
35,2750	C: 34041 0	C: 46360 0	I: 77624 1	C: 73274 1	I: 77624 1	C: 73306 0	I: 77624 1	C: 73522 0
35,2760	I: 77624 1	C: 73606 0	I: 77650 1	C: 72741 0	I: 66220 1	C: 03463 0	C: 03614 1	C: 40000 0
35,2770	I: 40345 1	C: 33734 1	C: 00001 0	C: 27574 1	C: 03536 1	C: 27500 1	C: 03544 1	C: 27506 1

DETAIL LISTING FOR PARAGRAPH # 206, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

35,3000	C: 03552 0	C: 27522 1	C: 03560 1	C: 03530 1	I: 77624 1	C: 73274 1	I: 63235 0	C: 03536 1
35,3010	I: 53515 0	C: 03536 1	I: 46315 1	I: 51352 1	C: 02311 0	I: 63256 0	I: 63241 0	C: 00001 0
35,3020	I: 75241 1	C: 02311 0	I: 65552 0	I: 50315 0	C: 02311 0	C: 03536 1	I: 71244 0	C: 73032 1
35,3030	C: 05530 1	I: 41425 1	I: 71214 0	C: 03740 1	C: 73261 0	C: 03576 0	C: 14033 1	I: 77625 0
35,3040	C: 02257 0	C: 03576 0	I: 45246 0	C: 33740 1	I: 77640 0	C: 73271 1	I: 70535 0	C: 03614 1
35,3050	I: 72030 1	C: 03463 0	C: 00154 1	I: 77330 1	C: 03612 0	C: 03552 0	I: 65256 0	C: 00045 0
35,3060	I: 53515 0	C: 03536 1	I: 77725 1	I: 41525 0	C: 00045 0	I: 77621 1	C: 00015 0	C: 14037 0
35,3070	C: 06520 0	I: 41425 1	C: 02257 0	I: 50165 0	C: 00037 0	C: 03463 0	I: 71545 0	I: 56205 0
35,3100	C: 00017 1	C: 00015 0	I: 77676 0	C: 00035 1	I: 44246 1	C: 06520 0	I: 77240 1	C: 03463 0
35,3110	C: 02261 0	I: 53435 0	C: 00007 0	I: 41241 0	C: 03544 1	C: 00015 0	I: 47315 0	C: 00001 0
35,3120	C: 03560 1	I: 53435 0	C: 00001 0	I: 41241 0	C: 03560 1	C: 00017 1	I: 77621 1	I: 63301 0
35,3130	C: 00047 1	C: 00007 0	I: 50235 0	C: 00001 0	C: 02261 0	I: 50315 0	C: 00001 0	C: 00007 0
35,3140	I: 65552 0	I: 77765 0	I: 43225 0	C: 06520 0	C: 02257 0	I: 65525 0	C: 00035 1	I: 75221 1
35,3150	C: 06520 0	C: 00037 0	I: 77615 0	I: 56205 0	C: 33732 1	I: 77605 1	I: 41257 1	C: 20176 0
35,3160	I: 51406 1	I: 50025 0	C: 03574 1	C: 73167 0	I: 75345 1	C: 03574 1	I: 77606 1	I: 51135 1
35,3170	C: 03614 1	C: 73177 1	I: 71331 0	C: 03614 1	C: 37777 1	I: 77650 1	C: 73235 1	I: 41345 0
35,3200	C: 03576 0	C: 00733 1	I: 71244 0	C: 73213 0	C: 03574 1	I: 77605 1	C: 33736 0	C: 17574 1
35,3210	I: 70446 0	I: 52076 1	C: 73223 0	I: 51545 1	C: 03576 0	I: 51525 1	C: 00033 1	I: 77625 0
35,3220	I: 71240 1	C: 73226 0	I: 77646 0	I: 52165 1	C: 03606 1	C: 73235 1	I: 57545 1	C: 03606 1
35,3230	I: 70406 1	C: 03606 1	I: 77515 0	I: 77650 1	C: 73236 1	C: 03606 1	I: 77615 0	C: 02317 0
35,3240	C: 02317 0	I: 63375 0	C: 03506 1	C: 03500 1	I: 77624 1	C: 73462 0	I: 77624 1	C: 46402 0
35,3250	I: 63375 0	C: 03530 1	C: 03522 1	I: 77624 1	C: 73462 0	I: 77624 1	C: 46412 1	I: 77650 1
35,3260	C: 73004 1	I: 43345 1	C: 03636 1	C: 02317 0	C: 17636 1	I: 77614 1	C: 01310 1	C: 73271 1
35,3270	C: 02257 0	I: 52145 0	C: 06522 1	C: 03463 0	I: 52375 1	C: 03552 0	C: 03536 1	I: 41456 0
35,3300	C: 26311 0	C: 03536 1	I: 53435 0	C: 03544 1	C: 02261 0	I: 77616 0	I: 77220 1	C: 03470 1
35,3310	C: 03560 1	I: 65315 0	C: 03552 0	C: 03610 0	I: 65325 0	C: 03631 0	C: 33732 1	I: 46125 0
35,3320	C: 03467 1	C: 73325 1	I: 77745 1	I: 41545 0	C: 06522 1	I: 77624 1	C: 73466 1	C: 27444 0
35,3330	C: 00007 0	C: 27506 1	C: 03444 0	I: 63256 0	C: 03536 1	I: 41456 0	I: 50235 0	C: 00001 0
35,3340	C: 02261 0	I: 77715 1	I: 72441 0	C: 00001 0	I: 75326 1	I: 43244 1	C: 73350 0	C: 06530 1
35,3350	C: 15756 1	C: 03631 0	I: 77625 0	C: 03610 0	C: 03452 1	I: 40335 0	C: 03467 1	C: 00001 0
35,3360	I: 63325 0	C: 33744 0	C: 03536 1	C: 26323 1	C: 03544 1	C: 36331 0	C: 22000 1	I: 77624 1
35,3370	C: 73447 1	I: 64375 1	C: 02366 0	C: 00001 0	I: 77772 0	C: 37434 0	C: 03470 1	I: 45020 1

OCTAL LISTING FOR PARAGRAPH # 207, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

35,3400	C: 03463 0	C: 73447 1	I: 61375 1	C: 03434 1	C: 00001 0	I: 77772 0	C: 02366 0	I: 63255 0
35,3410	C: 03544 1	C: 03535 1	I: 65325 0	C: 03442 0	C: 03631 0	I: 41525 0	C: 06530 1	I: 77624 1
35,3420	C: 73466 1	I: 77775 1	C: 00001 0	C: 03444 0	I: 41575 0	C: 02311 0	I: 57435 1	C: 02261 0
35,3430	I: 41456 0	I: 76435 1	C: 02311 0	I: 77715 1	I: 64315 1	C: 02366 0	C: 00001 0	I: 77772 0
35,3440	C: 35303 1	C: 03463 0	I: 40220 0	C: 03463 0	C: 00001 0	I: 77650 1	C: 73424 1	I: 57575 1
35,3450	C: 02261 0	C: 24007 0	C: 03536 1	I: 57456 1	C: 00015 0	I: 76435 1	C: 02261 0	C: 00001 0
35,3460	I: 43401 0	C: 00023 0	I: 65325 0	C: 06522 1	C: 02317 0	I: 41406 0	I: 45020 1	C: 03465 0
35,3470	C: 27414 0	I: 71214 0	C: 01573 1	I: 43054 1	C: 73476 0	C: 01473 0	I: 45545 1	C: 63736 0
35,3500	I: 73014 0	C: 00063 1	C: 02777 1	I: 43014 0	C: 04303 0	C: 73507 1	C: 00263 0	C: 25517 0
35,3510	I: 77657 0	C: 57176 0	C: 25535 0	I: 77657 0	C: 57176 0	C: 35543 0	C: 27107 1	I: 52175 0
35,3520	C: 00001 0	C: 03465 0	I: 43020 1	C: 03470 1	C: 01311 0	C: 73531 1	I: 52014 0	C: 00470 1
35,3530	C: 73576 1	I: 77214 0	C: 03274 0	C: 03434 1	C: 01237 0	I: 77776 1	33727 0	04616 1
35,3540	C: 20476 0	05001 0	03544 1	03536 1	35016 0	54003 0	22007 0	34756 1
35,3550	54002 1	50002 0	41433 0	50002 0	61236 1	26001 1	10002 1	13550 0
35,3560	22000 1	00006 1	13565 0	05504 0	C: 00146 1	06037 0	I: 45014 0	C: 03354 0
35,3570	C: 73572 0	C: 73377 0	I: 77214 0	C: 01267 0	C: 02366 0	C: 03656 1	I: 77624 1	C: 73442 1
35,3600	I: 77776 1	33726 1	03712 0	06037 0	I: 77650 1	C: 03470 1	I: 71220 1	C: 03470 1
35,3610	C: 35742 0	C: 02253 1	I: 71214 0	C: 01351 1	C: 73634 1	C: 33742 0	I: 77615 0	C: 33742 0
35,3620	C: 02253 1	I: 77414 0	C: 01742 1	C: 73634 1	03704 1	03627 1	03635 1	06037 0
35,3630	I: 41575 0	C: 03656 1	I: 77624 1	C: 15717 1	I: 77776 1	02432 0	31470 0	55464 1
35,3640	34777 1	04616 1	C: 01735 1	33730 0	04616 1	C: 20476 0	03651 0	03654 0
35,3650	03664 0	30005 1	55163 0	06001 0	40076 1	74746 1	00006 1	13651 1
35,3660	05353 1	C: 04024 0	05504 0	C: 00047 1	30005 1	55163 0	05353 1	C: 04024 0
35,3670	06037 0	I: 52014 0	C: 00670 0	C: 03464 1	00006 1	23463 1	33724 0	04616 1
35,3700	C: 20476 0	16001 1	01463 1	13676 1	37744 1	71011 1	00006 1	13711 1
35,3710	24002 0	00002 0	00006 1	23465 1	55615 0	31615 1	04616 1	C: 20476 0
35,3720	16001 1	01465 1	13715 0	C: 01445 0	C: 01467 0	C: 01472 1	C: 01473 0	C: 01521 0
35,3730	C: 04055 0	C: 14441 0	C: 37325 1	C: 00001 0	C: 20650 0	C: 12525 0	C: 12525 0	C: 00004 0
35,3740	C: 21505 1	C: 77777 0	C: 61337 1	C: 01252 0	C: 25253 1	C: 13434 0	C: 16162 0	04645 1
35,3750	55164 1	04616 1	C: 54255 1	10000 0	13766 1	34737 0	70106 1	10000 0
35,3760	13773 0	34747 1	00006 1	02030 0	00006 1	13773 0	33775 1	04616 1
35,3770	C: 20623 1	16001 1	13751 0	31164 0	04640 1	C: 00203 0	C: 03776 1	CKSM 44737 1

TOTAL LISTING FOR PARAGRAPH # 210, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

36,2000	C: 01056 0	C: 37167 0	C: 00457 1	C: C3250 0	C: 77777 0	C: 77731 1	C: 00307 0	C: 11040 0
36,2010	C: 00151 1	C: 05214 0	C: 77777 0	C: 77765 0	C: 00026 0	C: 30605 1	C: 00013 0	C: 14303 1
36,2020	C: 00030 1	C: 00014 1	C: 01512 0	12325 0	12612 1	13062 1	15261 0	12146 1
36,2030	C: 00000 1	C: 03770 1	C: 64067 1	12376 0	12563 1	12521 1	C: 01450 1	12325 0
36,2040	12614 1	13047 0	15261 0	12146 1	C: 04300 0	C: 03666 1	C: 74066 1	12366 1
36,2050	12563 1	12504 0	13123 0	12151 1	C: 77776 1	C: 03376 0	C: 74066 1	12400 0
36,2060	12567 0	C: 01450 1	12322 1	12614 1	13047 0	15261 0	12146 1	C: 05120 1
36,2070	C: 03666 1	C: 74066 1	12366 1	12563 1	12541 1	13420 0	C: 01476 0	12325 0
36,2100	12612 1	12777 0	15261 0	12151 1	C: 04300 0	C: 03770 1	C: 64067 1	12376 0
36,2110	12563 1	12455 0	C: 01477 1	12325 0	12612 1	13062 1	15261 0	12120 1
36,2120	12121 0	12122 0	12123 1	12376 0	12563 1	12531 0	05353 1	C: 04024 0
36,2130	34755 1	55507 0	55510 0	04616 1	C: 73747 1	00006 1	31442 1	53512 1
36,2140	00004 0	04674 0	C: 75564 1	00003 1	51455 1	10005 0	44762 1	04616 1
36,2150	C: 74664 0	06037 0	I: 45345 1	C: 03442 0	C: 35143 1	C: 34041 0	C: 61104 0	I: 45014 0
36,2160	C: 03347 1	C: 74200 0	C: 27043 0	I: 64375 1	C: 00025 0	C: 01734 0	I: 77762 1	C: 25726 0
36,2170	C: 00017 1	I: 64312 0	C: 01734 0	C: 35720 1	C: 67130 1	C: 16317 0	C: 00015 0	C: 00041 1
36,2200	I: 77624 1	C: 27557 0	12211 0	00006 1	31561 1	53442 0	00006 1	33143 1
36,2210	21442 0	52155 1	53500 1	00006 1	43756 1	21500 1	00006 1	31500 0
36,2220	05277 0	C: 02240 0	C: 74067 0	05353 1	C: 20254 0	05321 1	C: 00077 1	15155 1
36,2230	44752 1	55163 0	06037 0	I: 51575 1	C: 03553 1	C: 03472 0	I: 77776 1	15155 1
36,2240	33756 0	05173 1	C: 02276 0	05353 1	C: 40154 0	44752 1	55163 0	51455 1
36,2250	40006 0	00006 1	65261 1	33145 1	05173 1	C: 02266 1	35027 1	05072 1
36,2260	C: 02263 1	C: 74067 0	15261 0	04616 1	C: 20456 1	15155 1	35027 1	05072 1
36,2270	C: 02273 0	C: 74067 0	15261 0	33761 1	04616 1	C: 20455 1	33144 0	05173 1
36,2300	C: 02352 1	44762 1	55163 0	51455 1	30006 1	00006 1	62325 1	55477 0
36,2310	05173 1	C: 02346 1	36245 1	54001 1	46245 0	52753 1	40025 1	55053 1
36,2320	51455 1	10001 1	40106 1	74757 1	26106 1	00006 1	51455 1	30010 0
36,2330	53253 0	34752 0	54001 1	44752 1	52761 0	40025 1	55061 0	00006 1
36,2340	34755 1	52755 1	10763 1	15261 0	04635 0	C: 77410 1	02657 1	05353 1
36,2350	C: 00001 0	15261 0	00006 1	34755 1	52757 0	33756 0	05173 1	C: 02403 1
36,2360	05516 0	C: 00153 0	05516 0	C: 00154 1	51455 1	10011 0	10757 0	12376 0
36,2370	34736 1	05105 0	C: 02540 1	C: 56067 0	05353 1	C: 00053 1	44760 0	55163 0

DATA LISTING FOR PARAGRAPH # 211, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

36,2400	05353 1	C: 40074 0	15261 0	40103 1	74737 1	26103 1	05321 1	C: 00077 1
36,2410	12421 0	31422 1	05203 0	C: 02007 1	C: 36067 0	05327 1	C: 40033 0	C: 05014 1
36,2420	C: 77777 0	34740 0	70103 1	00006 1	51455 1	10012 0	40101 0	74745 1
36,2430	26101 0	44355 1	00006 1	02011 0	64737 0	00006 1	01011 0	00006 1
36,2440	30025 0	53345 0	00306 1	31517 0	53442 0	00006 1	30025 0	21442 0
36,2450	44742 0	70104 0	54104 0	51455 1	10013 1	00006 1	33137 1	53253 0
36,2460	30005 1	55163 0	40105 1	74743 1	26105 1	40103 1	74741 0	26103 1
36,2470	44735 0	70111 1	54111 1	00006 1	30025 0	53442 0	34755 1	55351 0
36,2500	55621 1	34752 0	55623 0	12541 1	40101 0	74740 1	00006 1	12541 1
36,2510	31422 1	05203 0	C: 02015 1	C: 36067 0	05327 1	C: 40033 0	C: 05014 1	C: 77777 0
36,2520	12541 1	35015 0	54003 0	31412 1	55537 0	31413 0	55541 1	35016 0
36,2530	54003 0	30005 1	55163 0	00006 1	33141 0	53253 0	40103 1	74741 0
36,2540	26103 1	44744 0	70111 1	54111 1	34743 0	70076 1	10000 0	13522 0
36,2550	05516 0	C: 00153 0	05516 0	C: 00154 1	05516 0	C: 00161 1	05353 1	C: 40054 1
36,2560	05221 0	C: 00062 0	02653 0	00006 1	34755 1	52761 0	15261 0	04635 0
36,2570	C: 35000 1	05504 0	C: 00161 1	05504 0	C: 00175 1	34751 0	55515 0	10765 1
36,2600	12603 1	04616 1	C: 74663 1	44765 0	55163 0	05353 1	C: 00004 0	15155 1
36,2610	51455 1	10002 1	30005 1	12615 0	44762 1	55163 0	05516 0	C: 00161 1
36,2620	05516 0	C: 00175 1	15155 1	05353 1	C: 00003 1	00004 0	06027 1	C: 36022 1
36,2630	04674 0	C: 75561 1	05504 0	C: 00312 1	02645 1	C: 00310 0	05504 0	C: 00314 1
36,2640	34753 1	00004 0	05173 1	C: 02352 1	15155 1	30002 0	05522 1	40000 0
36,2650	00006 1	06001 0	15511 0	44746 1	70111 1	54111 1	00002 0	40111 1
36,2660	74746 1	26111 1	00002 0	34755 1	55163 0	04645 1	55061 0	00006 1
36,2670	31442 1	52155 1	00006 1	40025 1	20155 1	07257 0	34777 1	54002 1
36,2700	52155 1	74346 0	00006 1	10002 1	30001 0	64752 0	00004 0	05173 1
36,2710	C: 02717 1	05527 1	C: 40036 0	C: 05024 1	C: 13000 0	31061 1	04640 1	40025 1
36,2720	55065 1	11163 0	12733 0	12724 0	37715 0	05072 1	C: 02737 0	C: 74067 0
36,2730	05221 0	C: 00144 0	12717 0	00006 1	34755 1	52765 1	15261 0	00006 1
36,2740	41442 0	53454 1	00006 1	30025 0	21454 1	00004 0	11163 0	15155 1
36,2750	15155 1	40000 0	00303 1	50000 1	13011 0	44755 0	55067 0	30371 1
36,2760	04616 1	C: 20471 0	12013 1	12610 0	12623 0	33146 1	04616 1	C: 20457 0
36,2770	13013 1	13030 0	12764 1	51455 1	30000 1	04616 1	C: 20465 1	44743 1

JCTAL LISTING FOR PARAGRAPH # 212, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

36,3000	55067 0	51455 1	30000 1	04616 1	C: 20473 0	13013 1	13041 0	13044 0
36,3010	04616 1	C: 20455 1	15155 1	03015 0	16001 1	00004 0	00006 1	23142 1
36,3020	02653 0	06027 1	C: 74346 0	05353 1	C: 00001 0	30005 1	55163 0	01142 1
36,3030	05353 1	C: 04024 0	34755 1	55163 0	35023 0	05105 0	C: 03210 1	C: 64065 0
36,3040	15155 1	05504 0	C: 00154 1	13102 0	00004 0	51455 1	10003 0	34644 0
36,3050	05105 0	C: 03223 1	C: 74067 0	00004 0	04674 0	C: 40204 0	03015 0	05353 1
36,3060	C: 00134 1	15155 1	35027 1	05105 0	C: 02424 1	C: 30067 0	05516 0	C: 00175 1
36,3070	00004 0	04674 0	C: 40204 0	03015 0	05353 1	C: 07024 0	C: 17000 1	C: 02424 1
36,3100	C: 30067 0	15155 1	40103 1	74737 1	10000 0	13116 0	34753 1	00004 0
36,3110	05173 1	C: 02426 0	34360 0	54001 1	40000 0	52761 0	44762 1	55163 0
36,3120	15155 1	05567 0	C: 01706 1	35006 1	04616 1	C: 20476 0	16001 1	13131 0
36,3130	13123 0	51455 1	10014 0	C: 02036 0	C: 02046 1	C: 02061 1	C: 03471 0	C: 62067 1
36,3140	C: 03642 1	C: 70067 1	C: 00000 1	C: 05656 1	C: 04672 0	C: 00752 1	C: 01475 0	05353 1
36,3150	C: 04024 0	33133 0	55455 0	30106 0	74737 1	10000 0	13121 1	04616 1
36,3160	C: 11254 1	40111 1	74737 1	10000 0	32020 1	62021 0	55251 1	34751 0
36,3170	55515 0	06037 0	I: 43175 0	C: 34001 1	C: 02663 0	C: 03735 0	I: 77735 0	C: 26002 1
36,3200	I: 70476 0	C: 37743 0	C: 56246 1	I: 77624 1	C: 56413 1	I: 77776 1	00004 0	04674 0
36,3210	C: 40142 1	03213 1	12126 1	00006 1	23142 1	00003 1	05516 0	C: 00124 0
36,3220	04616 1	C: 54123 0	01142 1	30005 1	55163 0	00006 1	32056 0	53253 0
36,3230	33760 0	04616 1	C: 20635 0	03256 0	13241 1	03223 1	05353 1	C: 00014 1
36,3240	15155 1	00004 0	04674 0	C: 40153 1	04674 0	C: 40140 0	00003 1	33761 1
36,3250	04616 1	C: 20462 0	03256 0	13256 1	03247 0	13236 1	00006 1	32106 1
36,3260	53253 0	34755 1	55462 1	30005 1	55163 0	00004 0	04674 0	C: 40123 0
36,3270	00003 1	06001 0	33134 1	55455 0	04616 1	C: 11254 1	06037 0	I: 71214 0
36,3300	C: 00700 0	C: 75305 0	C: 34015 1	C: 37735 1	C: 75310 1	I: 77745 1	C: 34017 0	C: 03735 0
36,3310	I: 77524 1	C: 56246 1	I: 77524 1	C: 56413 1	I: 77776 1	00004 0	04674 0	C: 40153 1
36,3320	04674 0	C: 40140 0	03213 1	06037 0	I: 45175 0	C: 03701 1	C: 57267 0	C: 03502 0
36,3330	I: 77776 1	33761 1	04616 1	C: 20446 0	35017 1	55163 0	05105 0	C: 03361 0
36,3340	C: 74067 0	05327 1	C: 00076 0	C: 04024 0	12135 0	34777 1	04616 1	C: 01735 1
36,3350	31163 1	64752 0	00006 1	13345 1	33761 1	04616 1	C: 20446 0	35017 1
36,3360	05146 1	31163 1	00006 1	65155 0	06037 0	I: 45175 0	C: 03701 1	C: 57267 0
36,3370	C: 03502 0	I: 77776 1	34777 1	04616 1	C: 01735 1	13361 1	06037 0	I: 77624 1

DATA LISTING FOR PARAGRAPH # 214. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

37,2000	C: 07623 1	C: 26552 1	05311 1	C: 00007 0	02325 1	34755 1	55414 0	55440 1
37,2010	55441 0	55576 0	34361 1	55571 1	32476 0	02367 1	34736 1	55664 0
37,2020	06037 0	I: 62545 1	C: 02403 1	C: 15047 0	C: 02401 0	I: 77434 1	C: 21614 1	56154 1
37,2030	55045 0	32473 0	04616 1	C: 20476 0	02270 0	02037 1	02031 1	06037 0
37,2040	I: 47135 0	C: 01046 1	C: 21576 0	C: 02401 0	I: 60535 1	C: 01047 0	C: 02403 1	I: 57546 1
37,2050	I: 77752 1	C: 16437 0	C: 02403 1	I: 72556 1	C: 16435 1	C: 02401 0	I: 73496 1	C: 02675 1
37,2060	C: 15705 1	I: 77746 1	C: 02577 0	I: 77676 0	C: 36703 0	C: 47353 1	I: 77776 1	04616 1
37,2070	C: 17000 1	34736 1	70077 0	00006 1	12076 0	25414 1	05516 0	C: 00056 1
37,2100	02315 1	11414 0	02126 0	02320 1	00006 1	31575 1	05277 0	C: 02113 0
37,2110	C: 76065 0	32116 0	05133 0	32116 0	05137 1	05261 1	C: 76500 0	34755 1
37,2120	55050 1	31504 1	55051 0	51416 0	55420 1	02457 0	51414 1	02130 1
37,2130	02447 1	34361 1	55476 1	32474 1	55412 0	34753 1	55537 0	34755 1
37,2140	51415 0	54037 1	55472 0	02332 1	00004 0	34752 0	05173 1	C: 02151 0
37,2150	05155 0	00006 1	27412 0	31412 1	00006 1	62161 0	34742 1	05173 1
37,2160	C: 02151 0	34736 1	05105 0	C: 02166 1	C: 76065 0	05261 1	51414 1	02170 0
37,2170	02447 1	31412 1	00006 1	62175 0	05155 0	34756 1	55537 0	02332 1
37,2200	11473 1	02205 1	05705 0	41476 1	55476 1	00006 1	41473 1	21477 0
37,2210	06037 0	I: 45345 1	C: 02501 1	C: 02475 0	I: 45044 0	C: 76217 1	C: 76275 0	I: 56325 0
37,2220	C: 02477 1	I: 47075 0	C: 37056 0	C: 21612 1	C: 01051 1	I: 77776 1	11414 0	02301 1
37,2230	02457 0	32471 1	55412 0	51416 0	41417 0	55442 0	11415 1	12245 1
37,2240	44747 0	27565 1	34747 1	27567 0	12251 1	44747 0	27565 1	34747 1
37,2250	27563 1	02447 1	34755 1	55404 1	55405 0	34733 1	55440 1	55441 0
37,2260	30032 0	55413 1	02500 0	31502 1	55051 0	34755 1	55050 1	02457 0
37,2270	05516 0	C: 00007 0	44755 0	05314 1	05472 0	I: 43215 0	C: 06530 1	C: 37064 1
37,2300	I: 77616 0	00006 1	23571 0	34755 1	54321 0	54322 0	54323 1	04616 1
37,2310	C: 17000 1	04616 1	C: 17716 1	03047 1	01571 0	00006 1	23571 0	02311 0
37,2320	00006 1	23571 0	04616 1	C: 17210 1	02311 0	00006 1	23571 0	04616 1
37,2330	C: 16714 1	02311 0	00006 1	23417 1	02342 0	00003 1	30067 0	00006 1
37,2340	62346 1	05122 0	00304 0	51415 0	40037 1	55571 1	00004 0	51415 0
37,2350	30037 0	61571 0	00006 1	12335 1	51415 0	30037 0	51537 1	55472 0
37,2360	04102 0	51537 1	55473 1	51537 1	23474 1	00003 1	01417 1	54001 1
37,2370	12372 1	55571 1	34755 1	50001 0	54000 0	24001 0	11571 1	12371 1

JCTAL LISTING FOR PARAGRAPH # 215. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

37,2400	00002 0	I: 65345 0	C: 37057 1	C: 02403 1	I: 57546 1	I: 73525 1	C: 02403 1	I: 74266 0
37,2410	C: 35001 0	C: 02405 1	I: 77634 0	C: 21575 0	C: 26433 1	C: 37057 1	C: 02564 1	I: 77616 0
37,2420	I: 47020 0	C: 00051 0	C: 21573 0	C: 02431 0	I: 51025 1	C: 02433 1	C: 76431 0	I: 77624 1
37,2430	C: 76275 0	I: 74261 1	C: 20212 1	C: 02405 1	I: 53321 1	C: 02643 1	C: 02564 1	C: 16564 1
37,2440	C: 02431 0	C: 02433 1	I: 47170 1	C: 02563 0	C: 21705 0	I: 77650 1	C: 00051 0	00006 1
37,2450	23420 0	06037 0	I: 77624 1	C: 76420 0	I: 77776 1	02315 1	01420 0	00006 1
37,2460	23417 1	31416 0	55052 0	32472 1	04615 1	C: 20476 0	02270 0	01417 1
37,2470	12461 1	C: 07626 1	C: 01542 0	C: 01451 0	C: 00072 1	C: 02737 0	C: 01664 1	C: 01642 0
37,2500	00004 0	31572 0	05173 1	C: 02536 0	34755 1	54037 1	54040 1	54041 0
37,2510	00003 1	33075 0	55571 1	33076 0	02367 1	06037 0	I: 77735 0	C: 37057 1
37,2520	C: 25477 1	C: 37070 1	C: 26445 0	C: 37057 1	C: 00325 0	C: 01472 1	I: 77735 0	C: 02441 1
37,2530	I: 50076 0	C: 76534 1	I: 77624 1	C: 76401 0	I: 77776 1	03035 1	31576 1	00006 1
37,2540	12542 1	05261 1	11530 1	30000 1	55531 0	40000 0	55530 1	44753 0
37,2550	61562 1	00006 1	12556 1	31412 1	00006 1	62562 1	31572 0	05173 1
37,2560	C: 02536 0	34755 1	56037 0	54324 0	34755 1	56040 0	54326 1	34755 1
37,2570	56041 1	54330 0	34736 1	05105 0	C: 02577 0	C: 76065 0	05261 1	11562 0
37,2600	02602 1	02604 1	04616 1	C: 15263 1	06037 0	I: 77745 1	C: 37066 0	C: 24051 0
37,2610	C: 00325 0	I: 76505 0	C: 02643 1	I: 57545 1	C: 00160 0	C: 16523 1	C: 00162 1	C: 02527 0
37,2620	I: 76001 1	C: 00001 0	C: 00010 0	I: 57535 0	C: 02563 0	I: 77640 0	C: 76772 1	I: 50135 0
37,2630	C: 02532 1	C: 76644 0	I: 72174 0	C: 00014 1	C: 02444 1	I: 62143 0	C: 02243 0	C: 77775 1
37,2640	C: 12545 0	I: 66104 1	C: 76635 0	C: 02444 1	I: 77770 1	C: 00010 0	I: 41343 0	C: 02533 0
37,2650	C: 37100 1	I: 43661 1	C: 21212 0	C: 02501 1	C: 06501 0	I: 40725 0	C: 37102 0	C: 02521 0
37,2660	I: 77732 1	I: 45425 0	C: 71216 1	C: 06563 1	I: 77100 0	C: 76646 1	C: 00004 0	I: 56743 1
37,2670	C: 75324 0	C: 75240 0	C: 12453 0	I: 77104 1	C: 76667 1	C: 00010 0	I: 66140 1	C: 02445 0
37,2700	C: 02445 0	I: 56743 1	C: 02450 1	C: 75216 0	I: 77613 0	C: 75276 0	C: 12501 0	I: 42743 1
37,2710	C: 75314 0	C: 75270 1	C: 12463 0	I: 42673 0	C: 75216 0	C: 75266 1	C: 12511 1	I: 40743 0
37,2720	C: 37105 1	C: 75216 0	I: 42772 0	C: 75256 1	C: 12521 1	I: 76104 0	C: 76676 1	C: 00010 0
37,2730	I: 64743 0	C: 02523 1	C: 02521 0	I: 55523 0	C: 02531 1	I: 76521 0	C: 02001 1	I: 77745 1
37,2740	C: 00155 0	C: 06511 0	I: 77745 1	C: 00160 0	C: 06521 1	I: 77745 1	C: 00162 1	C: 06523 0
37,2750	I: 77700 0	C: 76730 1	I: 76174 1	C: 00006 1	C: 00002 0	I: 57343 1	C: 02503 0	C: 37110 0
37,2760	I: 77722 0	I: 73406 1	I: 56072 1	C: 00046 0	C: 10021 0	I: 77745 1	I: 77746 1	C: 10027 0
37,2770	I: 77704 1	C: 76755 1	I: 77776 1	35016 0	54003 0	01400 1	11412 0	03034 0

OCTAL LISTING FOR PARAGRAPH # 216. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

37,000	11440 1	13003 0	03005 1	30032 0	55414 0	06037 0	I: 65345 0	C: 02473 0
37,3010	C: 02477 1	I: 55525 0	C: 02501 1	I: 74276 1	C: 37110 0	I: 74521 1	C: 02643 1	C: 02740 0
37,3020	I: 77776 1	32475 0	04616 1	C: 17323 0	02315 1	11440 1	02263 1	06037 0
37,3030	I: 77624 1	C: 76401 0	I: 77776 1	02117 1	55412 0	11440 1	02447 1	05155 0
37,3040	35014 1	54003 0	34753 1	55576 0	05567 0	C: 01600 0	02270 0	33054 0
37,3050	05744 0	05516 0	C: 00007 0	05155 0	C: 01601 1	C: 06200 0	C: 00000 1	C: 00000 1
37,3060	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00001 0	C: 00004 0	C: 00002 0	C: 00220 1
37,3070	C: 77776 1	C: 35730 0	C: 00035 1	C: 10317 0	C: 17550 1	C: 00115 1	C: 01443 0	C: 04133 1
37,3100	C: 02265 1	C: 57223 0	C: 66451 1	C: 05427 0	C: 12577 1	C: 77567 0	C: 44202 1	C: 24276 1
37,3110	C: 14066 1	C: 23073 1	C: 11773 1	33407 1	04616 1	C: 20334 1	05563 1	05563 1
37,3120	13113 0	40103 1	74747 0	00006 1	13377 0	40104 0	74744 0	00006 1
37,3130	13403 1	05037 0	I: 77634 0	C: 21573 0	C: 34041 0	C: 27057 0	I: 77775 1	C: 00017 1
37,3140	C: 26170 0	C: 00025 0	C: 16105 1	C: 00015 0	C: 02114 1	C: 34041 0	C: 27043 0	I: 77775 1
37,3150	C: 00017 1	C: 26140 0	C: 00025 0	C: 02120 0	I: 77776 1	40103 1	74747 0	00006 1
37,3160	13326 1	40104 0	74744 0	00006 1	13370 1	06037 0	I: 77634 0	C: 21573 0
37,3170	C: 34041 0	C: 27414 0	I: 43175 0	C: 02170 0	C: 00263 0	C: 25535 0	C: 02105 1	C: 15543 1
37,3200	C: 02114 1	I: 43014 0	C: 04344 0	C: 77205 0	C: 00063 1	I: 77614 1	C: 01473 0	C: 35517 1
37,3210	C: 27107 1	I: 77775 1	C: 00001 0	C: 26207 0	C: 00007 0	C: 36215 1	C: 27414 0	I: 71214 0
37,3220	C: 01473 0	C: 00015 0	C: 00041 1	I: 43175 0	C: 02140 0	C: 00263 0	C: 25535 0	C: 02120 0
37,3230	C: 15543 1	C: 02114 1	I: 43014 0	C: 04344 0	C: 77236 0	C: 00063 1	C: 35517 1	C: 27107 1
37,3240	I: 52375 1	C: 00001 0	C: 02207 0	I: 65234 1	C: 21724 0	C: 00045 0	I: 77657 0	C: 20201 0
37,3250	C: 26201 0	C: 00007 0	I: 50251 1	C: 02215 0	I: 77752 1	C: 26203 1	C: 02207 0	I: 63256 0
37,3260	C: 06514 1	I: 77624 1	C: 47661 0	I: 41505 1	C: 01734 0	I: 72431 1	C: 00001 0	I: 53445 1
37,3270	C: 00007 0	I: 47315 0	C: 00001 0	C: 02215 0	I: 50235 0	C: 00001 0	C: 00015 0	I: 77715 1
37,3300	I: 75241 1	C: 00007 0	C: 00015 0	I: 65512 1	C: 26205 1	C: 00001 0	I: 51041 0	C: 00007 0
37,3310	C: 77315 0	I: 45345 1	C: 06530 1	C: 02205 1	C: 02205 1	I: 77776 1	34747 1	71044 1
37,3320	00006 1	15472 1	41044 1	74740 1	27044 1	13155 1	37710 0	05146 1
37,3330	06037 0	I: 40375 1	C: 01221 1	C: 00001 0	C: 26207 0	C: 01227 1	C: 26215 0	C: 01726 0
37,3340	I: 65315 0	C: 01720 0	C: 01235 1	I: 77776 1	35015 0	05146 1	06037 0	I: 77214 0
37,3350	C: 03347 1	C: 77363 1	I: 60505 1	C: 01734 0	I: 77715 1	I: 76505 0	C: 01734 0	I: 40206 1
37,3360	C: 00001 0	I: 77650 1	C: 77240 1	I: 77624 1	C: 27414 0	I: 52014 0	C: 01673 1	C: 77222 0
37,3370	06037 0	I: 77634 0	C: 21573 0	C: 34041 0	C: 27057 0	I: 77650 1	C: 77211 0	40102 0

DATA LISTING FOR PARAGRAPH # 217, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

37,3400	74744 0	00006 1	13326 1	06037 0	I: 52034 1	C: 21573 0	C: 77144 0	C: 04066 0
37,3410	34757 0	03531 0	35031 0	05072 1	C: 03663 1	C: 14063 1	03544 1	40103 1
37,3420	74773 1	26103 1	44735 0	70076 1	54076 1	34751 0	55257 1	33537 0
37,3430	55260 0	37710 0	05105 0	C: 02461 0	C: 46067 1	34752 0	03525 0	35000 1
37,3440	05224 0	43540 1	60030 1	10000 0	44753 0	13447 1	34753 1	26030 0
37,3450	03541 1	34756 1	03531 0	34753 1	55257 1	34736 1	05105 0	C: 02206 1
37,3460	C: 66067 0	34743 0	00006 1	05011 1	30103 0	74747 0	00006 1	13517 0
37,3470	30102 1	74744 0	00006 1	13515 1	10755 1	13515 1	34757 0	55056 1
37,3500	40025 1	64756 1	64734 0	64734 0	57055 0	34361 1	54001 1	40000 0
37,3510	52755 1	36007 0	05203 0	C: 02006 0	C: 42067 0	34751 0	13436 1	00006 1
37,3520	33536 1	53253 0	34751 0	03525 0	05261 1	54001 1	40025 1	55063 1
37,3530	13532 1	54001 1	40001 1	52763 1	00002 0	C: 03661 0	C: 44067 0	C: 65772 0
37,3540	C: 37771 1	00006 1	30025 0	53561 0	44755 0	55254 1	55255 0	55256 0
37,3550	34755 1	54350 0	54331 1	54326 1	54327 0	54325 1	55257 1	00006 1
37,3560	40040 1	53255 0	52040 1	54324 0	22326 0	40041 0	57256 1	56041 1
37,3570	54330 0	00006 1	31561 1	53250 0	00006 1	41235 0	21250 0	30032 0
37,3600	55155 0	30033 1	55156 0	30034 0	55157 1	30324 1	55160 0	30326 0
37,3610	55161 1	30330 1	55162 1	00002 0	11257 1	13441 1	33654 0	54002 1
37,3620	10330 0	13571 0	13625 1	13571 0	13571 0	22007 0	10326 1	13632 1
37,3630	13641 0	13632 1	22041 1	11256 0	41256 0	13570 1	13634 1	22330 1
37,3640	13571 0	11254 1	41254 1	13646 1	13642 0	13557 1	54324 0	41255 0
37,3650	54326 1	44755 0	52040 1	13565 0	C: 03451 1	05504 0	C: 00054 0	00004 0
37,3660	00006 1	30025 0	52315 1	03714 0	03657 0	52155 1	52317 0	00004 0
37,3670	04615 1	C: 17175 1	05516 0	C: 00007 0	05516 0	C: 00010 0	34741 1	00006 1
37,3700	05013 0	05353 1	C: 07024 0	C: 20000 0	C: 03734 1	C: 76060 0	34774 1	04616 1
37,3710	C: 20623 1	13706 1	13706 1	12706 1	00006 1	22156 0	04103 1	00003 1
37,3720	52155 1	34747 1	54001 1	34755 1	20155 1	44346 0	70155 1	56155 0
37,3730	74346 0	10000 0	24156 0	00156 0	44741 0	00006 1	03013 0	00004 0
37,3740	34755 1	54001 1	52025 1	03714 0	03737 1	00006 1	40317 0	20155 1
37,3750	34742 1	07307 1	34755 1	54156 1	07257 0	10154 0	03763 0	03763 0
37,3760	03761 1	34742 1	26154 0	00006 1	30315 0	20155 1	07257 0	52155 1
37,3770	20025 1	05516 0	C: 00054 0	06001 0	C: 03774 0	C: 03775 1	CKSM 47535 1	a

OCTAL LISTING FOR PARAGRAPH # 220. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

40,2000	35017 1	05105 0	C: 02017 0	C: 60104 1	34740 0	05146 1	32076 1	04616 1
40,2010	C: 20353 0	05563 1	05563 1	05563 1	34751 0	05464 1	05155 0	00006 1
40,2020	30036 1	52155 1	06037 0	I: 77624 1	C: 46065 0	C: 00001 0	C: 14007 0	C: 06522 1
40,2030	C: 24011 1	C: 00007 0	I: 77656 1	C: 00007 0	I: 77641 1	C: 06514 1	C: 24021 1	C: 06520 0
40,2040	I: 77641 1	C: 00007 0	C: 34023 1	C: 47320 0	I: 43244 1	C: 60047 1	C: 06530 1	C: 26203 1
40,2050	C: 00001 0	I: 77641 1	C: 06516 0	C: 24023 0	C: 00001 0	I: 77641 1	C: 00007 0	C: 34021 0
40,2060	C: 47320 0	I: 43244 1	C: 60064 0	C: 06530 1	C: 02201 0	I: 77776 1	34777 1	04616 1
40,2070	C: 01735 1	34747 1	71044 1	10000 0	02017 0	05472 0	C: 04070 1	34753 1
40,2100	57012 0	54115 0	11042 1	02105 1	02112 1	42156 0	60154 1	00006 1
40,2110	12112 0	04374 0	56154 1	54117 1	50000 1	02116 0	03434 1	02175 0
40,2120	02175 0	02175 0	02175 0	02175 0	02175 0	02175 0	02161 0	02161 0
40,2130	03434 1	03434 1	03434 1	03434 1	03434 1	03434 1	02173 0	02354 1
40,2140	03603 1	03434 1	03434 1	03434 1	03434 1	03434 1	03434 1	03461 1
40,2150	02407 0	02374 0	02157 0	03434 1	02467 0	02370 1	C: 00022 1	04635 0
40,2160	C: 62002 1	10777 1	02166 1	02166 1	05155 0	05155 0	36245 1	71000 1
40,2170	10000 0	02175 0	03434 1	34755 1	54117 1	10777 1	02202 0	02202 0
40,2200	02201 0	05155 0	02324 0	11015 0	34755 1	55015 0	02207 0	50117 0
40,2210	34066 0	74346 0	54124 1	30777 0	54143 0	03322 1	36245 1	71000 1
40,2220	10000 0	02232 0	50137 1	57001 1	54022 0	40022 0	40022 0	56022 1
40,2230	60117 0	02247 1	50137 1	57001 1	54154 0	34755 1	54155 1	34363 0
40,2240	07307 1	56155 0	60117 0	54155 1	02247 1	26154 0	02265 1	50137 1
40,2250	55001 0	40777 1	50137 1	62315 1	00006 1	12257 1	02312 0	36245 1
40,2260	71000 1	10000 0	02265 1	40777 1	02313 1	44753 0	60137 1	00006 1
40,2270	62263 1	07103 1	C: 02322 0	36245 1	71000 1	50000 1	02276 0	02303 0
40,2300	00006 1	40156 1	52156 1	56156 0	50137 1	55004 0	56155 0	50137 1
40,2310	55001 0	02263 1	10777 1	54777 1	05155 0	C: 00022 1	C: 00020 0	C: 00012 1
40,2320	C: 00005 1	C: 00000 1	C: 05174 0	C: 13261 0	50777 0	32330 0	54137 0	00002 0
40,2330	C: 00004 0	C: 00004 0	C: 00004 0	C: 00004 0	C: 00004 0	C: 00003 1	C: 00003 1	C: 00003 1
40,2340	C: 00003 1	C: 00003 1	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	05705 0
40,2350	C: 00001 0	C: 00001 0	C: 00000 1	C: 00000 1	34755 1	55001 0	34360 0	54777 1
40,2360	02601 1	34753 1	55000 1	34755 1	55013 0	34217 1	54136 1	05155 0
40,2370	34755 1	55002 0	34361 1	02357 1	02446 0	02433 1	34752 0	50137 1

JCTAL LISTING FOR PARAGRAPH # 221. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

40,2400	64745 0	27000 1	11015 0	34755 1	55015 0	02406 1	05155 0	02446 0
40,2410	02413 0	34753 1	02377 0	22002 0	02324 0	50137 1	32441 1	54123 0
40,2420	64753 1	54122 1	34755 1	54124 1	56123 1	03404 1	34741 1	54124 1
40,2430	55122 0	03404 1	00001 0	22002 0	02324 0	50137 1	32441 1	54122 1
40,2440	64753 1	54123 0	02422 1	C: 00005 1	C: 00003 1	C: 00000 1	22002 0	36245 1
40,2450	71000 1	10000 0	05155 0	44317 1	02462 0	44320 0	02462 0	44321 1
40,2460	02462 0	05155 0	60777 0	00006 1	12466 0	00002 0	00001 0	10777 1
40,2470	64753 1	02473 0	64753 1	50000 1	32330 0	54137 0	11015 0	02505 0
40,2500	02502 1	02502 1	30137 1	02527 0	02522 0	10137 0	54137 0	02527 0
40,2510	32577 0	27013 0	30137 1	54125 0	00006 1	27001 0	04616 1	C: 62340 1
40,2520	30125 1	54137 0	02525 1	25015 1	05155 0	22002 0	02540 1	67746 0
40,2530	10000 0	00002 0	05705 0	05155 0	00002 0	54777 1	22002 0	02324 0
40,2540	34755 1	50137 1	55001 0	50137 1	55004 0	54124 1	50137 1	44745 1
40,2550	71000 1	72600 1	55000 1	50137 1	32570 1	54143 0	03322 1	50137 1
40,2560	32573 1	54777 1	02601 1	44752 1	26777 1	02601 1	50137 1	34315 1
40,2570	54777 1	00001 0	C: 00016 0	C: 00005 1	C: 00004 0	C: 00015 0	C: 00011 1	C: 00003 1
40,2600	C: 77774 0	30777 0	54021 0	42614 1	00004 0	50021 1	57023 1	00006 1
40,2610	62612 0	25016 1	00003 1	00002 0	C: 04000 0	34755 1	54156 1	02652 1
40,2620	02622 0	02645 1	02663 0	02625 1	02615 1	30154 1	74733 0	00006 1
40,2630	12634 0	40154 0	64753 1	54154 0	00002 0	00006 1	00033 1	00006 1
40,2640	74742 0	40000 0	76245 0	54154 0	02677 0	00006 1	50156 0	32674 0
40,2650	52124 1	00002 0	10154 0	00002 0	00002 0	12656 1	44735 0	70154 0
40,2660	54154 0	50002 0	00001 0	00006 1	50156 0	32674 0	52155 1	07307 1
40,2670	52124 1	20155 1	02702 0	C: 05605 1	C: 03656 1	C: 16314 0	C: 31463 1	52124 1
40,2700	52155 1	04415 0	04535 0	C: 62566 0	52124 1	52155 1	04415 0	02711 1
40,2710	02723 0	56155 0	56155 0	54154 0	02702 0	02723 0	02702 0	02723 0
40,2720	36242 0	03153 0	02702 0	56002 0	54162 0	02747 1	07257 0	07103 1
40,2730	C: 00123 1	00162 1	02536 0	02413 0	30154 1	03306 1	46245 0	50117 0
40,2740	64317 0	54777 1	02747 1	20155 0	03306 1	04635 0	C: 62570 1	56002 0
40,2750	54144 1	50140 1	02752 0	02767 0	50117 0	30150 0	74356 1	04313 1
40,2760	00006 1	50000 1	30001 0	52155 1	34755 1	54156 1	00144 0	30145 1
40,2770	02760 1	50140 1	02772 1	02775 0	05420 1	00006 1	50145 1	30001 0

DATA LISTING FOR PARAGRAPH # 222, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

40,3000	52155 1	34317 0	54777 1	34755 1	54156 1	07257 0	03273 1	00136 0
40,3010	07103 1	C: 03074 1	10155 1	34741 1	03016 0	44741 0	60155 0	03165 0
40,3020	04404 0	04404 0	03174 0	04404 0	10154 0	03031 0	03031 0	40000 0
40,3030	54154 0	10162 0	03070 0	03043 0	10154 0	05705 0	03066 1	03040 0
40,3040	56154 1	74733 0	54154 0	50140 1	03044 1	03050 1	03060 1	03051 0
40,3050	03063 1	40000 0	64752 0	00006 1	13056 0	02625 1	04635 0	C: 63155 0
40,3060	04615 1	C: 63034 0	03047 1	04616 1	C: 63026 0	03051 0	44733 0	03042 1
40,3070	40154 0	74733 0	40300 0	03042 1	C: 26161 0	C: 30707 1	07103 1	C: 00123 1
40,3100	56156 0	56155 0	56154 1	00006 1	13106 1	04145 0	03163 0	03174 0
40,3110	03056 1	07103 1	C: 00123 1	03106 0	07103 1	C: 00123 1	56156 0	60000 1
40,3120	54156 1	34755 1	60155 0	03165 0	03174 0	50140 1	03126 1	03137 1
40,3130	30117 0	60145 1	54002 1	56155 0	50002 0	54001 1	03056 1	34755 1
40,3140	03131 1	07103 1	C: 00123 1	36242 0	03153 0	03116 1	07103 1	C: 00123 1
40,3150	34752 0	03153 0	03116 1	56002 0	54124 1	56002 0	54123 0	04404 0
40,3160	10123 0	03156 0	00124 0	56155 0	60000 1	54155 1	00002 0	60154 1
40,3170	54154 0	00002 0	54162 0	00002 0	10162 0	04145 0	00002 0	04145 0
40,3200	56002 0	54144 1	10154 0	03213 1	03213 1	64753 1	54154 0	02433 1
40,3210	40155 1	54155 1	00144 0	02413 0	00144 0	00006 1	33261 1	20155 1
40,3220	00006 1	13225 0	00006 1	34733 1	52155 1	00002 0	56002 0	54115 0
40,3230	03200 0	03215 1	34751 0	54137 0	34363 0	07307 1	50154 1	34066 0
40,3240	74346 0	54124 1	34755 1	56156 0	56155 0	54154 0	56777 0	54143 0
40,3250	10000 0	54777 1	03322 1	10137 0	03233 0	44360 1	54777 1	00115 1
40,3260	C: 00000 1	C: 02476 0	56002 0	54115 0	03200 0	03232 1	56002 0	54115 0
40,3270	03200 0	34753 1	03233 0	56002 0	54115 0	34755 1	54124 1	36245 1
40,3300	03404 1	34751 0	03404 1	03200 0	34320 1	03233 0	00006 1	73316 1
40,3310	22154 1	34755 1	54155 1	56002 0	54115 0	03271 0	C: 00244 0	03306 1
40,3320	04635 0	C: 62347 0	56002 0	54114 1	34346 1	70143 0	54021 0	56021 1
40,3330	54141 1	34753 1	70143 0	10000 0	03336 1	03346 0	56124 0	04340 1
40,3340	54124 1	34756 1	70143 0	10000 0	34752 0	64753 1	54143 0	00004 0
40,3350	50141 0	11023 0	03354 0	05705 0	64753 1	54142 1	50143 1	73400 1
40,3360	00006 1	60124 0	00006 1	13376 1	50143 1	43400 1	70142 1	60124 0
40,3370	40000 0	50141 0	57023 1	00006 1	63376 0	25016 1	00003 1	00114 0

OCTAL LISTING FOR PARAGRAPH # 224, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

41,2000	03544 1	02775 0	34755 1	55015 0	34217 1	54136 1	11013 0	02035 0
41,2010	02035 0	02012 0	32033 0	61013 1	00006 1	12027 1	36245 1	71000 1
41,2020	10000 0	02023 1	02027 0	10777 1	02351 1	02351 1	02027 0	41013 0
41,2030	55013 0	04433 1	01013 1	C: 03431 1	C: 00034 0	34755 1	55000 1	44360 1
41,2040	54777 1	41001 0	55041 1	62034 1	00006 1	62133 1	00006 1	32114 1
41,2050	52006 0	50140 1	02052 1	02055 0	02221 1	10146 0	02131 0	02351 1
41,2060	02064 1	25017 0	04311 0	02120 0	34735 1	55015 0	44217 0	60136 0
41,2070	00006 1	12073 0	02116 0	02307 1	11000 1	04145 0	44360 1	54777 1
41,2100	11042 1	02104 0	02105 1	02104 0	04427 1	57005 0	04303 0	00006 1
41,2110	32114 1	52006 0	02133 1	C: 02103 1	C: 64101 0	C: 77772 0	30156 0	04303 0
41,2120	44756 0	61001 1	00006 1	12133 0	34321 0	54777 1	31017 0	03363 1
41,2130	02133 1	64753 1	04303 0	42145 1	61001 1	10000 0	64753 1	02141 1
41,2140	02146 0	54154 0	04457 0	04635 0	C: 66000 1	C: 00050 1	51001 1	32151 0
41,2150	04640 1	C: 62351 1	C: 62365 0	C: 62373 1	C: 62400 1	C: 62360 0	C: 62353 0	C: 62523 1
41,2160	C: 60771 0	C: 62351 1	C: 62351 1	C: 61420 0	C: 63230 0	C: 63230 0	C: 63230 0	C: 63230 0
41,2170	C: 63230 0	C: 63230 0	C: 63230 0	C: 62351 1	C: 62351 1	C: 62351 1	C: 62732 0	C: 62743 0
41,2200	C: 62760 1	C: 62703 1	C: 62616 1	C: 62351 1	C: 63353 1	C: 62351 1	C: 62351 1	C: 63466 0
41,2210	C: 63512 1	C: 61457 0	C: 61442 1	C: 61450 1	C: 63613 0	C: 12447 0	C: 63430 0	C: 62351 1
41,2220	C: 62351 1	10146 0	02226 0	02351 1	02226 0	02226 0	46242 1	61001 1
41,2230	00006 1	62233 1	02133 1	34752 0	54117 1	62260 1	54145 0	50117 0
41,2240	30150 0	54122 1	03034 0	02261 0	02246 0	24122 0	30122 0	74356 1
41,2250	04313 1	50000 1	30000 1	50145 1	56000 1	10117 1	02234 0	02133 1
41,2260	00125 1	50000 1	12263 0	00002 0	00002 0	00002 0	00002 0	12301 0
41,2270	12301 0	00002 0	12301 0	00002 0	00002 0	12301 0	00002 0	00002 0
41,2300	00002 0	50002 0	00001 0	34317 0	12310 0	34320 1	12310 0	34321 0
41,2310	54777 1	40002 1	55013 0	04616 1	C: 60536 1	04427 1	00136 0	55002 0
41,2320	56002 0	54117 1	00006 1	32114 1	52006 0	10146 0	64753 1	12332 0
41,2330	12333 1	12333 1	04303 0	34361 1	54777 1	31002 1	12345 0	55001 0
41,2340	56002 0	54117 1	34360 0	54777 1	31001 1	04635 0	C: 61317 0	00117 0
41,2350	04145 0	04635 0	C: 61420 0	44752 1	02424 1	50145 1	40002 1	56132 1
41,2360	44753 0	02424 1	50145 1	40001 1	56131 1	02443 0	02466 1	50145 1
41,2370	40000 0	56130 0	02405 1	44753 0	02437 0	50145 1	40001 1	02371 0

OCTAL LISTING FOR PARAGRAPH # 225, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

41,2400	44752 1	02437 0	50145 1	40002 1	02371 0	44752 1	61001 1	10000 0
41,2410	02413 0	00136 0	02413 0	54122 1	50000 1	34317 0	54777 1	50122 0
41,2420	40130 1	03263 1	56122 0	02407 0	54123 0	22002 0	02515 1	04331 1
41,2430	76245 0	50123 1	10000 0	00001 0	05705 0	02351 1	00001 0	54123 0
41,2440	22002 0	02443 0	02426 0	00006 1	22156 0	02515 1	74736 0	10000 0
41,2450	02351 1	00156 0	22002 0	02515 1	74736 0	10000 0	04145 0	00001 0
41,2460	22002 0	02515 1	10000 0	00001 0	00001 0	02351 1	22002 0	30146 1
41,2470	64753 1	00006 1	12504 0	50140 1	02474 1	02477 1	00001 0	03026 0
41,2500	02261 0	00001 0	24145 1	00001 0	31017 0	75004 1	00006 1	50000 1
41,2510	00000 1	40000 0	12371 1	C: 00147 0	C: 00146 1	50140 1	32512 0	50000 1
41,2520	30000 1	74350 1	00002 0	02515 1	04331 1	76245 0	54117 1	54122 1
41,2530	60145 1	50000 1	40000 0	50122 0	57003 0	10122 1	02527 0	34755 1
41,2540	54155 1	54156 1	50117 0	34317 0	54777 1	50117 0	41003 1	54154 0
41,2550	03047 1	54123 0	00006 1	32565 0	52006 0	50140 1	02556 0	02562 1
41,2560	03034 0	02575 1	03026 0	02575 1	C: 02141 1	C: 64101 0	04616 1	C: 61226 0
41,2570	10117 1	02573 1	00136 0	54117 1	02537 1	50000 1	32600 0	04640 1
41,2600	C: 61416 0	C: 62566 0	C: 60615 0	C: 60677 1	C: 60710 1	C: 60715 1	C: 60635 1	C: 60717 0
41,2610	C: 65230 0	C: 65303 1	C: 60715 1	C: 60704 1	C: 60732 1	C: 60623 0	44752 1	02424 1
41,2620	02460 1	33006 1	02337 1	02303 0	33007 0	02337 1	02305 0	33010 0
41,2630	02337 1	02307 1	46242 1	03011 1	00006 1	32114 1	52006 0	34755 1
41,2640	03075 0	50145 1	54000 0	34753 1	03075 0	50145 1	54001 1	34752 0
41,2650	03075 0	50145 1	54002 1	44757 1	61002 1	00006 1	12660 1	02775 0
41,2660	31003 0	04304 1	31005 0	00004 0	00006 1	12674 1	50145 1	40000 0
41,2670	71004 0	50145 1	26000 0	02701 0	41004 0	50145 1	70000 0	50145 1
41,2700	54000 0	00003 1	02775 0	44753 0	02424 1	02460 1	33006 1	02337 1
41,2710	02303 0	33007 0	02337 1	02305 0	44756 0	03011 1	00006 1	32114 1
41,2720	52006 0	34755 1	03075 0	50145 1	54000 0	34753 1	03075 0	50145 1
41,2730	54001 1	02775 0	02303 0	00006 1	32114 1	52006 0	34755 1	03075 0
41,2740	50145 1	54000 0	02775 0	44753 0	02424 1	34735 1	55015 0	02305 0
41,2750	00006 1	32114 1	52006 0	34753 1	03075 0	50145 1	54001 1	02775 0
41,2760	44752 1	02424 1	34735 1	55015 0	02307 1	00006 1	32114 1	52006 0
41,2770	34752 0	03075 0	50145 1	54002 1	02775 0	34755 1	55000 1	44755 0

JOCTAL LISTING FOR PARAGRAPH # 226, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

41,3000	55014 1	04457 0	44360 1	54777 1	04635 0	C: 61547 0	C: 00025 0	C: 00026 0
41,3010	C: 00027 1	54117 1	41000 1	54021 0	40021 0	40021 0	10000 0	13021 0
41,3020	00002 0	60117 0	00005 1	13025 1	04145 0	00002 0	56002 0	54114 1
41,3030	34347 0	70147 1	04322 0	00114 0	56002 0	54114 1	50117 0	33066 1
41,3040	54001 1	50117 0	34346 1	70153 1	50001 0	00000 1	00114 0	56002 0
41,3050	54114 1	50140 1	03052 0	03071 1	50117 0	33066 1	54001 1	50117 0
41,3060	34346 1	70147 1	50001 0	00000 1	60000 1	00114 0	03025 0	04322 0
41,3070	04231 1	34346 1	70147 1	60000 1	00114 0	54117 1	56002 0	54115 0
41,3100	34755 1	54162 0	50117 0	57006 0	54155 1	50117 0	57003 0	54154 0
41,3110	50140 1	03111 0	03137 1	50117 0	30150 0	74356 1	04303 0	00006 1
41,3120	60117 0	54145 0	11000 1	03174 0	02452 0	03034 0	02261 0	03155 0
41,3130	24145 1	30145 1	26117 1	34755 1	50117 0	53777 0	03155 0	04311 0
41,3140	11000 1	03174 0	02452 0	03026 0	02261 0	03151 1	34755 1	54117 1
41,3150	03130 0	30146 1	64753 1	00006 1	13161 0	56154 1	00115 1	C: 02147 1
41,3160	C: 64101 0	44757 1	61017 0	00006 1	12775 1	31017 0	75004 1	56154 1
41,3170	00006 1	50154 1	01000 0	02775 0	03047 1	54123 0	00006 1	33160 0
41,3200	52006 0	50140 1	03202 1	03206 0	03034 0	03207 1	03026 0	50000 1
41,3210	33212 0	04640 1	C: 62350 0	C: 61106 1	C: 61010 1	C: 61076 1	C: 61114 1	C: 61141 1
41,3220	C: 61420 0	C: 61114 1	C: 65452 1	C: 61420 0	C: 61146 0	C: 61111 1	C: 61420 0	C: 61010 1
41,3230	43237 0	71017 1	54155 1	40136 1	64217 1	10000 0	03245 1	C: 60000 1
41,3240	03245 1	34735 1	26155 1	34755 1	55022 1	36074 1	71001 0	04331 1
41,3250	54022 0	40022 0	56022 1	61002 1	54154 0	34755 1	55012 1	11042 1
41,3260	03262 1	04502 1	00004 0	11020 0	03271 0	34753 1	05203 0	C: 03275 1
41,3270	C: 62101 0	52155 1	53021 1	00003 1	00136 0	04400 1	11021 1	03303 1
41,3300	03303 1	03314 1	03314 1	33320 0	05203 0	C: 03275 1	C: 62101 0	34355 0
41,3310	05072 1	C: 03321 1	C: 62101 0	05261 1	34755 1	55020 0	55021 1	05261 1
41,3320	C: 00144 0	11021 1	03326 0	03326 0	05155 0	05155 0	11012 1	03351 0
41,3330	36074 1	71020 0	02317 0	34144 1	71020 0	63347 1	54023 1	30023 0
41,3340	55001 0	33350 1	54136 1	43237 0	71021 1	54156 1	02046 1	C: 75377 0
41,3350	C: 04124 1	04374 0	05155 0	34317 0	54777 1	31047 0	54001 1	31017 0
41,3360	04651 1	03363 1	05155 0	54022 0	56002 0	54115 0	34736 1	26777 1
41,3370	34751 0	54137 0	40022 0	40022 0	40022 0	40000 0	74757 1	50000 1

JOYCE LISTING FOR PARAGRAPH # 227. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

41,3400	34066 0	74346 0	54124 1	56777 0	54143 0	10000 0	54777 1	04635 0
41,3410	C: 61412 1	10137 0	03371 1	44360 1	54777 1	00115 1	54020 1	56002 0
41,3420	54115 0	34753 1	54137 0	40020 1	40020 1	56020 0	54022 0	03376 0
41,3430	03452 1	34747 1	60777 0	00006 1	13436 1	04145 0	34755 1	57002 1
41,3440	54154 0	34361 1	54777 1	04616 1	C: 60601 0	44360 1	54777 1	30154 1
41,3450	04635 0	C: 10040 1	40002 1	55013 0	34361 1	54777 1	34755 1	55002 1
41,3460	04616 1	C: 60601 0	04427 1	34753 1	55000 1	00136 0	34753 1	71045 0
41,3470	10000 0	03510 0	34351 1	54154 0	44753 0	71045 0	54160 1	04457 0
41,3500	34217 1	54157 0	00006 1	31047 0	52156 1	30160 0	00004 0	00154 1
41,3510	34354 1	03473 1	34352 1	54154 0	31045 1	03476 1	64757 0	00004 0
41,3520	54124 1	44740 1	50124 0	57023 1	10000 0	25016 1	03527 1	10124 1
41,3530	03520 0	00003 1	50123 1	03540 0	03535 1	55001 0	55002 0	55015 0
41,3540	44360 1	54777 1	04433 1	03566 1	33570 0	54136 1	10123 0	03553 1
41,3550	02351 1	03516 0	02351 1	36074 1	70123 0	54157 0	30123 1	54023 1
41,3560	30023 0	54160 1	10157 0	03571 1	30160 0	02337 1	34755 1	55013 0
41,3570	04202 0	10160 1	03576 0	30157 1	02317 0	04202 0	30156 0	54161 0
41,3600	30160 0	02337 1	30157 1	02317 0	34755 1	55014 1	55015 0	55013 0
41,3610	30161 1	54156 1	02035 0	00004 0	44753 0	71303 1	64753 1	55303 1
41,3620	33656 1	00006 1	05011 1	33657 0	55036 1	34742 1	00006 1	05013 0
41,3630	34363 0	54117 1	43654 1	50117 0	55023 0	10117 1	03631 0	43655 0
41,3640	55024 1	55027 1	55031 0	34760 1	55016 0	00003 1	33661 0	00004 0
41,3650	05203 0	C: 03662 0	C: 62102 0	05155 0	C: 05675 0	C: 07675 1	C: 00175 1	C: 40674 0
41,3660	C: 00115 1	C: 00764 1	34355 0	05072 1	C: 03667 0	C: 62102 0	05261 1	43660 0
41,3670	00004 0	00006 1	03011 1	44742 0	00006 1	03013 0	34750 1	00006 1
41,3700	02012 0	64715 1	55036 1	43726 0	71303 1	65026 0	55303 1	43730 1
41,3710	71302 0	65025 0	55302 0	43727 1	70110 0	64745 0	54110 0	00003 1
41,3720	04616 1	C: 10636 0	04204 0	04433 1	04635 0	C: 61471 1	C: 16001 1	C: 00330 1
41,3730	C: 55000 1	C: 03731 1	C: 03732 1	CKSM 72012 1	0	0	0	0
41,3740	0	0	0	0	0	0	0	0
41,3750	0	0	0	0	0	0	0	0
41,3760	0	0	0	0	0	0	0	0
41,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 230. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

42,2000	C: 26723 0	C: 00450 0	35021 1	05146 1	32034 1	04616 1	C: 20334 1	05472 0
42,2010	05472 0	42033 1	60154 1	00006 1	12016 0	05472 0	00004 0	34755 1
42,2020	54156 1	54001 1	52025 1	52155 1	53052 0	20155 1	07257 0	52155 1
42,2030	20025 1	00003 1	05472 0	C: 00027 1	C: 06230 0	34752 0	54002 1	50000 1
42,2040	30321 1	00036 1	72053 1	50002 0	56050 1	10002 1	12036 1	37740 0
42,2050	00006 1	05014 1	15261 0	C: 03146 1	05516 0	C: 00027 1	05516 0	C: 00031 0
42,2060	05516 0	C: 00007 0	06037 0	I: 77624 1	C: 27414 0	I: 77776 1	05353 1	C: 00002 0
42,2070	00004 0	04574 0	C: 40165 1	04674 0	C: 40123 0	06011 1	44736 0	00006 1
42,2100	03012 1	04635 0	C: 12770 1	52152 0	51002 1	32154 0	54146 0	51002 1
42,2110	32320 1	54147 1	41002 0	64771 1	00006 1	62121 1	34753 1	54140 0
42,2120	02137 0	34752 0	54140 0	51002 1	33064 0	54153 1	35012 1	70146 0
42,2130	54002 1	50000 1	32650 0	54150 1	00006 1	50002 0	32652 1	52152 0
42,2140	52006 0	52124 1	00006 1	50000 1	32557 1	52124 1	52006 0	52124 1
42,2150	00006 1	50000 1	32465 1	12145 1	C: 00000 1	C: 40000 0	C: 40000 0	C: 40000 0
42,2160	C: 01045 1	C: 01045 1	C: 01144 1	C: 01003 0	C: 01363 0	C: 00375 0	C: 77776 1	C: 03633 1
42,2170	C: 01051 1	C: 01776 0	C: 01051 1	C: 77777 0	C: 01051 1	C: 00000 1	C: 02344 0	C: 00000 1
42,2200	C: 00032 0	C: 00037 0	C: 00321 1	C: 00000 1	C: 01051 1	C: 01045 1	C: 01045 1	C: 01362 1
42,2210	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 02142 1	C: 03441 0	C: 01045 1	C: 03453 0
42,2220	C: 00024 1	C: 03635 1	C: 01516 1	C: 00000 1	C: 64000 0	C: 02003 0	C: 24006 1	C: 24011 1
42,2230	C: 64014 0	C: 64017 0	C: 00022 1	C: 22025 0	C: 22030 1	C: 24033 1	C: 00000 1	C: 22041 1
42,2240	C: 00044 1	C: 00000 1	C: 24052 0	C: 24055 1	C: 02060 0	C: 20063 0	C: 24066 1	C: 24071 1
42,2250	C: 24074 1	C: 64077 0	C: 64102 0	C: 24105 0	C: 64110 0	C: 24113 1	C: 62116 0	C: 04121 1
42,2260	C: 64124 1	C: 00000 1	C: 04132 0	C: 04135 1	C: 02140 0	C: 02143 0	C: 64146 0	C: 64151 0
42,2270	C: 24154 1	C: 62157 0	C: 02162 0	C: 24165 0	C: 02170 0	C: 24173 1	C: 24176 1	C: 24201 1
42,2300	C: 24204 1	C: 24207 1	C: 24212 0	C: 02215 0	C: 24220 1	C: 24223 1	C: 24226 1	C: 04231 0
42,2310	C: 00000 1	C: 04237 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 04253 1	C: 04256 1	C: 24261 1
42,2320	C: 00000 1	C: 04040 1	C: 04140 0	C: 04102 0	C: 00504 0	C: 00504 0	C: 04000 0	C: 04000 0
42,2330	C: 04000 0	C: 04000 0	C: 00000 1	C: 24400 0	C: 02000 0	C: 24400 0	C: 04140 0	C: 00000 1
42,2340	C: 24400 0	C: 00000 1	C: 04102 0	C: 00000 1	C: 04102 0	C: 04140 0	C: 04102 0	C: 00000 1
42,2350	C: 24400 0	C: 04140 0	C: 04000 0	C: 00140 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1
42,2360	C: 24400 0	C: 24400 0	C: 24400 0	C: 24400 0	C: 24400 0	C: 24400 0	C: 24400 0	C: 00000 1
42,2370	C: 24500 1	C: 00542 1	C: 24410 1	C: 20204 0	C: 00410 1	C: 10000 0	C: 00000 1	C: 00306 1

TOTAL LISTING FOR PARAGRAPH # 231. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

42,2400	C: 01367 1	C: 00510 0	C: 00000 1	C: 00204 1	C: 00004 0	C: 00000 1	C: 10507 1	C: 10200 1
42,2410	C: 00204 1	C: 00010 0	C: 24510 0	C: 24512 1	C: 60512 1	C: 54000 0	C: 24012 1	C: 60512 1
42,2420	C: 60500 1	C: 00000 1	C: 00016 0	C: 53223 1	C: 60026 0	C: 00000 1	C: 00000 1	C: 00000 1
42,2430	C: 00102 1	C: 00102 1	C: 10200 1	C: 00010 0	C: 20512 0	C: 00500 1	C: 00654 0	C: 00102 1
42,2440	C: 00200 0	C: 24512 1	C: 24512 1	C: 24512 1	C: 24512 1	C: 24512 1	C: 24512 1	C: 00102 1
42,2450	C: 00000 1	C: 16143 0	C: 10507 1	C: 10450 1	C: 00000 1	C: 06143 1	C: 00000 1	C: 00000 1
42,2460	C: 00000 1	C: 00000 1	C: 00000 1	C: 71572 1	C: 00006 1	C: 03240 1	C: 00000 1	C: 00000 1
42,2470	C: 00000 1	C: 00000 1	C: 10707 0	C: 03435 0	C: 13070 1	C: 34345 1	C: 00005 1	C: 21616 0
42,2500	C: 25113 0	C: 31713 0	C: 00070 0	C: 20460 1	C: 01065 0	C: 05740 1	C: 11414 0	C: 31463 1
42,2510	C: 07475 0	C: 16051 1	C: 00001 0	C: 03434 1	C: 00047 1	C: 21135 0	C: 77766 0	C: 50711 0
42,2520	C: 00005 1	C: 25006 0	C: 00002 0	C: 23224 1	C: 00014 1	C: 06500 1	C: 00012 1	C: 36455 0
42,2530	C: 04256 1	C: 07071 0	C: 77766 0	C: 60557 0	C: 00005 1	C: 01114 1	C: 00007 0	C: 01247 1
42,2540	C: 04324 0	C: 27600 1	C: 00036 1	C: 20440 0	C: 00035 1	C: 30400 0	C: 23420 0	C: 00000 1
42,2550	C: 01670 1	C: 20000 0	C: 07475 0	C: 16051 1	C: 14400 0	C: 00000 1	C: 05174 0	C: 13261 0
42,2560	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00714 0	C: 31463 1	C: 13412 1	C: 07534 1
42,2570	C: 05605 1	C: 03656 1	C: 00001 0	C: 16170 0	C: 00441 0	C: 34306 0	C: 07176 0	C: 21603 1
42,2600	C: 15340 1	C: 15340 1	C: 01031 1	C: 21032 0	C: 34631 1	C: 23146 0	C: 00636 1	C: 14552 0
42,2610	C: 74552 0	C: 70307 1	C: 05520 0	C: 15312 0	C: 14226 1	C: 31757 0	C: 02476 0	C: 05531 0
42,2620	C: 02727 1	C: 16415 0	C: 00007 0	C: 13734 0	C: 74477 0	C: 50643 0	C: 06265 0	C: 16004 1
42,2630	C: 04426 0	C: 31433 1	C: 34772 1	C: 07016 1	C: 01030 0	C: 33675 0	C: 01046 1	C: 15700 1
42,2640	C: 00321 1	C: 26706 1	C: 04231 0	C: 27400 0	C: 01031 1	C: 21032 0	C: 12172 0	C: 34122 1
42,2650	C: 03453 0	C: 03663 1	C: 03507 0	C: 01045 1	C: 01046 1	C: 00000 1	C: 02316 1	C: 02320 1
42,2660	C: 03663 1	C: 01120 0	C: 01122 1	C: 01124 1	C: 02117 1	C: 02121 1	C: 02140 0	C: 03462 1
42,2670	C: 03453 0	C: 02252 0	C: 01343 1	C: 00000 1	C: 00000 1	C: 01331 1	C: 01332 1	C: 00000 1
42,2700	C: 03002 0	C: 03001 0	C: 00000 1	C: 00314 1	C: 00316 0	C: 03745 1	C: 00000 1	C: 00000 1
42,2710	C: 00000 1	C: 02200 1	C: 02202 0	C: 00000 1	C: 01755 1	C: 00000 1	C: 00000 1	C: 00000 1
42,2720	C: 00000 1	C: 00000 1	C: 02200 1	C: 02202 0	C: 02204 0	C: 03466 0	C: 02256 1	C: 03620 0
42,2730	C: 02200 1	C: 02202 0	C: 00000 1	C: 02302 1	C: 00000 1	C: 00000 1	C: 03605 1	C: 03575 0
42,2740	C: 02347 0	C: 02302 1	C: 02304 1	C: 02306 0	C: 02262 0	C: 03473 1	C: 03534 0	C: 03475 1
42,2750	C: 03453 0	C: 02626 1	C: 03471 0	C: 03453 0	C: 03507 0	C: 03471 0	C: 03473 1	C: 03774 0
42,2760	C: 03666 1	C: 03473 1	C: 03534 0	C: 00013 0	C: 00013 0	C: 00013 0	C: 02206 1	C: 00000 1
42,2770	C: 00000 1	C: 02200 1	C: 02202 0	C: 02204 0	C: 02624 0	C: 03475 1	C: 03664 0	C: 00000 1

DCTAL LISTING FOR PARAGRAPH # 232. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

42,3000	C: 00000 1	C: 00000 1	C: 00735 0	C: 00736 0	C: 00737 1	C: 00735 0	C: 00736 0	C: 00737 1
42,3010	C: 00035 1	C: 00036 1	C: 00900 1	C: 01107 0	C: 01110 0	C: 00000 1	C: 03453 0	C: 02362 1
42,3020	C: 02364 1	C: 02577 1	C: 02252 0	C: 02254 0	C: 02276 0	C: 02272 1	C: 03642 1	C: 03453 0
42,3030	C: 02310 1	C: 00000 1	C: 02200 1	C: 02202 0	C: 00000 1	C: 01236 1	C: 01240 0	C: 01242 1
42,3040	C: 03733 0	C: 03734 1	C: 00700 1	C: 03433 0	C: 03435 0	C: 03437 1	C: 03433 0	C: 03435 0
42,3050	C: 03437 1	C: 03622 1	C: 03524 1	C: 03626 0	C: 02222 1	C: 02224 1	C: 02226 0	C: 03501 0
42,3060	C: 03503 1	C: 03505 1	C: 03433 0	C: 03435 0	C: 03437 1	C: 01347 0	C: 01350 0	C: 00000 1
42,3070	C: 02706 1	C: 02710 0	C: 02712 1	C: 02706 1	C: 02710 0	C: 02712 1	C: 02200 1	C: 02202 0
42,3100	C: 02204 0	C: 03715 1	C: 03711 0	C: 03713 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 02737 0
42,3110	C: 02741 1	C: 02743 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1
42,3120	C: 00000 1	C: 00000 1	C: 00000 1	C: 01045 1	C: 01046 1	C: 01047 0	C: 01050 0	C: 01051 1
42,3130	C: 01052 1	C: 02200 1	C: 02202 0	C: 02204 0	C: 16351 1	C: 00142 0	C: 16347 0	C: 16512 0
42,3140	C: 22347 1	C: 24443 1	C: 00000 1	C: 00553 1	C: 00143 1	C: 06347 1	C: 00000 1	C: 00512 1
42,3150	C: 00012 1	C: 00000 1	C: 24344 1	C: 24503 1	C: 00512 1	C: 00007 0	C: 16347 0	C: 16347 0
42,3160	C: 10347 0	C: 24451 1	C: 16447 1	C: 10347 0	C: 10354 1	C: 20410 0	C: 00304 0	C: 10204 0
42,3170	C: 10452 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00115 1	C: 00115 1	C: 24511 1	C: 22447 0
42,3200	C: 16347 0	C: 00351 0	C: 00204 1	C: 06102 1	C: 00503 1	C: 16347 0	C: 16347 0	C: 16347 0
42,3210	C: 16347 0	C: 16347 0	C: 16347 0	C: 00102 1	C: 02041 0	C: 10347 0	C: 24344 1	C: 24507 0
42,3220	C: 00000 1	C: 16347 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 06143 1	C: 06043 0	C: 24247 0
42,3230	04616 1	C: 60747 0	07257 0	03417 0	07103 1	C: 03271 0	34321 0	54777 1
42,3240	04616 1	C: 61226 0	03435 0	33273 1	56154 1	55007 0	33274 0	56155 0
42,3250	04415 0	34320 1	54777 1	04616 1	C: 61226 0	00006 1	33300 1	52155 1
42,3260	31007 1	04415 0	34317 0	54777 1	04616 1	C: 61226 0	00136 0	C: 25660 0
42,3270	C: 31742 1	C: 01727 1	C: 01217 1	C: 00011 1	C: 32445 0	C: 02104 0	C: 10422 1	C: 05174 0
42,3300	C: 13261 0	C: 00000 1	C: 00062 0	04616 1	C: 60747 0	07257 0	10154 0	03311 1
42,3310	03342 1	63377 1	10000 0	03326 0	03342 1	03342 1	10155 1	03321 1
42,3320	03342 1	63400 0	10000 0	03326 0	03342 1	03342 1	10154 0	33402 1
42,3330	03337 0	43402 0	54154 0	43403 1	54155 1	33401 1	03420 1	54154 0
42,3340	33403 0	03344 0	03404 1	33375 0	07507 1	46245 0	26777 1	04616 1
42,3350	C: 61266 1	34755 1	54124 1	44752 1	50117 0	64317 0	54143 0	04616 1
42,3360	C: 61322 0	03435 0	56155 0	00006 1	73376 1	52155 1	50117 0	34317 0
42,3370	54777 1	04616 1	C: 61266 1	04635 0	C: 62570 1	C: 23147 1	C: 23345 1	C: 77753 0

OCTAL LISTING FOR PARAGRAPH # 233. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

42,3400	C: 41126 1	C: 03343 0	C: 00025 0	C: 37016 1	10155 1	13414 1	13414 1	13410 0
42,3410	00006 1	43302 1	20155 1	13417 1	00006 1	33302 0	13412 1	56002 0
42,3420	54144 1	07103 1	C: 03267 1	00006 1	30155 0	53010 0	04404 0	04404 0
42,3430	34755 1	56156 0	56155 0	56154 1	00144 0	56002 0	54144 1	31010 1
42,3440	00006 1	74751 1	00006 1	74737 1	22155 0	31007 1	54154 0	07103 1
42,3450	C: 03275 1	00144 0	03573 0	07103 1	C: 03534 0	03543 0	34755 1	54156 1
42,3460	33536 1	54154 0	33537 0	56155 0	07307 1	03554 0	52156 1	52124 1
42,3470	31004 1	23007 1	52155 1	07103 1	C: 03534 0	03543 0	43541 0	03561 0
42,3500	56155 0	00006 1	73540 1	20124 1	00006 1	13507 1	04145 0	31005 0
42,3510	23010 1	52155 1	07103 1	C: 03534 0	03543 0	43542 0	03561 0	52124 1
42,3520	20155 1	00006 1	13524 0	04145 0	34755 1	54156 1	07257 0	52155 1
42,3530	50145 1	52001 1	04635 0	C: 62775 0	C: 00006 1	C: 03240 1	C: 00025 0	C: 37100 1
42,3540	C: 13560 0	C: 00073 0	C: 13557 1	56156 0	60000 1	54156 1	34755 1	60155 0
42,3550	54155 1	34755 1	60154 1	56154 1	10154 0	04145 0	00002 0	04145 0
42,3560	00002 0	54156 1	10155 1	64753 1	13566 0	64753 1	60156 0	00006 1
42,3570	63572 1	04145 0	00002 0	43600 0	71000 1	63600 1	10000 0	03603 1
42,3600	C: 77743 1	03603 1	00002 0	46010 1	55041 1	04145 0	04616 1	C: 11254 1
42,3610	06037 0	I: 47001 0	C: 00001 0	C: 21573 0	C: 34041 0	C: 27100 0	I: 46135 1	C: 00050 1
42,3620	C: 65636 1	I: 77775 1	C: 00001 0	C: 16205 1	C: 00015 0	I: 77624 1	C: 33664 0	I: 74375 0
42,3630	C: 02723 0	C: 24001 0	I: 53372 1	C: 02205 1	I: 77650 1	C: 65640 0	I: 77775 1	C: 00001 0
42,3640	I: 53401 1	C: 00001 0	I: 45076 1	C: 47537 0	I: 76521 0	C: 01734 0	I: 71206 0	C: 06522 1
42,3650	C: 02201 0	C: 26203 1	I: 77624 1	C: 47671 1	C: 16205 1	C: 02207 0	I: 45206 1	C: 02205 1
42,3660	I: 77605 1	C: 25771 1	C: 16207 0	I: 41215 1	C: 02205 1	C: 25771 1	C: 26205 1	C: 02205 1
42,3670	I: 63256 0	C: 02205 1	I: 72431 1	C: 06516 0	I: 40045 1	C: 02205 1	C: 65677 1	I: 40056 0
42,3700	C: 65745 1	I: 47206 0	C: 06514 1	I: 57572 0	C: 02205 1	I: 63241 0	C: 06516 0	C: 02205 1
42,3710	I: 75246 0	I: 77735 0	C: 26201 0	C: 00007 0	I: 51041 0	C: 06514 1	C: 65723 1	I: 45345 1
42,3720	C: 06520 0	C: 02201 0	C: 02201 0	I: 47375 0	C: 00001 0	C: 00007 0	I: 77772 0	C: 16205 1
42,3730	C: 02201 0	I: 74356 1	C: 06514 1	I: 71525 0	C: 02201 0	I: 52361 1	C: 06520 0	I: 63241 0
42,3740	C: 02205 1	C: 02205 1	I: 75246 0	I: 77736 0	C: 02203 1	I: 77776 1	31044 0	74747 0
42,3750	00006 1	15472 1	35017 1	05146 1	33767 1	04616 1	C: 20353 0	05563 1
42,3760	05563 1	05155 0	34751 0	05464 1	34740 0	05146 1	03610 0	C: 01463 1
42,3770	C: 25501 1	C: 07463 1	C: 03772 0	C: 03773 1	CKSM 56666 1	0	0	0

OBJECTAL LISTING FOR PARAGRAPH # 234. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

43,2000	50154 1	02002 1	02130 1	02171 1	02330 0	02707 0	02302 1	02120 0
43,2010	02120 0	02367 1	03135 0	13015 1	02361 1	02120 0	02361 1	02361 1
43,2020	02361 1	02401 0	03024 1	02322 0	02325 1	02120 0	02151 0	02163 1
43,2030	02166 1	02414 1	02700 1	03221 0	03142 0	03213 1	02120 0	02037 1
43,2040	03724 0	03726 1	03730 0	03732 1	03045 0	03224 0	03001 0	03006 1
43,2050	02404 0	02617 0	03051 0	03054 0	02746 0	02756 1	02120 0	03227 0
43,2060	02120 0	02120 0	02120 0	02764 0	02773 0	03100 0	03064 0	03073 0
43,2070	02120 0	03061 0	03206 0	02361 1	02120 0	02361 1	11044 1	02120 0
43,2100	30100 0	72127 0	10000 0	02120 0	36007 0	55044 1	30002 0	54155 1
43,2110	44752 1	04154 0	02113 0	00155 0	04364 1	05472 0	34755 1	02105 1
43,2120	04364 1	04635 0	C: 21050 1	31011 0	00006 1	16742 1	02120 0	C: 24100 0
43,2130	02174 1	02133 1	02142 1	02375 1	04616 1	C: 16714 1	04616 1	C: 17716 1
43,2140	02141 1	02121 1	02642 0	04616 1	C: 52343 1	04616 1	C: 17714 0	12150 0
43,2150	02121 1	02642 0	04616 1	C: 53471 0	04616 1	C: 17714 0	02160 1	02121 1
43,2160	05567 0	C: 00523 0	02121 1	05516 0	C: 00013 0	02121 1	05504 0	C: 00013 0
43,2170	02121 1	02174 1	02205 1	02227 1	46007 1	61002 1	00006 1	16742 1
43,2200	62204 0	00006 1	16737 0	02120 0	C: 77713 1	02375 1	02076 1	32225 0
43,2210	04616 1	C: 20334 1	05472 0	12214 0	32226 0	04616 1	C: 20620 1	04616 1
43,2220	C: 17000 1	04616 1	C: 17716 1	05472 0	05472 0	C: 06226 1	C: 12200 0	02642 0
43,2230	02076 1	34745 0	70074 0	10000 0	12114 0	42321 1	00004 0	70110 0
43,2240	54110 0	32260 1	04616 1	C: 20334 1	05472 0	12241 0	04616 1	C: 46000 0
43,2250	32226 0	04615 1	C: 20620 1	34736 1	05105 0	C: 02261 0	C: 66107 1	15472 1
43,2260	C: 06111 0	04616 1	C: 52475 0	02264 0	30167 1	75004 1	10000 0	50000 1
43,2270	54000 0	40000 0	26167 0	04616 1	C: 17714 0	02277 1	05155 0	05567 0
43,2300	C: 00503 1	05155 0	10110 0	12121 0	12121 0	12306 1	42321 1	00004 0
43,2310	70110 0	54110 0	06011 1	34777 1	04616 1	C: 01735 1	05516 0	C: 00126 1
43,2320	12121 0	C: 41000 1	05504 0	C: 00254 1	12121 0	05516 0	C: 00254 1	12121 0
43,2330	02375 1	02076 1	32357 1	04616 1	C: 20334 1	05472 0	02337 1	32360 0
43,2340	04616 1	C: 20620 1	04616 1	C: 17210 1	04616 1	C: 17716 1	05472 0	32356 0
43,2350	04616 1	C: 17323 0	04616 1	C: 17716 1	05472 0	05472 0	C: 02737 0	C: 06335 1
43,2360	C: 12400 0	04433 1	34201 0	00006 1	01007 1	04635 0	C: 62001 1	02076 1
43,2370	34740 0	05105 0	C: 02005 0	C: 64064 1	05155 0	31304 1	00006 1	16742 1

TOTAL LISTING FOR PARAGRAPH # 235. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

43,2400	02120 0	02076 1	04635 0	C: 64002 1	02642 0	30077 1	74743 1	10000 0
43,2410	02120 0	05504 0	C: 00117 0	12420 1	02642 0	02076 1	05504 0	C: 00063 1
43,2420	34741 1	54003 0	32640 1	55755 0	34755 1	55754 1	55756 0	00004 0
43,2430	42641 1	70110 0	54110 0	32641 0	00006 1	02033 0	26110 0	00003 1
43,2440	40077 0	74743 1	10000 0	12575 0	34753 1	55052 0	34751 0	55051 0
43,2450	32635 0	04616 1	C: 20353 0	12603 1	12461 1	12450 0	34751 0	05464 1
43,2460	05155 0	31052 1	55751 1	36242 0	71751 1	10000 0	12577 1	55753 0
43,2470	34752 0	00005 1	02033 0	00005 1	12505 1	32637 1	55045 0	32636 0
43,2500	04616 1	C: 20345 1	12603 1	12470 1	12475 1	34736 1	00006 1	05012 1
43,2510	34752 0	55752 1	05203 0	C: 02003 0	C: 52104 0	00003 1	40077 0	74743 1
43,2520	10000 0	12121 0	36242 0	71751 1	10000 0	12542 1	32631 1	04616 1
43,2530	C: 20334 1	12603 1	12534 0	12526 0	32632 1	04616 1	C: 20334 1	12603 1
43,2540	12556 1	12526 0	32633 0	04616 1	C: 20334 1	12603 1	12550 1	12542 1
43,2550	32634 1	04616 1	C: 20334 1	12603 1	12556 1	12542 1	34755 1	55755 0
43,2560	35000 1	04616 1	C: 01735 1	32640 1	55755 0	34755 1	55754 1	36242 0
43,2570	71751 1	10000 0	44753 0	64752 0	12462 1	34766 1	55755 0	34752 0
43,2600	55753 0	36242 0	12511 1	34755 1	55755 0	34744 1	04616 1	C: 01735 1
43,2610	00004 0	44736 0	00006 1	03012 1	05516 0	C: 00063 1	05472 0	34741 1
43,2620	54003 0	34755 1	55755 0	34746 0	04616 1	C: 01735 1	05516 0	C: 00117 0
43,2630	12121 0	C: 04110 0	C: 04116 0	C: 04102 0	C: 04103 1	C: 01014 0	C: 14431 1	C: 00201 1
43,2640	C: 00145 1	C: 00444 0	40077 0	74741 0	10000 0	02120 0	30101 1	74741 0
43,2650	10000 0	02120 0	40103 1	74746 1	10000 0	12662 0	40107 0	74735 0
43,2660	10000 0	02120 0	40075 1	74747 0	10000 0	12672 1	30074 1	74745 1
43,2670	10000 0	02120 0	41011 1	62677 0	00006 1	12120 1	00002 0	C: 00026 0
43,2700	02123 0	02076 1	34740 0	05105 0	C: 03606 1	C: 64104 0	05155 0	02123 0
43,2710	34763 1	00006 1	02012 0	10000 0	12120 1	34355 0	00006 1	06031 0
43,2720	74355 1	00006 1	12724 0	12120 1	02076 1	32225 0	04616 1	C: 20334 1
43,2730	05472 0	02722 0	32745 0	04616 1	C: 20620 1	34746 0	00006 1	05012 1
43,2740	34752 0	05203 0	C: 02035 0	C: 64100 1	15472 1	C: 12600 1	02076 1	35021 1
43,2750	05146 1	00006 1	32755 1	05165 0	C: 03242 0	C: 44104 1	02076 1	34752 0
43,2760	05203 0	C: 03674 1	C: 60107 1	05155 0	02123 0	02076 1	34737 0	05105 0
43,2770	C: 02022 0	C: 54104 0	05155 0	02076 1	35021 1	05105 0	C: 02656 0	C: 10104 0

JCTAL LISTING FOR PARAGRAPH # 236, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD. "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

43,3000	15155 1	00004 0	40111 1	74735 0	26111 1	12121 0	00004 0	44735 0
43,3010	70111 1	54111 1	04674 0	C: 40153 1	02121 1	02123 0	02076 1	34737 0
43,3020	05105 0	C: 02103 1	C: 46106 1	05155 0	33044 1	70074 0	00006 1	12121 0
43,3030	05516 0	C: 00010 0	05516 0	C: 00006 1	05516 0	C: 00037 0	34747 1	70075 1
43,3040	00006 1	12121 0	04635 0	C: 64054 1	C: 00500 1	33050 1	54335 0	02121 1
43,3050	C: 03707 1	05516 0	C: 00026 0	03056 1	05504 0	C: 00026 0	05516 0	C: 00030 1
43,3060	12121 0	05504 0	C: 00030 1	02121 1	02123 0	02076 1	37710 0	05105 0
43,3070	C: 02002 1	C: 76065 0	05155 0	00004 0	44753 0	70101 0	54101 0	02121 1
43,3100	02123 0	02076 1	35021 1	05146 1	34753 1	55376 0	34755 1	55362 0
43,3110	33245 1	55361 0	03522 1	23372 0	23373 1	33244 0	54156 1	33130 0
43,3120	04616 1	C: 20334 1	03125 1	03633 1	03115 1	33245 1	55371 1	05472 0
43,3130	C: 01201 0	31376 1	00006 1	13336 0	03522 1	02076 1	35021 1	05146 1
43,3140	04635 0	C: 40004 1	34737 0	05105 0	C: 03147 0	C: 66103 0	05155 0	06037 0
43,3150	I: 77624 1	C: 27414 0	I: 43014 0	C: 04063 0	C: 04304 1	C: 67160 1	I: 77614 1	C: 04263 1
43,3160	I: 77776 1	33204 1	05544 1	C: 01626 1	C: 01554 1	00003 1	06037 0	I: 77624 1
43,3170	C: 26760 1	I: 45154 0	C: 02030 0	C: 26114 1	I: 77776 1	33205 0	50120 1	54052 1
43,3200	04635 0	C: 27425 1	I: 77634 0	C: 21050 1	C: 00051 0	C: 67202 0	05504 0	C: 00221 0
43,3210	34755 1	04635 0	C: 10040 1	02076 1	35017 1	05105 0	C: 02007 1	C: 62064 1
43,3220	05155 0	05504 0	C: 00115 1	02121 1	05516 0	C: 00115 1	02121 1	02076 1
43,3230	04635 0	C: 60000 1	C: 00061 0	C: 01373 1	C: 01461 0	C: 01773 0	C: 00060 1	C: 60017 1
43,3240	C: 17777 0	C: 25252 0	C: 52400 1	C: 76777 1	C: 01371 0	C: 03336 1	31360 0	00006 1
43,3250	13257 0	00006 1	31376 1	51377 0	52001 1	34755 1	55360 1	00004 0
43,3260	30002 0	55357 0	55363 1	25365 0	05571 1	C: 01102 0	11362 0	34755 1
43,3270	55362 0	03336 1	01357 1	10000 0	13246 0	13246 0	10000 0	13246 0
43,3300	00002 0	00006 1	23371 0	03332 0	11362 0	03312 1	03303 1	03312 1
43,3310	25366 0	01371 0	65660 1	00006 1	63316 0	03267 1	25366 0	64757 0
43,3320	50000 1	03322 1	01371 0	01371 0	01371 0	03337 0	03520 0	01371 0
43,3330	01371 0	01371 0	00006 1	23361 1	04635 0	C: 03214 0	03301 0	34753 1
43,3340	55372 1	34755 1	54003 0	33234 1	55377 1	35012 1	55373 0	03367 0
43,3350	25007 0	55377 1	35012 1	55373 0	03367 0	35007 0	55377 1	33235 0
43,3360	55373 0	03367 0	55372 1	33232 1	55377 1	33233 0	55373 0	00004 0
43,3370	30003 1	55374 1	00006 1	51377 0	30001 0	53376 0	31377 0	55360 1

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4000	TO	4045	153	5360	TO	5425	1299	6523	TO	6556	1020	00,2236	TO	00,2276	1054
4046	TO	4065	154	5426	TO	5435	1300	6557	TO	6624	1021	00,2277	TO	00,2331	1055
4066	TO	4101	155	5436	TO	5444	1304			6625	1022	00,2332	TO	00,2352	1056
4102	TO	4123	381	5445	TO	5455	1306	6626	TO	6666	1023	00,2353	TO	00,2421	1057
4124	TO	4144	439			5456	1307	6667	TO	6722	1024	00,2422	TO	00,2436	1058
4145	TO	4153	446	5457	TO	5463	1309	6723	TO	6746	1025	00,2437	TO	00,2477	1059
4154	TO	4203	452	5464	TO	5503	1354	6747	TO	7002	1026	00,2500	TO	00,2537	1060
4204	TO	4206	454	5504	TO	5532	1375	7003	TO	7004	1027	00,2540	TO	00,2567	1061
4207	TO	4242	455	5533	TO	5543	1376	7005	TO	7061	1028	00,2570	TO	00,2607	1062
4243	TO	4302	456	5544	TO	5562	1379	7062	TO	7070	1029	00,2610	TO	00,2624	1063
4303	TO	4335	460	5563	TO	5566	1380	7071	TO	7102	1030	00,2625	TO	00,2641	1064
4336	TO	4377	461	5567	TO	5620	1381	7103	TO	7135	1031	00,2642	TO	00,2653	1065
4400	TO	4436	462	5621	TO	5635	1382	7136	TO	7153	1032	00,2654	TO	00,2720	1066
4437	TO	4461	464	5636	TO	5714	1383	7154	TO	7214	1033	00,2721	TO	00,2747	1067
4462	TO	4511	465	5715	TO	5752	1384	7215	TO	7236	1034	00,2750	TO	00,3006	1068
4512	TO	4522	521	5753	TO	5755	1404	7237	TO	7254	1035	00,3007	TO	00,3022	1069
4523	TO	4536	522	5756	TO	5774	1405	7255	TO	7315	1036	00,3023	TO	00,3072	1070
4537	TO	4563	523	5775	TO	5776	28	7316	TO	7330	1037			00,3073	1071
4564	TO	4577	524			6000	40	7331	TO	7341	1038	00,3074	TO	00,3132	1072
4600	TO	4615	525	6001	TO	6010	224	7342	TO	7400	1039	00,3133	TO	00,3150	1073
4616	TO	4644	998	6011	TO	6021	516	7401	TO	7424	1040	00,3151	TO	00,3173	1074
4645	TO	4673	999	6022	TO	6026	593	7425	TO	7457	1041	00,3174	TO	00,3206	1075
4674	TO	4726	1000	6027	TO	6036	750	7460	TO	7525	1042	00,3207	TO	00,3231	1076
4727	TO	4731	1001	6037	TO	6056	1002	7526	TO	7571	1043	00,3232	TO	00,3277	1077
4732	TO	4762	1095	6057	TO	6102	1003	7572	TO	7623	1044	00,3200	TO	00,3342	1078
4763	TO	5010	1096	6103	TO	6114	1004	7624	TO	7654	1045	00,3343	TO	00,3404	1079
5011	TO	5031	1097	6115	TO	6143	1005	7655	TO	7707	1046	00,3405	TO	00,3455	1080
5032	TO	5071	1102	6144	TO	6212	1006	7710	TO	7722	1097	00,3456	TO	00,3516	1081
5072	TO	5127	1103	6213	TO	6214	1007	7723	TO	7747	1098	00,3517	TO	00,3552	1082
5130	TO	5132	1104	6215	TO	6246	1008	7750	TO	7753	1302	00,3553	TO	00,3607	1083
5133	TO	5164	1105	6247	TO	6262	1009	7754	TO	7755	1459	00,3610	TO	00,3651	1084
5165	TO	5172	1116	6263	TO	6273	1010	7756	TO	7757	28	00,3652	TO	00,3713	1085
5173	TO	5234	1119	6274	TO	6333	1011	00,2000	TO	00,2016	1013	00,3714	TO	00,3734	1086
		5235	1120	6334	TO	6353	1012	00,2017	TO	00,2041	1047	00,3735	TO	00,3767	1377
5236	TO	5260	1121	6354	TO	6371	1014	00,2042	TO	00,2100	1048	00,3770	TO	00,3773	1378
5261	TO	5276	1129	6372	TO	6413	1015	00,2101	TO	00,2120	1049	00,3774	TO	00,3775	28
5277	TO	5300	1130	6414	TO	6433	1016	00,2121	TO	00,2143	1050	01,2000	TO	01,2001	43
5301	TO	5310	1131	6434	TO	6457	1017	00,2144	TO	00,2171	1051	01,2002	TO	01,2031	239
5311	TO	5326	1294	6460	TO	6467	1018	00,2172	TO	00,2213	1052	01,2032	TO	01,2070	240
5327	TO	5357	1298	6470	TO	6522	1019	00,2214	TO	00,2235	1053	01,2071	TO	01,2133	241

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01,2206	293	04,2024 TO 04,2027	224	05,2000	43	06,2024 TO 06,2074	157
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01,2266 TO 01,2342	295	04,2040 TO 04,2072	227	05,2021 TO 05,2064	52	06,2116 TO 06,2127	159
01,2343	296	04,2073 TO 04,2142	228	05,2065	193	06,2130 TO 06,2171	160
01,2344 TO 01,2371	1087	04,2143 TO 04,2205	229	05,2066 TO 05,2136	194	06,2172 TO 06,2207	161
01,2372 TO 01,2426	1088	04,2206 TO 04,2253	230	05,2137 TO 05,2171	195	06,2210 TO 06,2226	162
01,2427 TO 01,2446	1089	04,2254 TO 04,2322	231	05,2172 TO 05,2231	196	06,2227	163
01,2447 TO 01,2466	1090	04,2323 TO 04,2365	232	05,2232 TO 05,2275	198	06,2230 TO 06,2274	164
01,2467 TO 01,2515	1091	04,2366 TO 04,2424	233	05,2276 TO 05,2302	199	06,2275 TO 06,2342	165
01,2516 TO 01,2532	1092	04,2425 TO 04,2462	234	05,2303 TO 05,2343	200	06,2343 TO 06,2373	166
01,2533 TO 01,2554	1093	04,2463 TO 04,2535	235	05,2344 TO 05,2356	201	06,2374 TO 06,2415	167
01,2555 TO 01,2600	1094	04,2536 TO 04,2575	249	05,2357 TO 05,2406	202	06,2416 TO 06,2433	168
01,2601 TO 01,2635	1106	04,2576 TO 04,2614	370	05,2407 TO 05,2445	204	06,2434 TO 06,2457	169
01,2636 TO 01,2703	1107	04,2615 TO 04,2630	371	05,2446	205	06,2460 TO 06,2513	170
01,2704 TO 01,2757	1108	04,2631 TO 04,2635	372	05,2447 TO 05,2510	211	06,2514 TO 06,2532	171
01,2760 TO 01,2771	1109	04,2636 TO 04,2646	457	05,2511 TO 05,2565	212	06,2533 TO 06,2555	172
01,2772 TO 01,3022	1110	04,2647 TO 04,2655	464	05,2566 TO 05,2643	213	06,2556 TO 06,2564	173
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01,3103 TO 01,3150	1113	04,3013 TO 04,3026	983	05,2734 TO 05,3010	216	06,2622 TO 06,2647	176
01,3151 TO 01,3153	1114	04,3027 TO 04,3063	1185	05,3011 TO 05,3053	217	06,2650 TO 06,2670	177
01,3154 TO 01,3205	1115	04,3064 TO 04,3076	1186	05,3057 TO 05,3106	218	06,2671 TO 06,2702	178
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01,3231 TO 01,3257	1122	04,3130 TO 04,3164	1188	05,3154 TO 05,3223	220	06,2720 TO 06,2754	180
01,3260 TO 01,3307	1123	04,3165 TO 04,3211	1225	05,3224 TO 05,3301	221	06,2755 TO 06,3005	181
01,3310 TO 01,3353	1124	04,3212 TO 04,3252	1226	05,3302 TO 05,3355	222	06,3006 TO 06,3025	182
01,3354 TO 01,3370	1125	04,3253 TO 04,3270	1332	05,3356 TO 05,3401	223	06,3026 TO 06,3033	183
01,3371 TO 01,3373	1126	04,3271 TO 04,3273	1333	05,3402 TO 05,3404	830	06,3034 TO 06,3051	184
01,3374 TO 01,3406	1127	04,3274 TO 04,3316	1338	05,3405 TO 05,3452	831	06,3052 TO 06,3070	185
01,3407 TO 01,3451	1128	04,3317 TO 04,3371	1339	05,3453 TO 05,3501	832	06,3071 TO 06,3110	186
01,3452 TO 01,3500	1131	04,3372 TO 04,3400	1340	05,3502 TO 05,3505	852	06,3111 TO 06,3131	187
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01,3566 TO 01,3610	1304	04,3500 TO 04,3535	1391	05,3610 TO 05,3651	993	06,3156 TO 06,3222	191
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01,3662 TO 01,3706	1306	04,3601 TO 04,3647	1393	05,3707 TO 05,3756	996	06,3263 TO 06,3326	326
01,3707 TO 01,3745	1307	04,3650 TO 04,3714	1394	05,3757 TO 05,3771	997	06,3327	327
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06,3425 TO 06,3453	331	07,3431 TO 07,3463	1322	10,3562 TO 10,3572	1382	12,2156 TO 12,2235	1176
06,3454 TO 06,3506	332	07,3464 TO 07,3526	1323	10,3573 TO 10,3623	1397	12,2236 TO 12,2307	1177
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06,3555 TO 06,3624	334	07,3577 TO 07,3603	1325	10,3666 TO 10,3704	1399	12,2370 TO 12,2420	1179
06,3625 TO 06,3643	335	07,3604 TO 07,3630	1326	10,3705 TO 10,3711	1400	12,2421 TO 12,2502	1180
06,3644 TO 06,3712	336	07,3631 TO 07,3661	1327	10,3712 TO 10,3746	1401	12,2503 TO 12,2535	1181
06,3713 TO 06,3714	337	07,3662 TO 07,3711	1328	10,3747 TO 10,3774	1402	12,2536 TO 12,2611	1182
06,3715 TO 06,3752	692	07,3712 TO 07,3715	1329	10,3775 TO 10,3776	29	12,2612 TO 12,2652	1183
06,3753 TO 06,3763	1147	07,3716 TO 07,3743	1330	11,2000 TO 11,2036	686	12,2653 TO 12,2731	1184
06,3764 TO 06,3765	29	07,3744 TO 07,3772	1331	11,2037 TO 11,2116	687	12,2732 TO 12,2766	1186
07,2000 TO 07,2043	244	07,3773 TO 07,3774	29	11,2117 TO 11,2161	688	12,2767 TO 12,3041	1189
07,2044 TO 07,2057	245	10,2000 TO 10,2027	693	11,2162 TO 11,2233	689	12,3042 TO 12,3117	1190
07,2060 TO 07,2127	246	10,2030 TO 10,2065	1265	11,2234 TO 11,2274	690	12,3120 TO 12,3173	1191
07,2130 TO 07,2141	247	10,2066 TO 10,2142	1266	11,2275 TO 11,2332	820	12,3174 TO 12,3211	1192
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07,2202 TO 07,2254	252	10,2224 TO 10,2242	1300	11,2376 TO 11,2451	1227	12,3353 TO 12,3427	1195
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07,2332 TO 07,2401	254	10,2312 TO 10,2325	1302	11,2476 TO 11,2515	1229	12,3502 TO 12,3546	1197
07,2402 TO 07,2453	255	10,2326 TO 10,2330	1354	11,2516 TO 11,2574	1230	12,3547 TO 12,3627	1198
07,2454 TO 07,2460	256	10,2331 TO 10,2374	1355	11,2575 TO 11,2656	1231	12,3630 TO 12,3673	1199
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07,2667 TO 07,2700	851	10,2633 TO 10,2677	1361	11,3231 TO 11,3312	1237	13,2026 TO 13,2065	236
07,2701 TO 07,2713	852	10,2700 TO 10,2737	1362	11,3313 TO 11,3374	1238	13,2066 TO 13,2067	237
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07,3144 TO 07,3207	1315	10,3243 TO 10,3310	1368	11,3703 TO 11,3704	1244	13,2233 TO 13,2314	710
07,3210 TO 07,3233	1316	10,3311 TO 10,3361	1369	11,3705 TO 11,3763	1245	13,2315 TO 13,2350	711
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07,3273 TO 07,3322	1318	10,3421 TO 10,3470	1371	11,3776	29	13,2400 TO 13,2421	1134
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13,2550 TO 13,2557	1138	14,3066 TO 14,3146	942	15,3254 TO 15,3313	974	16,3713 TO 16,3734	1471
13,2560 TO 13,2603	1139	14,3147 TO 14,3163	943	15,3314 TO 15,3366	975	16,3735 TO 16,3765	1476
13,2604 TO 13,2620	1209	14,3164 TO 14,3223	944	15,3367 TO 15,3446	976	16,3766 TO 16,3771	1477
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13,3213 TO 13,3256	1217	14,3617 TO 14,3647	953	15,3664 TO 15,3705	985	17,2237 TO 17,2314	1445
13,3257 TO 13,3336	1218	14,3650 TO 14,3667	954	15,3706 TO 15,3767	986	17,2315 TO 17,2365	1446
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13,3421 TO 13,3466	1220	14,3724 TO 14,3773	956	15,3776	31	17,2450 TO 17,2531	1448
13,3467 TO 13,3524	1221	14,3774 TO 14,3775	31	16,2000 TO 16,2023	1410	17,2532 TO 17,2600	1449
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13,3553 TO 13,3600	1223	15,2046 TO 15,2047	251	16,2076 TO 16,2153	1412	17,2626 TO 17,2660	1451
13,3601 TO 13,3656	1224	15,2050 TO 15,2054	927	16,2154 TO 16,2212	1413	17,2661 TO 17,2726	1452
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14,2314 TO 14,2346	51	15,2534 TO 15,2562	962	16,3031 TO 16,3070	1431	17,3501 TO 17,3542	1465
14,2347 TO 14,2373	852	15,2563 TO 15,2574	963	16,3071 TO 16,3124	1432	17,3543 TO 17,3606	1466
14,2374 TO 14,2444	853	15,2575 TO 15,2640	964	16,3125 TO 16,3177	1433	17,3607 TO 17,3627	1467
14,2445 TO 14,2445	854	15,2641 TO 15,2715	965	16,3200 TO 16,3260	1434	17,3630 TO 17,3671	1468
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20,2151 TO 20,2205	1408	21,2451 TO 21,2527	902	22,3203 TO 22,3212	368	23,3220 TO 23,3246	1157
20,2206 TO 20,2225	1409	21,2530 TO 21,2607	903	22,3213 TO 22,3241	369	23,3247 TO 23,3303	1249
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20,2240 TO 20,2304	1415	21,2670 TO 21,2751	905	22,3301 TO 22,3355	714	23,3320 TO 23,3352	1251
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20,2322 TO 20,2364	1418	21,3034 TO 21,3076	907	22,3430 TO 22,3464	716	23,3420 TO 23,3440	1254
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20,2440 TO 20,2446	1420	21,3123 TO 21,3174	1473	22,3540 TO 22,3550	718	23,3501 TO 23,3532	1256
20,2447 TO 20,2476	1486	21,3175 TO 21,3242	1474	22,3551 TO 22,3611	720	23,3533 TO 23,3536	1257
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20,2676 TO 20,2755	1490	21,3335 TO 21,3407	1479	22,3704 TO 22,3710	864	23,3646 TO 23,3670	1262
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20,2776 TO 20,3016	1492	21,3441 TO 21,3477	1481	22,3737 TO 22,3772	1158	23,3716 TO 23,3765	1264
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20,3762 TO 20,3771	1506	22,2312 TO 22,2357	356	23,2432 TO 23,2442	841	24,2451 TO 24,2472	504
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21,2000 TO 21,2005	42	22,2422 TO 22,2503	358	23,2461 TO 23,2510	867	24,2553 TO 24,2632	506
21,2006 TO 21,2046	329	22,2504 TO 22,2546	359	23,2511 TO 23,2530	1100	24,2633 TO 24,2673	507
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24,3226 TO 24,3254	516	25,2705 TO 25,2714	549	26,2626 TO 26,2707	578	27,3031 TO 27,3112	778
24,3255 TO 24,3332	565	25,2715 TO 25,2762	550	26,2710 TO 26,2767	579	27,3113 TO 27,3174	779
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25,2306 TO 25,2322	535	26,2121 TO 26,2122	341	27,2200 TO 27,2200	750	30,2255 TO 30,2320	841
25,2323 TO 25,2342	536	26,2123 TO 26,2145	473	27,2201 TO 27,2245	751	30,2321 TO 30,2371	845
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25,2432 TO 25,2441	540	26,2266 TO 26,2270	477	27,2413 TO 27,2446	769	30,2620 TO 30,2701	849
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30,3164 TO 30,3214	912	31,3302 TO 31,3331	811	32,3540 TO 32,3551	832	33,3476 TO 33,3541	889
30,3215 TO 30,3257	913	31,3332 TO 31,3405	812	32,3552 TO 32,3627	833	33,3542 TO 33,3606	890
30,3260 TO 30,3325	914	31,3406 TO 31,3453	813	32,3630 TO 32,3703	834	33,3607 TO 33,3615	891
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30,3376 TO 30,3437	917	31,3543 TO 31,3552	816	32,3765 TO 32,3767	837	33,3670 TO 33,3726	895
30,3440 TO 30,3502	918	31,3553 TO 31,3577	823	32,3770 TO 32,3772	866	33,3727 TO 33,3775	896
30,3503 TO 30,3532	919	31,3600 TO 31,3650	824	32,3773 TO 32,3774	34	33,3776	897
30,3533 TO 30,3577	920	31,3651 TO 31,3714	825	33,2000 TO 33,2001	39	34,2000 TO 34,2005	616
30,3600 TO 30,3621	921	31,3715 TO 31,3745	826	33,2002 TO 33,2024	41	34,2006 TO 34,2056	617
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31,2207 TO 31,2215	792	32,2325 TO 32,2365	495	33,2415 TO 33,2432	867	34,3052 TO 34,3061	643
31,2216 TO 31,2245	793	32,2366 TO 32,2430	569	33,2433 TO 33,2437	868	34,3062 TO 34,3077	644
31,2246 TO 31,2307	794	32,2431 TO 32,2512	570	33,2440 TO 33,2446	872	34,3100 TO 34,3117	645
31,2310 TO 31,2347	795	32,2513 TO 32,2546	571	33,2447 TO 33,2460	873	34,3120 TO 34,3132	646
31,2350 TO 31,2416	796	32,2547 TO 32,2600	600	33,2461 TO 33,2526	874	34,3133 TO 34,3204	647
31,2417	797	32,2601 TO 32,2634	601	33,2527 TO 33,2545	875	34,3205 TO 34,3266	648
31,2420 TO 31,2437	798	32,2635 TO 32,2701	602	33,2546 TO 33,2620	876	34,3267 TO 34,3270	649
31,2440 TO 31,2466	799	32,2702 TO 32,2740	603	33,2621 TO 33,2663	877	34,3271 TO 34,3313	724
31,2467 TO 31,2536	800	32,2741 TO 32,2775	604	33,2664 TO 33,2721	878	34,3314 TO 34,3375	725
31,2537 TO 31,2602	801	32,2776 TO 32,3031	785	33,2722 TO 33,2727	879	34,3376 TO 34,3443	726
31,2603 TO 31,2640	802	32,3032 TO 32,3101	786	33,2730 TO 33,3005	880	34,3444 TO 34,3520	727
31,2641 TO 31,2677	803	32,3102 TO 32,3154	787	33,3006 TO 33,3031	881	34,3521 TO 34,3535	728
31,2700 TO 31,2745	804	32,3155 TO 32,3227	788	33,3032 TO 33,3104	882	34,3536 TO 34,3604	729
31,2746 TO 31,3002	805	32,3230 TO 32,3262	789	33,3105 TO 33,3154	883	34,3605 TO 34,3641	730
31,3003 TO 31,3046	806	32,3263 TO 32,3313	816	33,3155 TO 33,3226	884	34,3642 TO 34,3713	843
31,3047 TO 31,3117	807	32,3314 TO 32,3372	817	33,3227 TO 33,3304	885	34,3714 TO 34,3715	844
31,3120 TO 31,3151	808	32,3373 TO 32,3454	818	33,3305 TO 33,3354	886	34,3716 TO 34,3744	893

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34,3775 TO 34,3776	34	36,2022 TO 36,2043	731	37,2460 TO 37,2477	381	40,3111 TO 40,3161	433
35,2000 TO 35,2020	614	36,2044 TO 36,2110	732	37,2500 TO 37,2535	383	40,3162 TO 40,3177	434
35,2021 TO 35,2026	615	36,2111 TO 36,2146	733	37,2536 TO 37,2576	384	40,3200 TO 40,3250	441
35,2027 TO 35,2066	621	36,2147 TO 36,2224	734	37,2577 TO 37,2656	385	40,3251 TO 40,3305	442
35,2067 TO 35,2150	622	36,2225 TO 36,2272	735	37,2657 TO 37,2736	386	40,3306 TO 40,3321	443
35,2151 TO 35,2215	623	36,2273 TO 36,2337	736	37,2737 TO 37,3004	387	40,3322 TO 40,3346	444
35,2216 TO 35,2274	627	36,2340 TO 36,2377	737	37,3005 TO 37,3057	388	40,3347 TO 40,3415	445
35,2275 TO 35,2346	628	36,2400 TO 36,2447	738	37,3060 TO 37,3112	389	40,3416 TO 40,3441	446
35,2347 TO 35,2367	629	36,2450 TO 36,2517	739	37,3113 TO 37,3132	703	40,3442 TO 40,3451	448
35,2370 TO 35,2407	630	36,2520 TO 36,2564	740	37,3133 TO 37,3211	704	40,3452 TO 40,3460	449
35,2410 TO 35,2431	631	36,2565 TO 36,2570	741	37,3212 TO 37,3273	705	40,3461 TO 40,3504	450
35,2432 TO 35,2447	650	36,2571 TO 36,2633	742	37,3274 TO 37,3351	706	40,3505 TO 40,3505	456
35,2450 TO 35,2503	652	36,2634 TO 36,2673	743	37,3352 TO 37,3407	707	40,3506 TO 40,3533	457
35,2504 TO 35,2544	653	36,2674 TO 36,2742	744	37,3410 TO 37,3440	857	40,3534 TO 40,3576	458
35,2545 TO 35,2600	661	36,2743 TO 36,3007	745	37,3441 TO 37,3504	858	40,3577 TO 40,3602	459
35,2601 TO 35,2661	662	36,3010 TO 36,3052	746	37,3505 TO 37,3540	859	40,3603 TO 40,3650	470
35,2662 TO 35,2724	663	36,3053 TO 36,3120	747	37,3541 TO 37,3541	869	40,3651 TO 40,3673	471
35,2725 TO 35,2763	666	36,3121 TO 36,3132	748	37,3542 TO 37,3613	870	40,3674 TO 40,3712	703
35,2764 TO 35,3043	667	36,3133 TO 36,3146	749	37,3614 TO 37,3654	871	40,3713 TO 40,3714	36
35,3044 TO 35,3125	668	36,3147 TO 36,3170	753	37,3655 TO 37,3713	1335	41,2000 TO 41,2033	406
35,3126 TO 35,3207	669	36,3171 TO 36,3235	754	37,3714 TO 37,3747	1336	41,2034 TO 41,2112	407
35,3210 TO 35,3271	670	36,3236 TO 36,3305	755	37,3750 TO 37,3773	1337	41,2113 TO 41,2167	408
35,3272 TO 35,3273	671	36,3306 TO 36,3351	756	37,3774 TO 37,3775	36	41,2170 TO 41,2220	409
35,3274 TO 35,3305	672	36,3352 TO 36,3420	757	40,2000 TO 40,2046	299	41,2221 TO 41,2264	410
35,3306 TO 35,3363	673	36,3421 TO 36,3466	758	40,2047 TO 40,2076	300	41,2265 TO 41,2342	411
35,3364 TO 35,3376	674	36,3467 TO 36,3537	759	40,2077 TO 40,2150	398	41,2343 TO 41,2352	412
35,3377 TO 35,3441	675	36,3540 TO 36,3605	760	40,2151 TO 40,2216	399	41,2353 TO 41,2430	414
35,3442 TO 35,3446	676	36,3606 TO 36,3662	761	40,2217 TO 40,2277	400	41,2431 TO 41,2475	415
35,3447 TO 35,3521	677	36,3663 TO 36,3733	762	40,2300 TO 40,2351	401	41,2476 TO 41,2550	416
35,3522 TO 35,3567	678	36,3734 TO 36,3764	763	40,2352 TO 40,2424	402	41,2551 TO 41,2615	417
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35,3606 TO 35,3652	680	37,2000 TO 37,2001	44	40,2467 TO 40,2542	404	41,2660 TO 41,2737	426
35,3653 TO 35,3673	681	37,2002 TO 37,2036	373	40,2543 TO 40,2614	405	41,2740 TO 41,3013	427
35,3674 TO 35,3703	682	37,2037 TO 37,2117	374	40,2615 TO 40,2655	418	41,3014 TO 41,3066	428
35,3704 TO 35,3722	683	37,2120 TO 37,2171	375	40,2656 TO 40,2722	419	41,3067 TO 41,3140	429
35,3723 TO 35,3746	684	37,2172 TO 37,2251	376	40,2723 TO 40,2766	420	41,3141 TO 41,3210	430
35,3747 TO 35,3775	748	37,2252 TO 37,2274	377	40,2767 TO 40,2770	421	41,3211 TO 41,3227	431
35,3776 TO 35,3776	35	37,2275 TO 37,2346	378	40,2771 TO 40,3007	424	41,3230 TO 41,3255	437
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41,3353 TO 41,3362	440	42,3607 TO 42,3670	487	43,3337 TO 43,3412	1288		
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41,3613 TO 41,3656	467	43,2130 TO 43,2162	265	43,3744 TO 43,3751	1389		
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THE SUBROUTINES IN THIS PROGRAM ARE AS FOLLOWS:

LUMERASE.120
LNYAIDE .001
LEMP20S .127
LEMP30S .103
KISSING .050
FLY .132
LEMP50S .115
SKIPPER .087
LMDAP .015

THE ASSEMBLY WAS GOOD AND MANUFACTURABLE. NO LINES WERE CUSSSED.

BINARY RECORDS FOR "LMY99.R001" NOT STORED BECAUSE: A FILE WITH THIS NAME ALREADY EXISTS.